STUDY ON HIGH JUMPERS ON THE WORD

GHEORGHE DANIEL[1]

Abstract

Purpose. This work has proposed that purpose, to separate the essential data for selection and training high performance athletes in the perspective of major international competition.

Methods. As research methods I used the case study, observation and statistics.

Results. For the final selection to the Olympics, to accede to one of the medals, the athlete's performance should be over 2.30 m. If we have several athletes with special performances, we should focus primarily on those with a richer experience, with several international competitions, so a little older.

Conclusions. In 2 of the 5 Olympics, the performance for the first place is equal to the average top, which confirms first hypothesis. The top average age is 24 years and 7 months which confirms the second hypothesis. The third hypothesis is confirmed with the observation that for the Olympics the performance is the supreme criterion, the height isn't a decisive criterion (there are medalists with height below top average). The hypothesis of the athlete's weight isn't confirmed, recording an average of 77,36 kg. We only have significant correlation between athlete's height and weight.

Key words: athletes, performance, statistics.

Introduction

The present study is an analysis of the finalists from the last two Olympics and the first three of the last five Olympics. Also were processed and analyzed the data of the world's top athletes at high jump. Based on these data, it could be extracted the exceptions, the constant elements in performance and somatic data.

The effort provided by the high jumpers , is a type of anaerobic alactacid.

The small phosphocreatine (PC) deposit is that who supplies power for muscles for 7 to maximum 10 seconds. (T.O. Bompa. 2001)

In evaluating athletes we must always take into account two fundamental components of human performance in general: the biological and psychological.

In this way the body composition corresponds to the structural components of the human body composed of elements of very different nature and density (bone, fat, water, protein), maintained in constant proportion and functionally integrated. (M. Cordun, 2011) In this way the precise knowledge of the athlete's height and weight and is welcome framing it in a test pattern.

Many times in the sport's practice, While coaches respected the specific training method's guideline, worked with athletes selected by the constitutional model, they did not achieved the expected performance, because they neglected psychological component.

The goal of mental preparation for competition, consists in forming for athletes, of a system of attitudes and behavior, with operational and regulative character through which it is flexible and adapts to contest's situations and opponents actions. (I. Holdevici, M. Epuran, F. Toniţa, 2008)

Purpose

This work has proposed that purpose, to separate the essential data for selection and training high performance athletes in the perspective of major international competition.

Hypotheses

In this study, I begun with the following hypotheses in order to be tested:

- The word-class athletic performances at the Olympics, for the first three places, are not significantly different from the average performance of world top;

- The age of athletes who participate in the Olympics, are not different from the average of the world top and is somewhere over 20 years;

- Height of the worldwide athletes is located somewhere on average to 190 cm.

- The athlete's weight, from high jump, is located somewhere on average between 85 and 90 kg.

- Isn't significant correlations between the indicators mentioned above.

Methods

As research methods I used the case study, observation and statistics.

Content of the work

It has been processed the data of 39 athletes who participated in the last five Olympics and of the world top 103 jumpers. After harvest data, resulted 214 performances, 214 age data and 193 data on height and weight of athletes in high jump.

Data were included in Microsoft Excel of Microsoft Office and processed on the following statistical indicators: number of cases, the maximum value, minimum value, amplitude, mode, median, average, quartile 1, 3, quartile difference, dispersion, average of absolute deviation, standard deviation, coefficient of variation and correlation.

In fact we agree with the definition of statistical indicator as "a numerical expression of phenomena, processes, activities or economic and social categories,

defined in time, space and organizational structure".   (A.B. Cărbunaru, 2009)

Results

Table 1. Indicators of the medalists in last 5 Olympics

Name and Surname	Performance	Age	Height	Weight	Olympics	Position
Javier Sotomayor	2,34	25	195	82	Barcelona 1992	1
Patrick Sjoberg	2,34	27	200	82	Barcelona 1992	2
Artur Partyka	2,34	23	192	71	Barcelona 1992	3
Tim Forsyth	2,34	19	199	79	Barcelona 1992	3
Hollis Conway	2,34	25	184	68	Barcelona 1992	3
Charles Austin	2,39	29	184	77	Atlanta 1996	1
Artur Partyka	2,37	27	192	71	Atlanta 1996	2
Steve Smith	2,35	25	185	75	Atlanta 1996	3
Sergey Klyugin	2,35	26	190	80	Sydney 2000	1
Javier Sotomayor	2,32	33	195	82	Sydney 2000	2
Abderrahmane Hammad	2,32	23	189	70	Sydney 2000	3
Stefan Holm	2,36	28	181	70	Athens 2004	1
Matt Hemingway	2,34	32	201	84	Athens 2004	2
Jaroslav Baba	2,34	20	196	80	Athens 2004	3
Andrey Silnov	2,36	24	198	83	Beijing 2008	1
Germaine Mason	2,34	25	187	68	Beijing 2008	2
Yaroslav Rybakov	2,34	28	198	84	Beijing 2008	3

Table 2. Indicators of top all-time outdoor seniors[1]

Name and Surname	Performance	Age	Height	Weight	Venue	Position
1. Javier Sotomayor	2,45	26	195	82	Salamanca	1
2. Patrick Sjoberg	2,42	22	200	82	Stockholm	1
3. Igor Paklin	2,41	22	193	74	Kobe	1
4. Rudolf Povarnitsyn	2,40	23	201	75	Donetsk	1
5. Sorin Matei	2,40	27	184	71	Bratislava	1
6. Charles Austin	2,40	24	184	77	Zurich	1
7. Vyacheslav Voronin	2,40	26	190	78	London	1
8. Jianhua Zhu	2,39	21	193	70	Eberstadt	1
9. Hollis Conway	2,39	22	184	68	Norman. OK	1
10. Gennadiy Avdeyenko	2,38	24	200	82	Roma	2
11. Sergey Malchenko	2,38	25	190	74	Banska Bystrica	3
12. Dragutin Topic	2,38	22	197	77	Belgrad	1
13. Troy Kemp	2,38	29	187	69	Nice	1
14. Artur Partyka	2,38	27	192	71	Eberstadt	1
15. Jacques Freitag	2,38	23	204	83	Oudtshoorn	1
16. Andriy Sokolovskyy	2,38	27	196	80	Roma	1
17. Andrey Silnov	2,38	24	198	83	London	1
18. Valeriy Sereda	2,37	25	186	73	Rieti	2
19. Carlo Thranhardt	2,37	27	199	85	Rieti	2
20. Tom McCants	2,37	26	185	79	Columbus	1
21. Jerome Carter	2,37	25	185	74	Columbus	2
22. Sergii Dymchenko	2,37	23	205	75	Kiev	1
23. Steve Smith	2,37	19	185	75	Seoul	1
24. Stefan Holm	2,37	32	181	70	Athens	1
25. Williams Jesse	2,37	28	184	75	Eugene	1
26. Gerd Wessig	2,36	21	201	88	Moscova	1
27. Sergey Zasimovich	2,36	22	188	73	Tashkent	1
28. Dietmar Mogenburg	2,36	23	201	80	Eberstadt	3
29. Eddy Annys	2,36	27	187	73	Gent	1
30. Jim Howard	2,36	28	196	80		
31. Clarence Saunders	2,36	27	188	75	Auckland	1
32. Doug Nordquist	2,36	32	193	79	Norwalk	2

Name and Surname	Performance	Age	Height	Weight	Venue	Position
33. Georgi Dakov	2,36	23	196	80	Bruxelles	2
34. Dalton Grant	2,36	25	186	76	Tokyo	4
35. Labros Papakostas	2,36	23	193	78	Athens	1
36. Tim Forsyth	2,36	24	199	79	Melbourne	1
37. Steinar Hoen	2,36	26	193	75	Oslo	1
38. Sergey Klyugin	2,36	24	190	80	Zurich	1
39. Konstantin Matusevich	2,36	29	202	85	Perth	1
40. Martin Buss	2,36	25	193	81	Edmonton	1
Name and Surname	Performance	Age	Height	Weight	Venue	Position
41. Aleksander Walerianczyk	2,36	21	195	78	Bydgoszcz	1
42. Michal Bieniek	2,36	21	195	73	Biala Podlaska	1
43. Jaroslav Baba	2,36	21	196	80	Roma	2
44. Dusty Jonas	2,36	22	193	82	Boulder	1
45. Ivan Ukhov	2,36	24	192	83	Opole	1
46. Aleksey Dmitrik	2,36	27	189	74	Cheboksary	1
47. Jacek Wszola	2,35	24	190	75	Eberstadt	1
48. Gerd Nagel	2,35	31	188	74	Forbach	1
49. Darrin Plab	2,35	22	190	79	New Orleans	2
50. Mark Boswell	2,35	22	189	66	Sevilla	2
51. Nathan Leeper	2,35	23	188	82	Sacramento	1
52. Victor Moya	2,35	23	194	80	Monaco	1
53. Donald Thomas	2,35	23	190	75		
54. Yaroslav Rybakov	2,35	27	198	84	Osaka	2
55. Kyriakos Ioannou	2,35	23	193	60	Osaka	3
56. Andra Manson	2,35	25	196	75	Austin	1
57. Ivan Ukhov	2,35	23	192	83	Cheboksary	1
58. Vladimir Yashchenko	2,34	19	193	74	Tbilisi	1
59. Dwight Stones	2,34	31	197	81	Los Angeles	1
60. Robert Ruffini	2,34	21	186	75	Prague	1
61. Aleksey Yemelin	2,34	22	205	88	Split	2
62. Rolandas Verkys	2,34	25	193	77	Warszawa	1
63. Arturo Ortiz	2,34	25	194	73	Barcelona	2
64. Marino Drake	2,34	24	193	73	Paris-Saint Germaine	2
65. Ralf Sonn	2,34	26	197	85	Stuttgart	4
66. Jin-taek Lee	2,34	25	189	70	Seoul	1
67. Wolfgang Kreissig	2,34	29	196	80	Mannheim	1
68. Kwaku Boateng	2,34	26	193	84	Zagreb	1
69. Abderrahmane Hammad	2,34	23	189	70	Alger	1
70. Matt Hemingway	2,34	31	201	84	Modesto	1
71. Germaine Mason	2,34	20	187	68	Santo Domingo	1
72. Grzegorz Sposob	2,34	28	200	87	Bydgoszcz	1
73. Jamie Nieto	2,34	28	193	79	Athens	4
74. Tomas Janku	2,34	32	192	78	Goteborg	2
75. Linus Thornblad	2,34	21	180	76	Goteborg	4
76. Andrey Tereshin	2,34	25	195	78	Warszawa	1
77. Kabelo Kgosiemang	2,34	22	188	71	Addis Ababa	1
78. Jesse Williams	2,34	26	184	75	Eugene	1
79. Aleksey Demyanyuk	2,33	23	188	80	Leningrad	1
80. Milton Ottey	2,33	27	178	69	Ottawa	1
81. Lee Balkin	2,33	26	192	75	Durham	1
82. Brian Stanton	2,33	27	196	82	Walnut	1
83. Marcello Benvenuti	2,33	25	182	64	Verona	1
84. Zhongge Zhou	2,33	23	187	75	Beijing	1
85. Jean-Charles Gicquel	2,33	27	200	81	Eberstadt	4
86. Gilmar Mayo	2,33	25	190	72	Pereira	1
87. Svatoslav Ton	2,33	26	192	74	Praga	1
88. Yuriy Krymarenko	2,33	22	187	65	Langen	1

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89. Tora Harris	2,33	28	190	83	Indianapolis	1
90. Naoyuki Daigo	2,33	25	182	67	Kobe	1
91. Scott Sellers	2,33	21	190	72	Lincoln	1
92. Aleksey Dmitrik	2,33	25	189	74	Thessalonoki	1

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Table 3. Statistics indicators of the participants in last 5 Olympics

Indicators	Performance	Age	Height	Weight		
N	39	39	32	32		
N. max.	2,39	34,00	202,00	85,00		
N. min.	2.20	19,90	181,00	65,00		
Amplitude	0,19	15,00	21,00	20,00		
Mode	2,34	24	181	70		
Median	2,32	26,00	192,00	78,00		
Average	2,31	26,13	191,69	76,16		
Quartile 1	2,29	24	187,75	70		
Quartile 3	2,34	28	196,25	80,5		
Quartile difference	0,05	4,00	8,50	10,50		
Dispersion	0,002084	12,62459	35,83984	36,81934		
Average absolute deviation	0,035897	2,817883	5,082031	5,376953		
Standard deviation	0,045651	3,55311	5,986639	6,067894		
Coefficient of variation	1,975581	13,59875	3,123124	7,96769		
Correlation[2]	-0,03222	0,036656	0,206216	0,002896	0,772136	0,147836

Table 4. Statistics indicators of world top high jumpers

Indicators	Performance	Age	Height	Weight		
N	175	175	161	161		
N. max.	2,45	32,00	205,00	88,00		
N. min.	2,33	19,00	178,00	60,00		
Amplitude	0,12	13,00	27,00	28,00		
Mode	2,37	27	195	82		
Median	2,37	25,00	193,00	78,00		
Average	2,37	24,69	192,43	77,28		
Quartile 1	2,34	22	188	74		
Quartile 3	2,38	27	195	82		
Quartile difference	0,04	5,00	7,00	8,00		
Dispersion	0,000594	8,066939	31,41345	30,88461		
Average absolute deviation	0,019389	2,357551	4,585471	4,791096		
Standard deviation	0,024375	2,840236	5,60477	5,557392		
Coefficient of variation	1,030577	11,50558	2,912556	7,191289		
Correlation[2]	-0,02618	0,186011	0,224453	-0,07264	0,696224	0,114456

2 - In order from left to right: correlation between performance and age, the correlation between performance an height, the correlation between performances and weight, the correlation between age and height, the correlation between height and weight the correlation between age and weight.
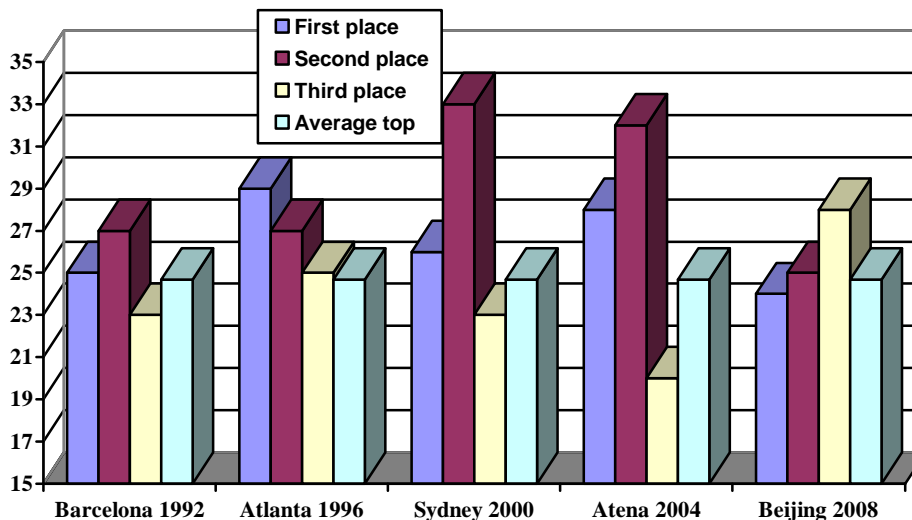
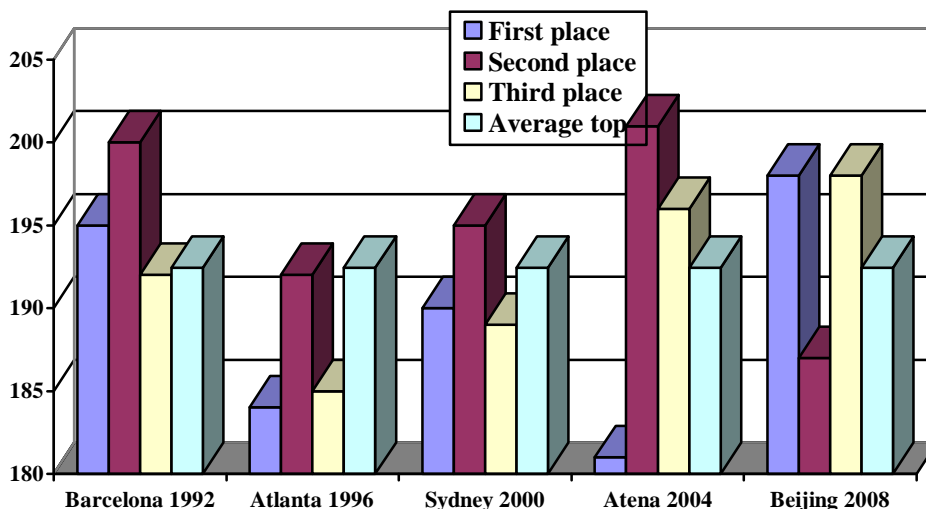**Graphic 1. The evolution of medalist's performances at the last 5 Olympics**
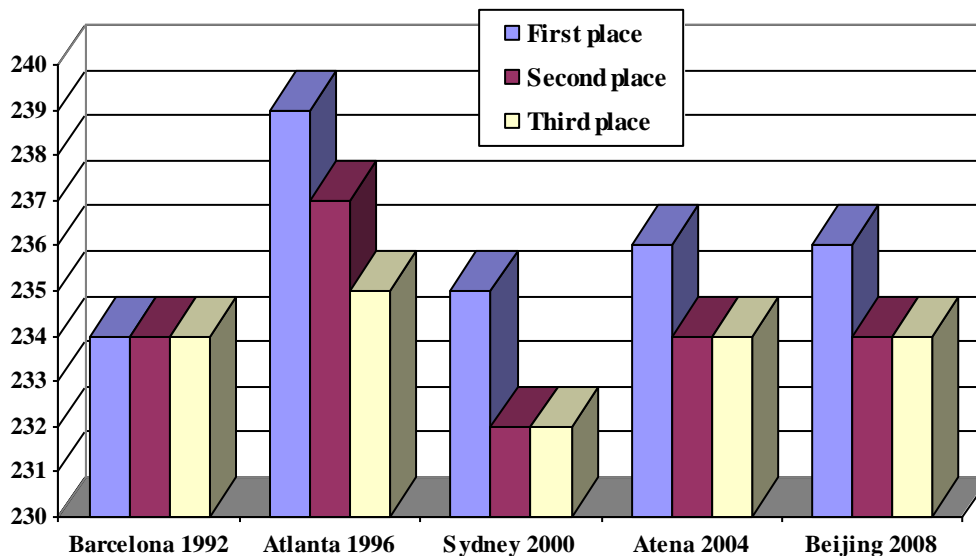
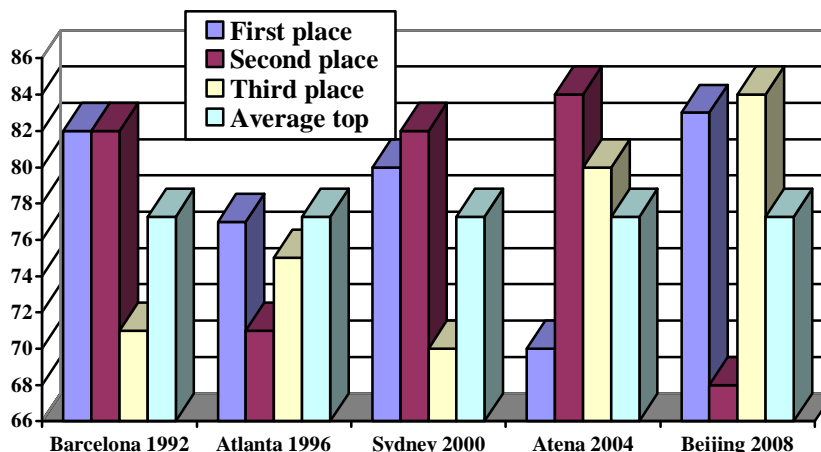**Graphic 2. The evolution of medalist's performances at the last 5 Olympics**
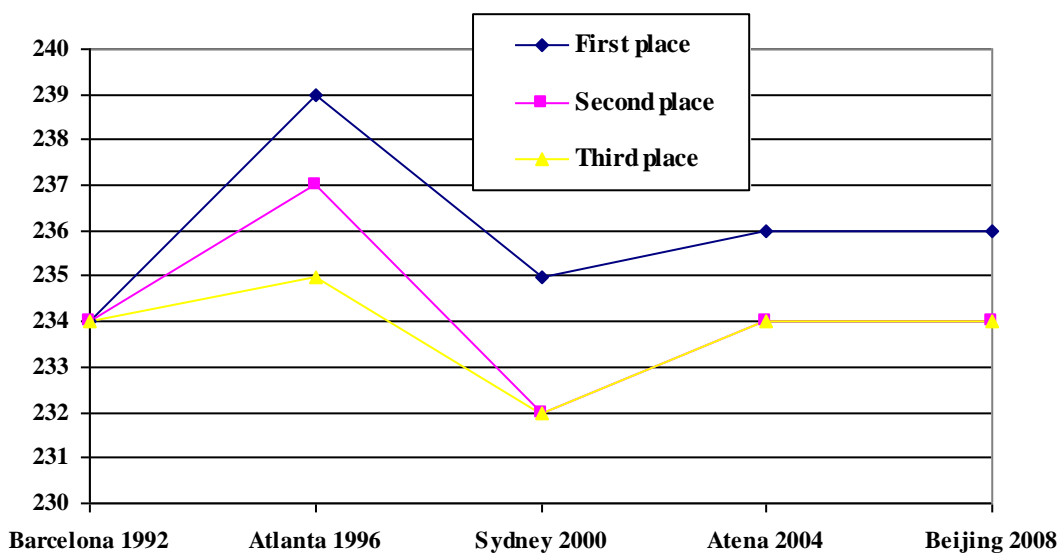
Graphic 3. Athlete's age at last 5 Olympics

Graphic 4. Athlete's height at last 5 Olympics

Graphic 5. Athlete's weight at last 5 Olympics

Discussions

We interpret the values obtained from performance indicators, age, height and weight.

Performance. apart from the Atlanta Olympics in 1996, when it was Olympic record with 2.39 meters, Olympic medalists performances are below the average of the world's best performers. However these results are not significantly different, so we can state that for the first place at the Olympics we should have results around this average.

Age. Compared to the top athlete's average, located in 24years and 7 month, the editions Atlanta and Athens Olympic champions have a more advance age, respectively 29 and 28 years. Yet, as medalist's average we can't say that it differs greatly.

Height. In three of five Olympics, the champion's height is smaller than the top average. All in all the Olympic medalists are around the average.

Weigh. In two of five Olympics the champion's weight is greater than the top average.

Conclusions

1. In 3 of the 5 Olympics, the performance for the first place is equal to the average top, which confirms first hypothesis.

2. The top average age is 24 years and 7 months which confirms the second hypothesis.

3. The third hypothesis is confirmed with the observation that for the Olympics the performance is the supreme criterion, the height isn't a decisive criterion (there are medalists with height below top average).

4. The hypothesis of the athlete's weight isn't confirmed, recording an average of 77.28 kg.

5. We only have significant correlation between athlete's height and weight.

Proposals

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1. For the final selection to the Olympics, to accede to one of the medals, the athlete's performance should be over 2.30 m.

2. If we have several athletes with special performances, we should focus primarily on those with a richer experience, with several international competitions, so a little older.

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