Competition Jumping Horses: Effects of Age, Sex and Breed on the Fei/Wbfsh World Ranking

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Abstract

The breed, age and sex of the horses are all important factors in determining the future rank in international high-level show jumping competition and this is the reason why we choose to analyze these factors. The objective of this study was to analyze the differences between the top jumping horses in the world regarding breed, sex and age, and to investigate the impact of these factors on the average number of FEI points gained in the last year. For this research, we examine the first 103 jumping horses from FEI&WBFSH World Ranking List for Jumping Horses April 2014, divided in 6 groups for breed variable and 3 groups for sex and age variables. The results show that 82.5% of the horses have between 10 and 14 years, 10.7% have less than 10 years and only 6.8% have more than 14 years. For breed variable, the results show that 34% of the horses belong to warmblood breeds from Germany (34.3% HOLST, 20% OLDBG, 20% WESTF, 17.1% HANN, 5.7% BRAND and 2.9% Thuringer), 26.2% belong to warmblood breeds from Belgium (11.1% ZANG, 70.4% BWP and 18.5% SBS), 18.4% belong to warmblood breeds from The Nederland (94.7% KWPN and 5.3% NRPS), 9.7% belong to warmblood breeds from Great Britain (70% AES, 20% ISH and 10% SSH), 8.7% belong to warmblood breeds from France (100% SF) and 2.9% belong to warmblood breeds from Sweden (100% SWB). The average number of FEI points gain in the last year was evaluated as not being significantly different ($p>0.05$) for any of the variable considered for this study. In the present research work, we demonstrated that for performance in show jumping competition at the highest levels it is necessary a horse from a sport breed with a strict selection and not one from a traditional breed, and that between the principal warmblood breeds grown in Europe there are no significant differences.

Keywords: *breed, jumping, ranking, sport horses, warmblood*

INTRODUCTION

In the latest years, interest in sport horses and in horse breeding increased. Many new breeds arise from the general demand for good animals with a good attitude and performance in sports and the market of sport horses for show jumping competition become more and more international (Ruhlmann *et al.*, 2009). Obtaining performance at the highest level in show jumping depends not only on the abilities of the trainer and rider, but mostly of the horse. For this reason, a sport horse should ideally display certain qualities of temperament and physiognomy. Sport horses typically share many physical features, including sloping shoulders, an uphill build, and an arched neck (Schacht, 2012).

The purpose and breeding of sport horses across the world varies little and in this way, the warmbloods breeds tend to take over the equestrian world especially in traditional equestrian sporting events, such as show jumping, eventing, and dressage (Bartolomé *et al*., 2011). Warmbloods are a group of middleweight horse types and breeds, primarily originating in Europe, registered with organizations that are characterized by open studbook policy, studbook selection, and the aim

of breeding for equestrian sport. The warmblood breeds are named according to the individual country from which they are originated.

Taking into account the above, we can say that the breed, age and sex of the horses are all important factors in determining the future rank in international high-level show jumping competition and this is the reason why we choose to analyze these factors.

MATERIALS AND METHODS

Animals. For this research we examine the first 103 show jumping horses from FEI&WBFSH World Ranking List for Jumping Horses April 2014 (http://www.wbfsh.org), divided in 6 groups for breed variable and 3 groups for sex and age variables. The three categories for the sex variable were: stallions (s), geldings (g) and mares (m), while for the age variable there are: horses under 10 years (< 10 years), horses aged between 10 to 14 years (10 – 14 years) and horses older than 14 years (> 14 years), the divisions being dictated by the fact that horse jumping peak of form is obtained within the range of age 10 to 14 years.

The breed variable was divided into six categories:

- warmblood breeds from Germany including: Holsteiner (HOLST), Oldenburg (OLDBG), Westphalian (WESTF), Hanoverian (HANN), Brandenburger (BRAND) and Thüringer Reitpferd (Thuringer);
- warmblood breeds from Belgium including: Zangersheide (ZANG), Belgian Warmblood (BWP) and Belgian Sport Horse (SBS);
- warmblood breeds from The Nederland including: Dutch Warmblood (KWPN) and Dutch Riding Horse (NRPS);
- warmblood breeds from Great Britain including: Anglo-European (AES), Irish Sport Horses (ISH) and Scottish Sports Horse (SSH);

Tab. 1. Horse distribution according to gender, age and breed variables

Breed		Age			Sex			N
		< 10 years	10 – 14 years	> 14 years	m	s	g	
WBG	HOLST	1	10	1	3	6	3	12
	OLDBG	1	6	0	2	0	5	7
	WESTF	0	6	1	0	2	5	7
	HANN	0	6	0	2	3	1	6
	BRAND	0	2	0	0	0	2	2
	Thuringer	0	1	0	1	0	0	1
	Total	2	31	2	8	11	16	35
WBB	ZANG	0	3	0	2	0	1	3
	BWP	5	13	1	8	1	10	19
	SBS	0	5	0	0	2	3	5
	Total	5	21	1	10	3	14	27
WBN	KWPN	3	12	3	4	2	12	18
	NRPS	0	1	0	0	1	0	1
	Total	3	13	3	4	3	12	19
WBGB	AES	0	6	1	5	1	1	7
	ISH	0	2	0	1	0	1	2
	SSH	0	1	0	1	0	0	1
	Total	0	9	1	7	1	2	10
WBF	SF	1	8	0	3	4	2	9
	Total	1	8	0	3	4	2	9
WBS	SWB	0	3	0	2	1	0	3
	Total	0	3	0	2	1	0	3

Note: WBG: warmblood breeds from Germany, WBN: warmblood breeds from The Netherlands, WBF: warmblood breeds from France, WBB: warmblood breeds from Belgium, WBGB: warmblood breeds from Great Britain, WBS: warmblood breeds from Sweden, N: total number.

- warmblood breeds from France including: Selle Français (SF);
- warmblood breeds from Sweden including: Swedish warmblood (SWB).

The horses' distribution for the three variables taken into account (sex, age and breed) is shown in *Table 1*.

Statistical analysis. Data was manipulated using Excel 2007 (Microsoft) and was analyzed using SPSS Version 21 for Windows (IBM, USA). The aim of the statistical analysis was to analyze the differences between the top jumping horses in the world regarding breed, sex and age, and to investigate the impact of these factors on the average number of FEI points gained in the last year. The statistical test used was:

- One-Way ANOVA for comparing the means (using the F distribution) of our three to six categories for each variable;
- Two-Way Factorial ANOVA for studying the effect of two independent categorical variables on the dependent variable. We test the main effect of each independent variable and also test if the effect of one independent variable on the dependent variable is the same across all level of the other independent variable, that is, if there is any interaction between the independent variables.

The value of alpha was set at 0.05 for all statistical tests.

RESULTS AND DISCUSSION

The results show that the number of FEI points gained in the last year for the first 103 jumping horses from FEI&WBFSH World Ranking List for Jumping Horses April 2014 vary between 365 and 1104, with an average of 516.82.

Age. The results show that 82.5% of the horses have between 10 and 14 years, 10.7% have less than 10 years and only 6.8% have more than 14 years. For the age variable, the results from the statistical analysis show that the average number of FEI points gained in the last year doesn't present statistically significant differences for the 0.05 significance level (F=2.935, p=0.058). The descriptive statistics and One-way ANOVA main statistics for the three dimensions of age variable regarding the average number of FEI points gained in the last year are shown in *Table 2* and *3*.

Therefore, we can say that, regarding the average number of FEI points gained in the last year, there are no statistically significant differences between horses aged over 14, horses aged between 10 and 14 years and horses younger than 10 years. The results can be explained by the fact that the majority of horses (82.5%) were in the group age between 10 and 14 years and because the horses younger than 10 years were all 9 years old so the variability between this two groups is really small.

Tab. 2. The descriptive statistics for age variable regarding the average number of FEI points gained in the last year

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
over 14 years	7	587.57	130.331	49.261	467.03	708.11	460	840
between 10 and 14 years	85	523.49	165.189	17.917	487.86	559.12	365	1104
under 10 years	11	420.18	41.417	12.488	392.36	448.01	365	473
Total	103	516.82	158.199	15.588	485.90	547.73	365	1104

Tab. 3. One-way ANOVA main statistics for the three dimensions of age variable regarding the average number of FEI points gained in the last year

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	141554.897	2	70777.449	2.935	0.058
Within Groups	2411206.598	100	24112.066		
Total	2552761.495	102			

Tab. 4. The descriptive statistics for sex variable regarding the average number of FEI points gained in the last year

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
mare	34	526.76	183.549	31.478	462.72	590.81	365	1104
stallion	23	541.35	176.698	36.844	464.94	617.76	365	954
gelding	46	497.20	126.419	18.639	459.65	534.74	365	879
Total	103	516.82	158.199	15.588	485.90	547.73	365	1104

Tab. 5. One-way ANOVA main statistics for the three dimensions of sex variable regarding the average number of FEI points gained in the last year

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	34914.921	2	17457.460	0.693	0.502
Within Groups	2517846.574	100	25178.466		
Total	2552761.495	102			

Tab. 6. The descriptive statistics for breed variable regarding the average number of FEI points gained in the last year

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
WBG	35	522.66	167.598	28.329	465.09	580.23	365	954
WBN	19	499.79	122.305	28.059	440.84	558.74	365	840
WBB	27	491.37	132.418	25.484	438.99	543.75	365	830
WBF	9	524.00	142.927	47.642	414.14	633.86	405	863
WBS	3	645.00	190.591	110.038	171.55	1118.45	425	760
WBGB	10	552.50	247.168	78.161	375.69	729.31	365	1104
Total	103	516.82	158.199	15.588	485.90	547.73	365	1104

Tab. 7. One-way ANOVA main statistics for the six dimensions of breed variable regarding the average number of FEI points gained in the last year

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	86675.655	5	17335.131	0.682	0.638
Within Groups	2466085.840	97	25423.565		
Total	2552761.495	102			

Sex. The results show that 33% of the horses are mares, 22.3% are stallions and 44.7% are geldings. For the sex variable the results from the statistical analysis shows that the average number of FEI points gained in the last year doesn't present statistically significant differences for the 0.05 significance level (F=0.693, p=0.502). The descriptive statistics and One-way ANOVA main statistics for the three dimensions of sex variable regarding the average number of FEI points gained in the last year are shown in *Table 4* and *5*. Therefore, we can say that, regarding the average number of FEI points gained in the last year there are no statistically significant differences between mares, stallions and geldings.

Breed. The results show that 34% of the horses belong to warmblood breeds from Germany (34.3% HOLST, 20% OLDBG, 20% WESTF, 17.1% HANN, 5.7% BRAND and 2.9% Thuringer), 26.2% belong to warmblood breeds from Belgium (11.1% ZANG, 70.4% BWP and 18.5% SBS), 18.4% belong to warmblood breeds from The Nederland (94.7% KWPN and 5.3% NRPS), 9.7% belong to warmblood breeds from Great Britain (70% AES, 20% ISH and 10% SSH), 8.7% belong to warmblood breeds from France (100% SF) and 2.9% belong to warmblood breeds from Sweden (100% SWB).

For the breed variable, the results from the statistical analysis show that the average number of FEI points gained in the last year doesn't present statistically significant differences for the 0.05 significance level (F=0.682, p=0.638). The descriptive statistics and One-way ANOVA main statistics for the three dimensions of breed variable regarding the average number of FEI points gained in the last year are shown in *Table 6* and *7*. Therefore, we can say that, regarding the average number of FEI points gained in the last year, there are no statistically significant differences between the six warmblood horse breeds considered in this study. These results are not surprising at all, because in case of all warmblood sport horses from this list are used breeding schemes that share the same objectives even if the procedure for selection varies in different European countries. Another explanation is that all warmblood breeds have open study books and mandy stallion are used as breeding stallions in more that one breed (Dubois, 2008).

Sex X Age. The results from the statistical analysis (Two-Way Factorial ANOVA) shows that there are no main effects for none of the two variable taken to be studied (sex and age) and doesn't exist a statistically significant interaction effect between sex and age variables regarding the average number of FEI points gained in the last year. The Two-way factorial ANOVA main statistics for sex and age variables regarding the average number of FEI points gained in the last year are shown in *Table 8*.

Tab. 8. Two-Way Factorial ANOVA Tests of Between-Subjects Effects. Effects of sex and age variables on the average number of FEI points gained in the last year

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	166026.923[a]	7	23718.132	.944	.477
Intercept	7350537.733	1	7350537.733	292.576	.000
sex	16599.240	2	8299.620	.330	.719
age	47710.288	2	23855.144	.950	.391
sex * age	18828.802	3	6276.267	.250	.861
Error	2386734.572	95	25123.522		
Total	30063886.000	103			
Corrected Total	2552761.495	102			

a. R Squared = .065 (Adjusted R Squared = -.004)

Breed X Age. The results from the statistical analysis (Two-Way Factorial ANOVA) shows that there are no main effects for none of the two variable taken to be studied (breed and age) and doesn't exist a statistically significant interaction effect between breed and age variables regarding the average number of FEI points gained in the last year. The Two-way factorial ANOVA main statistics for breed and age variables regarding the average number of FEI points gained in the last year is shown in *Table 9.*

Breed X Sex. The results from the statistical analysis (Two-Way Factorial ANOVA) shows that there are no main effects for none of the two variable taken to be studied (breed and sex) and doesn't exist a statistically significant interaction effect between breed and sex variables regarding the average number of FEI points gained in the last year. The Two-way factorial ANOVA main statistics for breed and sex variables regarding the average number of FEI points gained in the last year is shown in *Table 10*.

Tab. 9. Two-Way Factorial ANOVA Tests of Between-Subjects Effects. Effects of breed and age variables on the average number of FEI points gained in the last year

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	280373.950[a]	13	21567.227	.845	.613
Intercept	6534230.718	1	6534230.718	255.919	.000
breed	56592.028	5	11318.406	.443	.817
age	90778.259	2	45389.130	1.778	.175
breed * age	74025.812	6	12337.635	.483	.819
Error	2272387.545	89	25532.444		
Total	30063886.000	103			
Corrected Total	2552761.495	102			

a. R Squared = .110 (Adjusted R Squared = -.020)

Tab. 10. Two-Way Factorial ANOVA Tests of Between-Subjects Effects. Effects of breed and sex variables on the average number of FEI points gained in the last year

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	326056.171[a]	16	20378.511	.787	.696
Intercept	12992218.287	1	12992218.287	501.787	.000
breed	41642.260	5	8328.452	.322	.899
sex	47065.864	2	23532.932	.909	.407
breed * sex	223783.593	9	24864.844	.960	.478
Error	2226705.324	86	25891.922		
Total	30063886.000	103			
Corrected Total	2552761.495	102			

a. R Squared = .128 (Adjusted R Squared = -.035)

CONCLUSION

In conclusion, we can say that regarding the average number of FEI points gained in the last year for neither one of the three variables taken into account (sex, age and breed) there were no statistically significant differences between the first 103 jumping horses from FEI&WBFSH World Ranking List for Jumping Horses April 2014 considered in this study.

These results are not surprising at all because when we consider the first 103 jumping horses in the world it is normal to exist a great degree of homogeneity especially regarding the breed and age.

For success in the modern show jumping world is recommended to have a horse that belong to a warmblood breed with a strict selection and not a horse from other traditional breeds. Even if breeds like the Thoroughbred had known success in the show jumping arena in the past, the present results show that horses from this breed are no longer present in the first 100 in the world, but for the modern sport horse breeds of the Thoroughbred influence will persist in the future.

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