



MODEL OF TESTS FOR ASSESMENT OF SPRINT RUNNING PROFICIENCY

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Abstract

Purpose. The main goal of this research was to establish the model of tests that every PE teacher could use independantly and effortlessly to easily and simply select and direct talented children in sprint running.

Methods. The differences in motor abilities' tests between different subsamples of girls were analyzed and the assessment model was established by valorization of results' achievements using tables and frequency diagrams categorized in six point groups.

Results. Statistically significant differences in motor abilities' tests were found in all subsamples. The assessment model for valorization of results' achievements was established.

Conclusions. Scientifically based models for easier selection of children talented for spint running and track and field sport have not yet been known of in Croatia. This model could have a multiple use both for selection, and for new competition systems.

Key words: sprint running, motor abilitie tests, selection, girls.

Introduction

Selection is everpresent in every segment of people's actions. In sports, selection refers to the acts of talented individuals selection for which it is assumed under the certain criteria that they could accomplish high sports' result. Timely and qualitative orientation and selection is needed for elite sports. By orientation and selection of talented children to some of the track and field groups or to a specific track and field event, children begin their track and field sports' path, much sooner than a track and field athlete achieves a noteworthy result (V. Babić, 2001). Child's accomplishment in track and field depends on many factors such as his morphological characteristics, motor abilities, starting time of certain sports' engagement, hereditary factors, environment and etc. Selection in track and field is a long-term process that begins at the ages from 6 to 10 years and continues incessantly up until junior category where the changes are still possible. Based on early selection assessments not only a child's potential ability for certain track and field event is being determined, but also the processes of encouraging and directing talented individuals in sports begin. Talented individual sometimes chooses independently to engage in certain sports but more often this happens due to an initiative from an expert, mostly PE teacher. Besides teaching, PE teachers monitor development of different school children generations, they notice the changes in different segments of their anthropological statuses, they also notice predispositions of individuals who have prediction of a success in the events of sprint running in the 5th grade girls (V. Babić, 2001; V. Babić and N. Viskić Štalec, 2002; V. Babić et al. 2010 a and b). Therefore, the main goal of this research was to establish the model of tests that every PE teacher could

opportunities for accomplishments in certain sports; all in all, PE teachers have one of the most important roles in sports' development and promotion and in any other form of kinesiological activity.

Research study's problem and goal

It is a well known fact that for every motor ability there is the best developmental period, the so called sensible developmental phases that must be taken into account. For speed development the best developmental period is from the ages of 7 to 11 years, that is, from the ages of 13 to 14 years in girls and from the ages of 7 to 10 and 15 to 16 years in boys (H. Sozanski and T. Witczak, 1981). When it comes to timely selection and orientation of children into track and field sprint events it is important to be able to conduct quality, simple, fast, and also importantly, cheap testing of those motor abilities that have significant influence on track and field accomplishments.

In children aged from 11 to 13 years, researchers have mostly investigated relations and influence of different anthropological dimensions on sprint running accomplishments (V. Šnajder, 1982; S. Kurija, 1982; N. Zagorac, 1984; V. Babić, 2001; M. Bračić, K. Tomažin, M. Čoh, 2009; I. Blažević, 2010). The negative influence of subcutaneous fat on sprint running result was determined, as well as the influence of tests used to predominantly asses explosive strength. Earlier research studies tried to establish tests of those motor abilities that have significant role in the

use independantly and effortlessly to easily and simply select and direct talented children in sprint running or in any other track and field event.

There are more partial goals of this research study:

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1. Since the competition systems include two grades' groups to compete in the same category, it will be determined if there are statistically significant differences in motor abilities of the 5th and the 6th grade girls.

2. It will also be determined if there is a difference in motor abilities between more and less successful girls in sprint running.

3. Lastly, it will be determined if there are statistically significant differences in motor abilities' tests of the selected 5th and 6th grade girls, that is, in those girls who have been selected considering their 60m running result.

Hypothesis of this research are:

1. There are statistically significant differences in motor abilities between the 5th and the 6th grade girls.

2. There are statistically significant differences in motor abilities' tests between the girls that have shown through more selection levels to be more successful and the less successful girls.

3. There are statistically significant differences in motor abilities' tests between the 5th and the 6th grade girls that have passed more selection levels.

The results of this research could facilitate the future sprint running talents search and encourage PE teachers to direct the individuals recognized as sprint running talents into the track and field sport.

The sports' competition examples in countries that are nurturing and developing track and field sport are complying to competitions within the age group. In track and field the age groups are defined by the beginning, that is, by the end of the calendar year. In Croatian school competition system, the competitions are organized within two grades' groups.

Research methods

Participants sample

The 5th and the 6th grade girls from 40 Zagreb elementary schools were tested on the 60m sprint running. For this research study, the sample of 185 girls, aged 11 – 13 years, was extracted from the overall sample of 8184 5th and 6th grade girls. The sample of 185 girls were divided into few subsamples:

1. The 5th grade girls sample (79 girls, average age 11.63 yrs \pm 0,51; average height 151,62 cm \pm 7,05; average body mass 40,57 kg \pm 7,72), and the 6th grade girls (106 girls, average age 12,43 yrs \pm 0,55; average height 156,15 cm \pm 6,07; average body mass 45,32 kg \pm 7,26).

2. Among the first sample there were two subsamples: one subsample consisted of 83 successful

(selected) girls that have passed more selection levels (from classes' and school's championship to regional championship) and that were among the most successful in the 60m sprint running at the city championship – selected girls (average age 12,12 yrs \pm 0,67; average height 155,34 cm \pm 6,82; average body mass 43,90 kg \pm 7,04), while the second subsample consisted of 102 girls that were not successful in the 60m sprint running at their own schools (average age 12,07 yrs \pm 0,66; average height 153,30 cm \pm 6,80; average body mass 42,79 kg \pm 8,36).

3. The sample of the successful girls is especially interesting for this research, from 83 selected girls: 38 were 5th graders (average age 11,66 g \pm 0,53; average height 152,89 cm \pm 7,31; average body mass 40,97 kg), and 45 were 6th graders (average age 12,51 g \pm 0,51; average height 157,42cm \pm 5,68; average body mass 46,38 kg \pm 5,90).

For all participants parental consent forms were obtained in accordance with scientific ethical principals.

Variables' sample

The variables' sample consisted of the battery of one criterion variable. *60m running (s)* and eight predictor variables that are most often used in monitoring and assesment of school children's motor abilities: *Side strides (s)*, *Standing long jump (cm)*, *Supine position medicine ball throwing (m)*, *Obstacle course backwards (s)*, *Bent arm hang (s)*, *Sit-ups in 60 s from lying with the legs bent (quantity)*, *20 m running (s)* and *Long jump (m)*. The 60m sprint running test and the standing long jump test are the elements that PE teachers most often longitudinally monitor in practice.

All measurements for all participants were conducted by educated individuals, students of the last year at the Faculty of Kinesiology that specialized in track and field, as well as the employees of the Faculty of Kinesiology, University of Zagreb.

Statistical analysys

Descriptive parameters were calculated from the obtained results. T-test for independent samples was used to determine statistically significant differences between subsamples. Valorization of results was obtained using tables and frequency diagrams categorized into six point groups and was assessed by points and grades. All results were analyzed using program package Statistica for Windows ver. 7.0 at the Faculty of Kinesiology, University of Zagreb.

Results and discussion

VARIABLES	5 G (N=79)		6 G (N=106)		t - test	P
	AM	SD	AS	SD	df = 183	
Side strides (s)	12,73	0,84	12,29	0,68	3,96	0,00
Standing long jump (cm)	168,52	17,12	174,21	16,33	-2,30	0,02
Supine position medicine ball throwing (m)	3,61	1,04	4,24	1,08	-3,92	0,00
Obstacle course backwards (s)	13,77	2,90	13,09	2,46	1,74	0,08
Bent arm hang (s)	35,65	22,59	34,00	21,23	0,51	0,61
Sit-ups in 60 s from lying with the legs bent	38,94	6,26	39,27	6,05	-0,37	0,71
20 m running (s)	4,01	0,25	3,92	0,22	2,46	0,01
Long jump (m)	2,78	0,45	2,93	0,46	-2,13	0,03
60 m running (s)	10,10	0,81	9,88	0,77	1,86	0,07

Table 1. Basic descriptive parameters (AM-arithmetic mean and SD- standard deviation) and differences analysis (t-test, df- freedom degrees, p-alpha level) between the 5th (5 G) and the 6th (6 G) grade girls.

VARIABLES	SEL (N=83)		NESEL 5/6 G (N=102)		t - test	P
	AM	SD	AM	SD	df = 183	
Side strides (s)	12,20	0,68	12,70	0,79	-4,48	0,00
Standing long jump (cm)	181,81	13,02	163,63	15,18	8,63	0,00
Supine position medicine ball throwing (m)	4,33	1,01	3,68	1,11	4,18	0,00
Obstacle course backwards (s)	12,40	1,92	14,18	2,92	-4,77	0,00
Bent arm hang (s)	41,52	22,08	29,15	19,96	3,99	0,00
Sit-ups in 60 s from lying with the legs bent	39,92	6,23	38,49	5,99	1,58	0,12
20 m running (s)	3,80	0,15	4,09	0,22	-10,21	0,00
Long jump (m)	3,12	0,40	2,66	0,40	7,82	0,00
60 m running (s)	9,29	0,30	10,53	0,61	-16,87	0,00

Table 2. Basic descriptive parameters (AM-arithmetic mean and SD- standard deviation) and differences analysis (t-test, df- freedom degrees, p-alpha level) between successful (selected) and less successful girls (5/6 G).

VARIABLES	SEL 5 G (N=38)		SEL 6 G (N=45)		t - test	P
	AM	SD	AM	SD	df = 81	
Side strides (s)	12,46	0,74	11,99	0,54	3,37	0,00
Standing long jump (cm)	177,72	12,59	185,26	12,49	-2,73	0,01
Supine position medicine ball throwing (m)	4,00	0,91	4,62	1,01	-2,93	0,00
Obstacle course backwards (s)	12,61	1,99	12,22	1,86	0,94	0,35
Bent arm hang (s)	45,92	25,11	37,80	18,65	1,69	0,10
Sit-ups in 60 s from lying with the legs bent	39,87	7,19	39,96	5,38	-0,06	0,95
20 m running (s)	3,84	0,13	3,77	0,16	2,02	0,05
Long jump (m)	3,02	0,35	3,20	0,43	-2,01	0,05
60 m running (s)	9,41	0,23	9,19	0,32	3,55	0,00

Table 3. Basic descriptive parameters (AM-arithmetic mean and SD- standard deviation) and differences analysis (t-test, df- freedom degrees, p-alpha level) between **selected** 5th grade girls (SEL 5 G) and 6th grade girls (SEL 6 G)

The analysis of descriptive parameters' results showed that in the overall sample of the 5th and the 6th grade girls (Table 1), as well as in the selected sample of girls (Table 3), the only variable whose results did not improve in the 6th grade was bent arms hang (s) although it is expected that all motor abilities in children of that age improve. Additionally, it can be seen that selected girls had statistically significant better results in the same test than the girls who were less successful (Table 2). This result could be due to the average body mass increasement by approximately 5 kg which certainly makes the performance of this test more difficult since the static arms's strength is being tested by this test. The results of this study recommend more attention to be paid in the PE classes of the 5th grade girls to contents that influence on arms' and shoulders' strengthening. The results of all other variables, in all analyzed samples, show better, progressive values in regards to the age group.

T-test results' analysees indicate: 1. statistically significant differences in all measured tests between the selected and the less successful girls (Table 2); 2. statistically significant differences in the arithmetic means of the following tests: *side strides, standing long jump, supine position medicine ball throwing, 20m running, long jump* in regards to the grade categorization between the sample of girls that, on average, are in the 5th and the 6th grade –girls aged from 11 to 13 years (Table 1), as well as between the selected samples of the 5th and the 6th grade girls (Table 3). The analysis of the criterion variable *60m running* in the samples of selected girls showed to be statistically significant in favor of the older girls.

In regards to the proven statistically significant variables, the results' values (norms) were presented, alike Likert scale, through 6 point groups and organized through 3 grades/categories: excellent, very good and good (Table 4).

VARIABLES	GIRLS N = 183	SEL 5 G N = 38	SEL 6 G N = 45	POINTS	GRADE/CATEGORY
60 m running (s)	8,00 - 8,69	8,70 - 8,89	8,20 - 8,49	10	EXCELLENT
	8,70 - 9,49	8,90 - 9,09	8,50 - 8,69	8	
	9,50 - 10,29	9,10 - 9,29	8,70 - 8,99	6	VERY GOOD
	10,30 - 10,99	9,30 - 9,49	9,00 - 9,19	4	
	11,00 - 11,79	9,50 - 9,69	9,20 - 9,39	3	GOOD
	11,80 - 12,60	9,70 - 9,80	9,40 - 9,70	2	
Side strides (s)	10,70 - 11,39	10,80 - 11,49	10,80 - 11,29	10	EXCELLENT
	11,40 - 12,19	11,50 - 12,09	11,30 - 11,69	8	
	12,20 - 12,89	12,10 - 12,79	11,70 - 12,09	6	VERY GOOD
	12,90 - 13,69	12,80 - 13,49	12,10 - 12,49	4	
	13,70 - 14,49	13,50 - 14,09	12,50 - 12,99	3	GOOD
	14,50 - 15,20	14,10 - 14,80	13,00 - 13,40	2	
Standing long jump (cm)	198 - 212	199 - 208	201 - 211	10	EXCELLENT
	184 - 197	188 - 198	191 - 200	8	
	169 - 183	178 - 187	181 - 190	6	VERY GOOD
	155 - 168	167 - 177	171 - 180	4	
	141 - 154	157 - 166	162 - 171	3	GOOD
	126 - 140	146 - 156	151 - 161	2	
Supine position	6,90 - 8,10	5,70 - 6,39	7,00 - 8,00	10	EXCELLENT

medicine ball throwing (m)	5,70 - 6,89	4,90 - 5,69	6,00 - 6,99	8	VERY GOOD
	4,50 - 5,69	4,20 - 4,89	5,00 - 5,99	6	
	3,40 - 4,49	3,40 - 4,19	3,90 - 4,99	4	
	2,20 - 3,39	2,70 - 3,39	2,90 - 3,89	3	GOOD
	1,00 - 2,19	1,90 - 2,69	1,90 - 2,89	2	
20 m running (s)	3,30 - 3,49	3,50 - 3,59	3,30 - 3,49	10	EXCELLENT
	3,50 - 3,79	3,60 - 3,69	3,50 - 3,69	8	
	3,80 - 3,99	3,70 - 3,79	3,70 - 3,79	6	VERY GOOD
	4,00 - 4,19	3,80 - 3,89	3,80 - 3,99	4	
	4,20 - 4,49	3,90 - 3,99	4,00 - 4,19	3	GOOD
	4,50 - 4,70	4,00 - 4,10	4,20 - 4,40	2	
Long jump (m)	3,70 - 4,20	3,60 - 3,90	3,80 - 4,20	10	EXCELLENT
	3,20 - 3,69	3,40 - 3,59	3,50 - 3,79	8	
	2,70 - 3,19	3,10 - 3,39	3,10 - 3,49	6	VERY GOOD
	2,20 - 2,69	2,80 - 3,09	2,80 - 3,09	4	
	1,60 - 2,19	2,60 - 2,79	2,50 - 2,79	3	GOOD
	1,10 - 1,59	2,30 - 2,59	2,10 - 2,49	2	

Table 4. Points and grades for valorization of the 5th and the 6th grade girls' successfulness (overall sample of girls) and the selected girls of the 5th (SEL 5 G) and the 6th grade (SEL 6 G) of the elementary school in chosen (statistically significant) tests of basic and specific motor abilities.

The suggested range of results, points and grades can serve to PE teachers, as well as to practitioners kinesiologists, especially those that identify and select children, as a model for selecting sprint running talented children. Similarly, besides for comparison of girls' results in every individual test through suggested points and grades system for one or more tests, this model can be used for periodical assessments, for motivational and practice purposes, as in the class, so in the group that undergoes different training and selection levels. Using this model, PE teachers and practitioners can independently assess the predispositions of the girls for successfulness primarily in the sprint running events, but likely in the other track and field events as well. It is to be expected that this model will make the talent identification easier for PE teachers and practitioners and if this model is to be actively applied in practice, more girls will be directed into the track and field sport.

According to available information, this is the first suggestion of the model for tests' valorization and for the long-term valorization of practice effects in the 5th and the 6th grade girls (girls aged from 11 to 13 years). The application of this model can positively influence on the cooperation between the PE teachers and track and field coaches, furthermore, it can contribute to the track and field development in Croatia, as well as to the sport culture development in children and maybe in their family members too.

Conclusions

Up until nowadays, the scientifically based models to facilitate the selection of sprint and track and field talented children have not been known of in Croatia.

It is well known from the practical experiences that the selection is a sensitive, yet quantitatively measurable process. The results of this research showed statistically significant differences in motor abilities' tests between the girls of different grades and between the selected girls of different grades. The suggested model of results' ranges, points' categories and grades may establish a new way of valorization and diagnostics of potential candidates for track and field sport, and especially for sprint running events. The suggested model may in the same way be used for valorization of accomplishments in track and field events and for additional tests. The system of new competition types may be developed (modified track and field multievents) that could be valorized by this suggested model.

The obtained results showed that there were statistically significant differences in the measured tests between the 5th and the 6th grade girls (Table 1), between the successful and less successful girls in sprint running, as it was expected (Table 2), and lastly, statistically significant differences were determined between selected girls as well (Table 3). These are all arguments attesting that the competition system should be reorganized and conducted within each age group. This might be more difficult to conduct and control in school competition systems but however, in that case,



competition conduction within one grade group is recommended.

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