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Research Article

COMPARISON OF VARIOUS PHYSICAL AND MOTORIC FEATURES OF NORMAL AND GIFTED STUDENTS

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ABSTRACT

In this study, motor skills of giftedstudents with no professional sports background who are more succesful than others in terms of perception and academical success, are compared with the motor skills of ones who are not accepted as gifted. Weights, heights, flexibility, vertical jump, standing broad jump, right-left grip power, right-left visual and auditory reaction times of 50 male students (10,66 age) selected from a 12500 sample with a 3 stage test and 105 male participants (10,96 age) selected randomly among students who are not accepted as successful, were measured.SPSS 19,0 package programme was utilized for statistical analysis and signifance value was taken to be 0,05. Findings of this study imply that motor performance skills, especially reaction time values, of gifted subjects were superior to the other group. The gifted are also more successful in right and left hand grip power, vertical and standing broad jump tests. The other group performed better only in the sit-ups. No statistical difference was observed in balance and flexibility tests between two groups. Results are supposed to be related with the high concentration abilities of gifted students. The observed success in the perormance data reveals that it would be beneficial to divert gifted students to various sports branches.

INTRODUCTION

Gifted students are the ones who show higher performance in special academic fields or intelligence, creativity, arts and capacity for leadership in comparison to their peers and need services and activities to improve their skills which can not be provided by school (Özgüven, 2000). For years, many identification works, scientific studies and projects have been published forthe purpose of identification and reintegration of gifted individuals to society. Even though many number of methods have been utilized in identification of such individuals, usually a long term, multi-disciplinary process comprising acouple of stages, is recommended (Ersoy *et al*., 2001). This process consists of several stages such as assessments of class teachers and student advisors, special skill tests and individual examination tests. Marland, while making the definition of gift, mentions the ability to show superior performance in one or several of the areas like intellectual, creative, academic, visual and leadership capabilities including psychomotor skills (Passow *et al*., 1995). From this point of view, relation between psychomotor skills and other elements of gift (intellectual, visual, academic, creative) is an important subject worth deliberating.

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It is possible to find many studies examining the relation between intellectual skills which constitutes much of gift i.e.intelligence, brain functions, cognitive skills and exercise. It is widely known that; sports improve cognitive skills (Marmeleira, 2013; Patricia, 2012; Nofuji *et al*., 2012; Dustman, 1990), brains of active people show more cortical activities (Polich, 1997) and more mobilityoccurs in their several brain segments in cognitive tests, when compared with sedentary (Polich, 1997) individuals. While in some studies a positive relation was observed between intelligence level and sportive success (Burley *et al*., 1995; Hung *et al*., 2004), in other studies this relation could not be set forth (Killgore *et al*., 2012; Mirabile, 2005; Cheng Yongmin, 1999). Within the frame of the general purpose of this research, an answer to the question; whether a difference exists between the psychomotor skills of gifted and normal children, will be sought out. Namely, motor skills of gifted students with no professional sports background who are more succesful than others in terms of perception and academical success, will be compared with the motor skills of ones who are not accepted as gifted.

METHODS

Selection of the Gifted Group: Within the context of the Project supported by Karabük University, a three stage test was implemented by the "student diagnostics center".

In the first stage, applications were accepted by the center after students were diverted by class teachers and student advisors using "Observation Forms" (between 2011-2013, 4.5.6.7. class students were selected among 12.500). Forthis purpose an observation form was used to identify the skill categories. In the second stage, students took tests in general and intellectual skills under the guidance of class teachers and student advisors. The ones who succeded (Between 2011-2013, 2350 subjects took General Intellectual Skills Test among 4.5.6.7. class students) were subject to student/child individual examination tests in the third stage, conducted by experts (Testers). In this stage Wechsler Intelligence Scale for Children (WISC-R) was applied

In this study; general information, similarities, arithmetics, number series and judgement subscales were applied in verbal tests, picture completion, picture arrangement, patterns with cubes, combination of parts, cipher subtests were applied in performance tests.

Subject Groups: 50 successful male students constituted the gifted group (GG) and randomly chosen 105 unsuccessful male students constituted the ungifted group (NG). Performance and identifying data were compared with each other and tabulated.

Performance Measurements: Weights, heights, vertical jump, standing broad jump, right-left grip power, right-left visual and auditory reaction time, 30 seconds sit-ups and stability

Table 1 . Age and GG/NG Crosstabulation

		GG	NG	Total
Age	9	13	16	29
	10	9	22	31
	11	12	17	29
	12	14	50	64
	13	2	0	2
Total		50	105	155

Table 2. Comparison between GG and NG in descriptive variables

	Group	N	Mean	Std. S.	t	p
Age	GG	50	10,66	1,25	-1,48	0,139
	NG	105	10,96	1,14		
Weigh(kg)	GG	50	40,65	10,92	-0,253	0,800
	NG	105	40,58	8,96		
Height(cm)	GG	50	146,19	10,33	1,384	0,168
	NG	105	146,60	10,38		
NGBMI	GG	50	18,76	3,58	-1,337	0,183
	NG	105	19,64	3,90		

*significant level is 0,05 GG:Gifted Group NG: Normal Group

Table 3. Comparison between GG and NG in performance variables

	Group	N	Mean	Std. S.	t	p
Flexibility(cm)	GG	50	17,10	7,89	-1,676	0,098
	NG	105	19,19	5,82		
Hand Grip Power- left(kg)	GG	50	18,23	4,30	4,727*	0,000
	NG	105	14,88	4,03		
Hand Grip Power- right(kg)	GG	50	19,40	4,05	7,341*	0,000
	NG	105	14,07	4,29		
Dominant HandLightReaction Time(ms)	GG	50	270,50	45,53	-9,588*	0,000
	NG	105	477,33	149,032		
Non- Dominant Hand Light Reaction (ms)	GG	50	276,04	40,40	-10,568*	0,000
	NG	105	481,06	134,05		
Dominant HandVoiceReaction(ms)	GG	50	279,90	50,72	-9,356*	0,000
	NG	105	479,25	146,32		
Non- Dominant Hand Voice Reaction(ms)	GG	50	276,48	46,04	-10,052*	0,000
	NG	105	489,58	146,27		
Crunch in 30 sec.	GG	50	15,58	6,32	-4,286*	0,000
	NG	105	19,62	5,32		
Standing Broad Jump(cm)	GG	50	133,64	20,06	3,652*	0,000
	NG	105	121,73	20,48		
Vertical Jump(cm)	GG	50	27,10	5,50	3,405*	0,001
	NG	105	24,55	3,15		
Flamingo	GG	50	14,08	6,20	1,636	0,104
	NG	105	15,04	8,41		

*significant level is 0,05 GG:Gifted Group NG: Normal Group

WISC-R: This test was developed by Wechsler in 1949, revised in 1974 and adopted to Turkey in 1986 by Savaşır and Şahin. Two half test reliability results of the test revealed reliability coefficients of 0,97 for verbal section, 0,93 for performance section and 0.97 for total (Soysal et al., 2001).

measurements were taken. Weight was measured by a weighing machine with 20 gr. precision, height was measured by a Holtain floating caliper of 1mm. precision. Flexibility measurement was performed with a sit-and-reach test using a test bench. Subject was halted for 1-2 seconds in the farthest

point without flexing back or forth. Test was repeated two times and maximum values were recorded. Vertical and standing broad jump test results were recorded in centimeters.Right and left grip power measurements were carried out with a Takkei hand dynamometer, results were recorded in kilograms. Visual and auditory reaction times of subjects were determined using a Newtest 1000 device. 1 test and consecutively 3 measuremets were applied to each subject for sound and light stimuli.

The best result of the last 3 measurement subject scores were recorded in miliseconds as dominant and non-dominant values. In sit-up test subjects were asked to reach their maximal number of repetitions in 30 seconds. Results were recorded as number of repetitions. As for stability Flamingo Balance Test was used. Balance disruptions (failure numbers) of subjects were written down for 1 minute. Each feet were measured after 1 minute resting intervals. Failure average of right and left feet were recorded as number of failures.

Statistics: Dual comparisons about descriptive statistics and performance test data were determined and tabulated by Independent Variables T-Test. Signifance level is accepted to be 0.05 and SPSS 19,0 package programme was used for statistical analysis.

RESULTS

In Table 1 Number of subjects in the groups according to age distributionsis illustrated. As seen in Table 2, there is no significant difference between age averages of the groups.Descriptive information about subjects are given in Table-2. Obviously age, weight, height and body mass index values of NG and GGare close to each other and no statistical difference was found between them. In Table-3 comparison of statistical data belonging to GG and NG performance test averages is shown. Differences were observed between groups for all performance values except balance and flexibility. This difference was in favour of NG only for 30 sec. crunch test, for all the other variables GG obtained statistically more successful results.

DISCUSSION

This study compares the sportive performance features of gifted and not gifted students. According to the results obtained from this study, GG shows a superiority in performance with respect to the other group, especially in reaction time. In all the reaction tests, reaction times of students of this group are statistically shorter than the NG Group. Similarly, in right and left hand grip power, vertical and standing broad jump tests GG is more successful. Only in the crunch test NG had a higher score. No statistical difference was observed between groups in stability and felxibility (Table-3). Studies reveal different results just like in different performance features. It is known that sports increase brain activity and develops cognitive intelligence (Killgore *et al*., 2012; Tomporowski *et al*., 2008; Marmeleira, 2013; Patricia, 2012; Nofuji *et al*., 2012; Dustman, 1990; Polich, 1997). According to the findings, youngsters who deal with sports have higher academical success when compared with their peers and their academical performance increase (Castelli *et al*., 2007; Dwyer *et al*., 2001; Ismail, 1967; Wininger, 2011).

Also, common features of high level and successful athletes appear to be fast learning ability and cognitive intelligence (Gabbard, 2004; Bloom, 1985; Hemery, 1986). At this point the problem may be classified as “effect of sports on intelligence” and vice versa:“effect of intelligence on sports”. The aim of this study was to find out the effect of intelligence on physical performance. However most of the work in the relevant literature focus on effect of exercise on academic success, intelligence and cognitive skills.

It is well known that compound and complex rhythmic movements require intelligent activity (PlaninSec, 2002). Especially most of the studies carried on coordination-IQ andneuron speed-IQ reveal positive relation. 460 children were subject to IQ and motor skill tests, 19% variance of motor results were expalined by IQ scores. The study came to the conclusion that children with low IQ level showed poorer motor performances. In a study where 550 students participated, below and above average intelligence was detected with TN-20 test, high motor control and coordintion skills (rhythm, eye-hand coordination, whole body coordination, complex coordination) were observed in the ones with above average intelligence level (Planinsec, 2006). Thomas and Chissom concluded that highest level of correlation appears in eye hand coordination (Thomas, 1972). Graf and Hinton found a highly positive relation between motor performance test and WISC intelligence test (Graft, 1997) It is believed that as the complexity of motor activity increases, its relation with intelligence also increases (Kim, 1996). Although basic reaction ability does not require interpretation in the central nervous system, a faster neural transmission is observed in gifted students. Similar results have been layed out in other studies (Gabbard, 2004; Vernon, 1992). Tan observed this relation in males bu not in females (Tan, 1996). This relation was also detected in this study where basic visual and auditory reaction speeds were measured. Most evident perormance difference between GG and NG is the reaction skill which is almost two times faster (Table 3).

Researches on sportive performance and intelligence reveal different results. In some researches no relation was observed between sportive success and intelligence. In astudy administered on 84 football players in American National Football League no relation was identified between the intelligence of players and their passing ability (Mirabile, 2005). In another research in China, intelligence level of badminton players were found to be normal, no significant relation was seen between success and intelligence [10]. In another studyyoung elite athletes were compared with a non athlete population and their intelligence test scores came up to be lower than non athletes (Slusher, 1964). In this study, in vertical and standing broad jump and right-left hand grip power GG was more successful than NG (Table-3) In alongitudinal study applied on old people a mean level positive relation is stated where reaction time and grip power decreases linearly with memory and intelligence loss (Christensen *et al*., 2000) .Burley and Anderson compared intelligence and jumping test scores of 1013 high school students and found a low correlation value (r=0,037) (Burley *et al*., 1955). Results of this study imply that most of the motor performance features of GG are more successful than the other group, especially for reaction time. Investigations show that this superiority is specifically related to motor control and coordination.

This situation may be the result of high concentration ability and self-confidence of GG. Reaction time is an important factor which could affect the results in many individual or collective sports, so it would be beneficial to divert such studentsto various sports branches. What is more, long term motor performans surveys on gifted students would be helpful in gaining detailed information about sportive development of such children.

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