

Study on the Test Methods of College Entrance Examination in Shandong Province from the Perspective of Educational Equity

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Abstract

Through the comprehensive analysis of the data of the general physical examination enrollment in Shandong Province in 2013-2016, the author tries to make the content and method of ordinary sports test fairer. The cluster analysis indicated that the general linear model and other statistical methods were processed more than 50 thousand candidates for four years to draw the corresponding conclusions. In the special test, table tennis, martial arts, gymnastics, these three specially account for at least 46.37%, almost a half. In the quality test, compared with the 100 m and standing long jump, shot has the gap between the candidates; the difficulty is too large. The comparison between the cities, standing long jump, shot put and 100 m has significant difference, but has no regularity, thus standard for evaluation should be appropriately adjusted.

Keywords

Shandong Province, General Sport Enrollment Examination, Special Project, Physical Quality

1. Research Background

Education fairness refers to the reflection, measurement and evaluation of relationship of interpersonal education's interest [1]. Education fair measures the fairness of education by existing education fairness standards. Education fair is the norms and principles of a country's allocation of the education resources. Chinese government always attaches importance to the citizen physical quality and sports industry and other aspects. In order to promote the sports work bet-

ter, we must cultivate all aspects of sports talent. In order to make cultivate good sports better, we must stress on the selection of sports talent. Ordinary Sports college entrance examination is the main form of sports talent selection, and social attention is very high. The general college entrance examination should explore a selection system that is more suitable for the development of modern quality-oriented education according to the principle of education fairness, which makes the college entrance examination system more rational and scientific to meet the developmental needs of high quality sports' talents in modern society.

General college entrance examination: Sport Test (GCEEST) is divided into special project (40 points) and physical quality (standing long jump, shot and 100 m, each 20 points, 60 points in total) in Shandong Province, and the total score is 100 points. More than 13,000 candidates were divided into three batches each year according to the city that candidates stay in, and each batch will last for 4 days. At present, the number of studies of general sports college entrance examination is so large. Xu Kangkang studied on the setting up of college entrance examination of Physical Education Specialty [2], Shen Qiao'er evaluated the standards of enrollment of physical education [3], Wang Yaqi studied the setting up of college entrance examination of Physical Education in Jiangxi Province [4]. Wang Xiangying thought the scoring criteria of table tennis were higher than other items [5]. Hobin studied multilevel examination of school and student characteristics associated with physical education class enrollment among high school students [6]. Crocher researched general levels of physical activity [7]. Brooks studied adolescents' experiences of the transition from inactivity to active participation in school-based physical education [8], and so on. But lacking of a large number of data's support, and most of general college entrance examination researches are mostly local, lacking of corresponding data and efforts of macro control. Sports candidates' group changes continuously, so the relevant test's content should also dynamic changes. The GCEEST content and evaluation criteria should be developed in line with the local and temporal examination's requirements, and conform to the needs of sport enterprise and sport science developments. The content of test and evaluation criteria should be added and improved so that the ordinary college entrance examination test can get dynamic and healthy development. Regarding the GCEEST content and criteria is vital to sports candidates; it's important to make the GCEEST fairer for students. Thus, based on the big data of the GCEEST from 2013-2016, we comprehensively analyzed the GCEEST content and criteria problems in Shandong Province and made some proposals from the perspective of education fairness.

2. The Research of Objects and Methods

The object of this research is a comprehensive analysis of the general college entrance examination in Shandong Province. The object of survey includes 54,583 candidates for the general college entrance examination of Shandong province in

2013-2016. Some candidates' data are removed from total results of examination because of missing exam and special items. In addition, one male candidate whose jump performance is 1.16 m (He was estimated to be injured and his data is processed as abnormal data). Finally in the statistics, there are 36,535 male and 8613 female candidates. The data is from Institute of Education Entrance Examination of Shandong Province which could insure the validity of the data. 100 m adopts the Feipulai electronic timing system; the shot uses the earth laser ranging; long jump adopts the infrared measurement system. The source of data is so reliable.

3. Results and Analyses

Due to a number of special projects use technical evaluation, lacking of comparison between each special, there is no uniform standard for reference, and the candidates apply for different special, lacking of contrast between each special, so the only basic situation of the candidates' special was analyzed. Each candidate need participate in the project of quality. The data were derived from a unified instrument; every item was tested in early April; the weather has no much difference between all the tests, so the collection of data was be provided with "three properties" mentioned above.

3.1. The Analysis of Each Special Registration in Recent Four Years

From **Table 1**, the number of men's 200 m of special dropped, while the number of women's 200 m enrollments increased. The number of men's basketball dropped, the number of women's basketball raised significantly. Among them, the lowest proportion of the total number of students in gymnastics, martial arts and table tennis is 46.37% in all the projects of technical evaluation. The number of annual enrollment is basically fine-tuned among the three projects, accounting for almost more than half of all candidates, and it has rising trend. From this point we can know that candidates are more inclined to gymnastics, martial arts and table tennis.

3.2. The Analysis of Situation of Sports Candidates' Registration

Through the analysis of the number of registered candidates in the city, we found that the number of registered persons was relatively high in Liaocheng per ten thousands of candidates. The males' registered number is 10.70 per ten thousands of candidates, while the females' registered number is relatively less which is 3.36 per ten thousands of candidates. From the analysis of registered number of males per ten thousands of candidates and the degree of relationship of economic development (GDP ranking of Shandong Province in 2016). From **Table 2**, we know that they are positively correlated. It means that some of the city has the better economic development, while its registration's number is relatively smaller. As the better economic development, the sports foundation

Table 1. The statistics of each special registration in recent four years.

Item	Male (%)				Female (%)			
	2013	2014	2015	2016	2013	2014	2015	2016
200 m	12.24	12.6	5.74	5.34	5.77	5.61	13.88	14.38
400 m	2.84	2.25	4.37	3.25	3.87	3.19	2.76	1.96
800 m	3.64	2.77	1.84	1.97	1.85	1.32	3.2	2.85
1500 m	0.74	0.45	2.26	1.28	2.26	1.65	0.57	0.53
110 m hurdle	0.05	0.07	0.27	0.08	0.23	0.15	0.09	0.05
100 m hurdle								
High Jump	0.18	0.25	0.16	0.12	0.05	0.11	0.28	0.24
Long jump	2.28	1.86	1.72	2.17	2.91	1.58	1.53	1.71
Triple jump	0.98	0.78	1.88	2.44	3.18	2.72	0.55	0.6
Shot	1.41	1.61	1.41	1.12	2.03	1.06	1.74	1.4
Javelin	0.28	0.26	0.16	0.27	0.23	0.29	0.39	0.28
Discus	0.32	0.22	0.47	0.54	0.55	0.26	0.29	0.26
Basketball	17.01	14.16	2.73	3.37	3.46	2.97	14.43	12.32
Volleyball	7.26	7.57	8.2	8.82	9.23	6.5	7.1	9.17
Football	4.4	4.42	3.05	2.59	2.58	2.24	5.13	6.24
Table tennis	20.84	24.85	20	15.67	24.57	25.95	19.96	16.36
Martial art	15.12	15.62	25.23	29.22	27.54	25.65	16.38	18.46
Gymnastics	10.41	10.26	20.51	21.75	9.69	18.75	11.72	13.19

Table 2. The correlation coefficient between the number of registered persons per ten thousands of candidates and the degree of economic development in each city.

Gender	Per ten thousands of candidates	Per ten thousands of candidates	GDP ranking of city	GDP ranking of city
Man Kendall's tau	Per ten thousands of candidates	Correlation coefficient sig. (2-tailed)	1	0.353*
	GDP ranking of city	Correlation coefficient sig. (2-tailed)	0.353*	1.000
Female Kendall's tau	Per ten thousands of candidates	Correlation coefficient sig. (2-tailed)	0.265	1
	GDP ranking of city	Correlation coefficient sig. (2-tailed)	0.265	1

*Correlation is significant at the 0.05 level (2-tailed). Note: The ranking of urban economy comes from the statistical yearbook of Shandong Province.

should be better, but the number of registered candidates for the general college entrance examination is smaller, which should pay attention to this problems. The number of registrations of females and the degree of economic development is not relevant, in other words, the number of registrations of females is more balanced in each city.

3.3. The Determination of Difficulty Coefficient in Each Quality

It can be seen from **Table 3**, the sampling error rate of male and female students is almost zero. No participating and missing items in the exam were removed from this paper ensuring the accuracy of the data. From the coefficient of variation, the degree of variation of the shot is still relatively high between whether candidates are male or female. The results' gap between the candidates is relatively large. From the coefficient of difficulty, the coefficient of difficulty of the shot is the largest one.

3.4. Study on the Scoring Criteria of Physical Quality

By examining the scoring standards of general college entrance examination in Shandong Province, we can see that scoring standards of male, female and each project are imbalanced. In terms of the pass rate, male is better than female. From **Table 4**, we know that the full mark rate of men standing long jump is up to 17.6%, which is much higher than other qualities. In terms of the pass rate, girls are relatively balanced, while boys need to balance the various projects. In particular, the standards of standing long jump full score need to be properly raised. The full score rate of male and female is 6.67%. The pass rate of male and female is 44.95%. Therefore, in the mean score, the shot and the women's 100 m

Table 3. Descriptive statistics of three qualities of male and female candidates (male, 36,535 and female, 8613).

Gender	Quality	Mean	Std. error	Std. deviation	Variance	Skewness	Kurtosis	Variable coefficient	Coefficient of difficulty
Male	SLJ	2.57	0.001	0.160	0.026	-0.438	0.420	6.22	0.415
	Shot	9.39	0.006	1.065	1.134	0.184	0.340	11.34	0.612
	100 m	13.02	0.004	0.685	0.469	0.850	3.060	5.26	0.428
Female	SLJ	2.085	0.001	0.137	0.019	-0.298	0.169	6.59	0.412
	Shot	6.73	0.009	0.806	0.649	0.490	0.893	11.97	0.631
	100 m	15.47	0.010	0.943	0.889	0.745	3.620	6.09	0.422

Note: SLJ mean standing long jump in order to composing.

Table 4. Analysis of three qualities scoring standards of male and female candidates.

Gender	Quality	Min		Max		Mean		Percent of full standard	Percent of qualified standard
		Result	Score	Result	Score	Result	Score		
Male	SLJ	1.67	2.07	3.25	20	2.57	14.60	17.60	46.30
	Shot	4.49	1.55	15.97	20	9.39	12.24	2.00	52.20
	100 m	11.06	20	21.22	0	13.02	14.04	5.60	66.60
Female	SLJ	1.45	1.87	2.49	20	2.09	14.12	7.60	28.70
	Shot	3.66	3.96	10.85	20	6.73	11.95	0.60	43.60
	100 m	12.8	20	26.59	0	15.47	12.35	6.60	32.30

standards should be reduced appropriately, which fully reflect the balance and fair of each project. Overall, the current scoring criteria need to be adjusted. Through the normal test of the male and female, the three qualities of male and female meet the normal distribution.

According to the characteristics of normal distribution, as shown **Table 5**, checking the normal distribution table, we worked out the standards of three qualities of male and female, which included full mark, qualified mark and zero mark. Through this criterion, the corresponding scoring criteria are drawn in reference to the progressive integral formula of the ten-round (men) and the seven heels (women).

3.5. Contrastive Analysis of Different Years, Specialties and Cities

Through the analysis of standing long jump, shot and 100 m in different years, specialties and cities, we can see the differences in the above mentioned 3 variables, both for male and female candidates, as shown **Table 6**.

Through comparative analysis of each two male candidates, we see that the scores of standing long jump and shot in the year 2014 are worse than other years. In the aspect of the quality of standing long jump, candidates of jumping special (Long jump, triple jump and high jump) make the better scores than candidates of running special, throwing special, basketball special, volleyball special, Soccer special, table tennis special, gymnastics special, martial arts special and other specials; the results of candidates of throwing class are weaker than other special's candidates; besides the results of table tennis, gymnastics and martial arts are better than throwing ones, but they are weaker than other specials. In terms of the quality of shot, throwing candidates have an advantage, however, the candidates of jump make weaker scores than others. In terms of the quality of 100 m, candidates majoring in running make better results than others, but the throwing candidates are weaker than others.

In terms of 100 m and shot, female candidates obtain better scores in the year 2016; however, in terms of standing long jump, there is no difference every year. From the point of view of different specials, women's running projects are weaker than the jump's projects, but it's better than other specials. The projects

Table 5. The normal test of the three qualities for male and female and the designate of each score.

Gender	Quality	Kolmogorov-Smirnova			Mean	SD	Full standard	Qualified standard	Zero standard
		Statistic	df	Sig.					
Male	SLJ	0.039	36,535	0.000	2.57	0.160	2.81	2.59	2.33
	Shot	0.020	36,535	0.000	9.39	1.065	10.99	9.53	7.79
	100 m	0.038	36,535	0.000	13.02	0.685	14.04	13.10	11.99
Female	SLJ	0.040	8613	0.000	2.09	0.137	2.29	2.10	1.88
	Shot	0.040	8613	0.000	6.73	0.806	7.94	6.84	5.52
	100 m	0.027	8613	0.000	15.47	0.943	14.05	15.59	16.88

Table 6. The testing results of these three variables: different years, special projects and cities.

Gender	Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	
Male	Year	SLJ	0.966	3	0.322	14.137	0.000	
		Shot	57.427	3	19.142	19.341	0.000	
		100 m	7.289	3	2.430	6.653	0.000	
	Item	SLJ	85.338	8	10.667	468.407	0.000	
		Shot	4546.978	8	568.372	574.262	0.000	
		100 m	3231.099	8	403.887	1105.904	0.000	
		City	SLJ	11.773	16	0.736	32.311	0.000
			Shot	704.804	16	44.050	44.507	0.000
			100 m	174.309	16	10.894	29.830	0.000
	Female	Year	SLJ	0.112	3	0.037	2.184	0.088
			Shot	6.332	3	2.111	3.696	0.011
			100 m	16.638	3	5.546	7.740	0.000
Item		SLJ	11.888	8	1.486	87.252	0.000	
		Shot	589.440	8	73.680	129.009	0.000	
		100 m	1126.978	8	140.872	196.609	0.000	
City	SLJ	3.007	16	0.188	11.033	0.000		
	Shot	65.015	16	4.063	7.115	0.000		
		100 m	132.040	16	8.252	11.518	0.000	

of throwing has no difference with football, table tennis, martial arts and gymnastics, but it's weaker than running, basketball and volleyball.

Although candidates from different cities differ in standing long jump, shot and 100 m, yet there are no regular features.

3.6. Effects of Different Years and Batches on the Results of Quality

Through the analysis of multivariate of general linear model based on of the quality of male and female candidates of 12 batches from the year 2013 to the year 2016, we can see that in different years, these three qualities of male and female candidates who belong to same batch are different; and for the candidates who are from different batches in the same year, the results are also different (The general sports test is conducted three times in each year in Shandong Province). On the project of standing long jump, the first batch of standing long jump test in 2013 and the third installment of standing long jump test in 2015 is better than other units; for the shot, the differences only exist in the first and second batch in 2015; and for 100 m, the first batch of it in 2013 and second batch in 2016 are better than other batches. Overall, there are one or several batches to be better than other batches regardless of male and female candidates

with so many reasons, but there are some differences in all periods, which is related to the weather and each batch of male's and female's different special of candidates, therefore it can't prove that different batches have an impact on the candidates.

4. Discussion

4.1. The Issue of Testing Specials

According to the testing data in recent four years, the candidates of table tennis, martial arts and gymnastics of male and female candidates is basically more than 46%, accounting for almost half of all the number of special's applicants, these projects all stress on the results of Technical evaluation. However, for basketball, volleyball and soccer had results of competition and technical ability. If the referee was unchanged in the three batches of special's tests, which do not meet the relevant policies; if the change is large, it is difficult to achieve the same score, the proportion of candidates' applicant changed little, so the fairness between the various specialties cannot be guaranteed. The track and field has a duplicate part in specialty and quality, for example, students specialized in 200 m also have a good grade in the test of the quality of 100 m. The test of special needs more manpower and material resources, and spends longer time, and the number of applicants in Shandong Province each year is 13,000 or so, and this test need 12 days, so all the things above mentioned disturbed examination of the organization of teaching working. We need to find a more feasible way to shorten the test time. For candidates, they prefer to those projects which are easy to practice and to get high scores. After entering into university, there are more projects comparing with the college entrance examination's, so students will choose their favorite profession.

At present, through consulting the examination websites of each province, the provinces which test specialties and the provinces which test both specialties and qualities account for 50% respectively. In the general sports test, there is a trend of stressing on the development of the basic quality of the body. For the establishment of the test of content, we need a more equitable, objective and normative test's method and system, which can comprehensively and objectively reflect the quality of the candidates. In Shandong Province, the current test, including both special testing and basic quality testing, is conducted in three batches, lasting 12 days. Time-consuming and energy-intensive, these problems have a certain impact on school teaching, so it is necessary to consider shortening the test time and using the method of only testing the quality.

4.2. The Issue of Testing Quality

If the test content only includes quality and without the specialty, candidates' mastery of the basic skills of specialties can only reach the general level, furthermore their special quality and coordination will be poor. In order to deal with the college entrance examination and improve students' test scores, the

majority of the teachers do not allow students to train projects that have nothing to do with college entrance examination, which results in weak special sports skills and physical quality after they entering into university. The endurance quality and coordination ability are especially poor, and the ability to accept special skills is also weak. The method of solution is to add some special basic ability tests into quality tests, changing single method of measuring the quality, for example shuttle run or snake run can be used to measure speed quality which can also be used to measure various body qualities. And in the highly developed society of technology, it should be easy to achieve.

4.3. The Questions of Applying for General College Entrance Examination of Liberal Arts and Science

All the time, the general sports college entrance examination has been recruiting science students in order to facilitate future university study. But now diversity of sports, it not only include science content, but also more contents of humanities. Many schools have management and social sports which lay particular stress on the Liberal arts profession. Many of the curriculums of physical education also are humanities courses, in my opinion, there is no need to limit the liberal arts and science, of course, high school soon carry out the implementation regardless of Division of Arts and Sciences, which is so good. It is recommended that the relevant departments should loosen the restrictions of liberal arts and science for the general college entrance examination to attract more sports students to enrich the sports team. Through the survey, Yang Gaisheng also believed that the general sports test should recruit the students of liberal arts and science [9].

5. Conclusions

In the special tests, the special projects, table tennis, martial arts and gymnastics account for at least 46.37%, even more than half. In the quality test, the gaps of examinees are larger in shot compared with the 100 m and standing long jump. The shot is more difficult. In different cities, the differences are significant among the standing long jump, shot and 100 m, but there is no regularity.

According to the characteristics of normal distribution, we work out the scoring standards of the standing long jump, shot, 100 m, which include full mark, qualified mark and zero mark. We can further develop the equation basing on progressive integral.

In order to reflect the principle of educational equity, we should only measure the quality, try to reduce the impact of human factors, and test results objectively.

6. Limitations and Suggestions

There are some limitations should be stated. This study did not include the data of special project as it is difficult to collect the subjective scoring. As a result, this

study did not analysis the relationship between special project data and physical quality data. Basing on the education fair, it is suggested that the students of science and liberal arts should take part in the GCEEST. At present, the test of sports' content and scoring standards of Shandong Province should be adjusted appropriately. In order to solve the imbalance between the special, it is recommended that we should only test the quality, make the appropriate adjustment of professional lesson setting, and increase the number of hours of special's time.

References

- [1] Zhang, L.C. (2002) Theoretical Thought on the Issue of Educational Equity. *Educational Research*, **275**, 35.
- [2] Xu, K.K. (2016) Study on the Setting up of College Entrance Examination of Physical Education Specialty in China. *Journal of Nanjing Sport Institute*, **15**, 120-125.
- [3] Shen, Q.E. and Li, J.S. (2001) The Summary of Setting and Evaluation Standards of Enrollment of Physical Education Examination Was in China. *Journal of Beijing Sport University*, **24**, 525-527.
- [4] Wang, Y.Q. (2013) Study on the Setting up of College Entrance Examination of Physical Education Specialty in Jiangxi Province. Soochow University, Suzhou, 5-8.
- [5] Wang, X.Y. (2008) Study on the Scoring Criteria of Table Tennis in College Entrance Examination. *Journal of Shandong Normal University*, No. 6, 167.
- [6] Hobin, E.P., Leatherdale, S.T., Manske, S.R., *et al.* (2010) A Multilevel Examination of School and Student Characteristics Associated with Physical Education Class Enrollment among High School Students. *Journal of School Health*, **80**, 445-452.
<https://doi.org/10.1111/j.1746-1561.2010.00526.x>
- [7] Crocker, P.R.E., Bailey, D.A., Faulkner, R.A., *et al.* (1997) Measuring General Levels of Physical Activity: Preliminary Evidence for the Physical Activity Questionnaire for Older Children. *Medicine and Science in Sports and Exercise*, **29**, 1344-1349.
<https://doi.org/10.1097/00005768-199710000-00011>
- [8] Brooks, F., Magnusson, J., *et al.* (2006) Taking Part Counts: Adolescents' Experiences of the Transition from Inactivity to Active Participation in School-Based Physical Education. *Health Education Research*, **21**, 872-883.
<https://doi.org/10.1093/her/cyl006>
- [9] Yang, G.S., *et al.* (2010) Study on Enrollment of Physical Education Major in Colleges and Universities. *China Sports Science*, **36**, 30-31.

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