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Teenager physical quality and physical exercises gender differences research

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ABSTRACT

Physical exercises have important effects on improving physical quality, soothing mood, and adjusting mental states aspects. Teenager is main force in physical exercises, and different genders because of physical technology and other aspects differences, their physical exercises efficiency also has significant differences. The paper utilizes grey correlation degree method and variance analysis method, studies on Chinese teenager physical quality and physical exercises gender differences. Firstly, establish teenager exercises habits and physical quality study model, by calculating correlation degree value, comparing its size, analyze different genders physical exercises habits and their weight changes when carry on jogging and walking, three big balls sports, swimming , sports dance, and roller skating five kinds of sports activities. Secondly, establish different genders physical exercises habits significance model on physical quality impacts, make comparative analysis of data, and observe its significance differences. And then get conclusion: jogging and walking, three big balls sports, swimming have bigger impacts on schoolboys, while jogging and walking, three big balls sports, sports dance have bigger impacts on schoolgirls. Among them, jogging and walking have significant impacts on improving schoolgirls' physical quality aspects, and three big balls sports have significant impacts on improving schoolboys' physical quality aspects.

KEYWORDS

Physical exercises; Gender differences; Grey correlation degree; Variance analysis; Teenager; Physical quality.

INTRODUCTION

Society today, no matter in medical field or in sports circles, physical exercises take crucial position. Physical exercises relax mood, relief emotions, and can improve physical functions, ensure body each technology to sound develop, especially in teenager growth aspect, it plays very important roles.

In the article "Shanghai community fitness population physical exercises values recognition and exercises behaviors relationship study" , Yao Jin-Tao took Shanghai as an example, from the perspective of community fitness population, analyzed physical exercises values and people recognition degree on physical exercises. The thesis pointed out that community residents physical exercises consciousness was stronger, most of residents averagely could spend 2~3 hours to take physical exercises per day, and physical exercises had various ways, square dance, Taijiquan, ballroom dance and others were first choice of community residents sports fitness activities.

In the article "University students physical exercises habits forming factors influence research—investigation analysis of six regular universities in Hohhot city ,inner Mongolia", Jiang Xiao-Zhen took six universities in inner Mongolia as examples, researched on exercises habits formation factors by university students physical exercises behaviors. The thesis pointed out good physical exercises behaviors formation should rely on higher sports awareness, and have certain physical basis; it should select physical exercises types according to practical situation. In addition, university students' physical exercises behaviors forming also suffered school physical education impacts.

In the article "Hebei province independent college physical education status research", Ma Hui took Hebei province as an example, studied on independent college physical education problems. Thesis analyzed Hebei province sports development existing problems in physical teaching aspect by investigating Hebei province each independent college's sports teaching status. The thesis pointed out Hebei province independent college sports teaching status was not good, physical education course mostly was occupied by cultural courses, students suffered learning pressure, and their enthusiasm in participating in physical course was also not so high.

The paper studies on Chinese teenager physical exercises gender differences, referencing formers research results, by making quantitative analysis of data, finally it gets Chinese teenager physical quality and physical exercises have significant differences.

MOLD ESTABLISHMENT

It is well known that physical exercises can improve physical quality, especially for teenager, they are just in the period of growing; often take physical exercises can avoid obesity and other teenager common diseases occurrence. However, different physical exercises events have different effects on improving physical qualities. Here, take different genders teenager weight changes as examples, study on jogging, walking, skating type, sports dance type, swimming type, ball type sports impacts on teenager weight changes, below Table 1 is statistical data.

TABLE 1: Data statistical table

	Weight before exercising kg	Age (Years old)	Physical exercise frequency h/day		Jogging, walking	Three big balls sports	Swimming	Sports dance	Roller skating
Boy	97.11 ± 22.71	18.45 ± 45.5	Exercise regularly	3.5	96.68	96.43	95.21	97.01	97.11
			Don't exercise regularly	0.5	95.44	96.01	94.23	97.22	96.98
Girl	85.02 ± 17.47	21.00 ±	Exercise regularly	3.3	84.22	84.15	83.11	85.22	85.10

	7.19	Don't exercise regularly	0.5	82.01	83.75	82.06	84.97	84.77

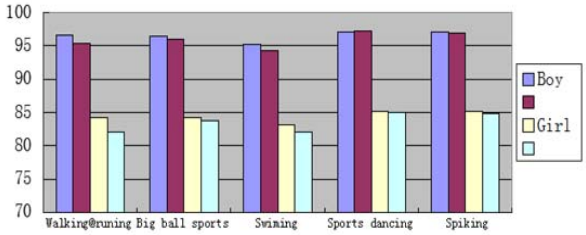

Figure 1: The picture of the above data

Above statistical Figure 1 shows that different genders, due to physical exercises habits differences, their weight changes have great differences. Jogging, walking, three big balls sports, swimming, sports dance, roller skating have different impacts on schoolboys and schoolgirls. With respect to this, utilize correlation degree method to analyze above data, and further study on different genders weight changes scale after jogging and walking, three big balls sports, swimming, sports dancing and roller skating five kinds of sports events.

Grey correlation degree method analyzes data

Record feature behaviors sequence as following :

$x_i^{'} = \left(x_i^{'}(1), x_i^{'}(2), \cdots, x_i^{'}(5)\right)^T, i = 1, 2, \cdots, 5$ among them, relative factors line sequence is :

$x_1^{'} = (96.68, \quad 95.44); x_2^{'} = (96.43, \quad 96.01); x_3^{'} = (95.21, \quad 94.23);$

$x_4^{'} = (97.01, \quad 97.22); x_5^{'} = (97.11, \quad 96.98)$

Therefore, it can get:

$$x_i^{'} = \begin{pmatrix} 96.68 & 95.44 \\ 96.43 & 96.01 \\ 95.21 & 94.23 \\ 97.01 & 97.22 \\ 97.11 & 96.98 \end{pmatrix}$$

Define reference sequence

Take physical exercise frequency sequence $x_0^{'}$ as reference sequence,that:

$x_0^{'} = (3.5 \quad 0.5)$

Initialization method data handling

Utilize formula $x_i(k) = \frac{x_i^{'}(k)}{x_i^{'}(1)}$ to handle with relative factors line sequence, result is as following :

$x_1(k) = \frac{x_1^{'}(k)}{x_1^{'}(1)} = (1, \quad 0.98); x_2(k) = \frac{x_2^{'}(k)}{x_2^{'}(1)} = (1, \quad 0.99);$

$x_3(k)=\frac{x_3^{'}(k)}{x_3^{'}(1)}=(1 \quad 0.98)$; $x_4(k)=\frac{x_4^{'}(k)}{x_4^{'}(1)}=(1, \quad 1.01)$;

$x_5(k)=\frac{x_5^{'}(k)}{x_5^{'}(1)}=(1, \quad 0.99)$;

Calculate $\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|, \max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|$

Input $x_1(k)=\frac{x_1^{'}(k)}{x_1^{'}(1)}=(1, \quad 0.98)$; $x_2(k)=\frac{x_2^{'}(k)}{x_2^{'}(1)}=(1, \quad 0.99)$;

$x_3(k)=\frac{x_3^{'}(k)}{x_3^{'}(1)}=(1 \quad 0.98)$; $x_4(k)=\frac{x_4^{'}(k)}{x_4^{'}(1)}=(1, \quad 1.01)$;

$x_5(k)=\frac{x_5^{'}(k)}{x_5^{'}(1)}=(1, \quad 0.99)$ into above formulas and can get:

$\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=3.02$, $\max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=8.99$

Calculate correlation coefficient

Below is correlation coefficient computational formula:

$$\zeta_i(k)=\frac{\min\limits_{1\le i\le n}\min\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}{\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}$$

Among them, ρ is resolution coefficient ,and $\rho\in(0,1)$, $\rho=0.5$, ρ gets bigger, relations would be larger.

Input $\left|x_0^{'}(k)-x_i(k)\right|$ each value , and can get:

$\zeta_1=(1.14, \quad 1.01)$; $\zeta_2=(1.11, \quad 0.996)$; $\zeta_3=(1.38, \quad 0.95)$;

$\zeta_4=(1.01, \quad 0.989)$; $\zeta_5=(1.21, \quad 0.996)$;

Calculate correlation degree

Utilize correlation degree computational formula $r_i=\frac{1}{m}\sum_{k=1}^{m}\zeta_i(k)$,input

$\zeta_1=(1.14, \quad 1.01)$; $\zeta_2=(1.11, \quad 0.996)$; $\zeta_3=(1.38, \quad 0.95)$;

$\zeta_4 = (1.01, \quad 0.989); \zeta_5 = (1.21, \quad 0.996);$

And get : $r_1 = 1.082, r_2 = 1.046, r_3 = 0.857, r_4 = 0.757, r_5 = 0.662$,and further get following data Table 2:

TABLE 2 : Grey correlation degree value

	Jogging, walking	Three big balls sports	Swimming	Sports dance	Roller skating
Correlation degree	1.082	1.046	0.857	0.757	0.662

Above data Table 2 is schoolboys body weight changes an physical exercises time correlation degree values when jogging, walking , taking three big balls sports, swimming, sports dancing and roller skating. Therefore, it is clear that jogging, walking, three big balls sports have larger impacts on weight changes.

Schoolgirls weight changes and physical exercises relationship

Record feature behaviors sequence as following:

$x_i^{'} = \left(x_i^{'}(1), x_i^{'}(2), \cdots, x_i^{'}(5)\right)^T, i = 1, 2, \cdots, 5$ among them, relative factors line sequence is:

$x_1^{'} = (84.22, \quad 82.01); x_2^{'} = (84.15, \quad 83.75); x_3^{'} = (83.11, \quad 82.06);$

$x_4^{'} = (85.22, \quad 84.97); x_5^{'} = (85.10, \quad 84.77)$

Therefore, it can get:

$$x_i^{'} = \begin{pmatrix} 84.22 & 82.01 \\ 84.15 & 83.75 \\ 83.11 & 82.06 \\ 85.22 & 84.97 \\ 85.10 & 84.77 \end{pmatrix}$$

Define reference sequence

Take physical exercise frequency sequence $x_0^{'}$ as reference sequence,that:

$x_0^{'} = (3.3 \quad 0.5)$

Initialization method data handling

Utilize formula $x_i(k) = \dfrac{x_i^{'}(k)}{x_i^{'}(1)}$ to handle with relative factors line sequence, result is as following :

$x_1(k) = \dfrac{x_1^{'}(k)}{x_1^{'}(1)} = (1, \quad 0.97); x_2(k) = \dfrac{x_2^{'}(k)}{x_2^{'}(1)} = (1, \quad 0.89);$

`` $x_3(k)=\frac{x_3^{'}(k)}{x_3^{'}(1)}=(1 \quad 0.97)$; $x_4(k)=\frac{x_4^{'}(k)}{x_4^{'}(1)}=(1, \quad 1.01)$;

$x_5(k)=\frac{x_5^{'}(k)}{x_5^{'}(1)}=(1, \quad 1.10)$;

Calculate $\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|, \max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|$

Input $x_1(k)=\frac{x_1^{'}(k)}{x_1^{'}(1)}=(1, \quad 0.97)$; $x_2(k)=\frac{x_2^{'}(k)}{x_2^{'}(1)}=(1, \quad 0.89)$;

`` $x_3(k)=\frac{x_3^{'}(k)}{x_3^{'}(1)}=(1 \quad 0.97)$; $x_4(k)=\frac{x_4^{'}(k)}{x_4^{'}(1)}=(1, \quad 1.01)$;

$x_5(k)=\frac{x_5^{'}(k)}{x_5^{'}(1)}=(1, \quad 1.10)$ into above formulas and can get:

$\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=4.16$, $\max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=9.01$

Calculate correlation coefficient

Below is correlation coefficient computational formula:

$$\zeta_i(k)=\frac{\min\limits_{1\le i\le n}\min\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}{\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}$$

Among them, ρ is resolution coefficient ,and $\rho\in(0,1)$, $\rho=0.5$, ρ gets bigger, relations would be larger.

Input $\left|x_0^{'}(k)-x_i(k)\right|$ each value , and can get:

$\zeta_1=(1.11, \quad 1.08)$; $\zeta_2=(1.12, \quad 0.987)$; $\zeta_3=(1.27, \quad 0.92)$;

$\zeta_4=(1.10, \quad 0.976)$; $\zeta_5=(1.01, \quad 0.966)$;

Calculate correlation degree

Utilize correlation degree computational formula $r_i=\frac{1}{m}\sum_{k=1}^{m}\zeta_i(k)$,input

$\zeta_1=(1.11, \quad 1.08)$; $\zeta_2=(1.12, \quad 0.987)$; $\zeta_3=(1.27, \quad 0.92)$;

$\zeta_4=(1.10, \quad 0.976)$; $\zeta_5=(1.01, \quad 0.966)$;

And get: $r_1 = 1.112, r_2 = 1.028, r_3 = 0.797, r_4 = 0.862, r_5 = 0.654$, and further get following data Table 3:

TABLE 3 : Grey correlation degree value

	Jogging, walking	Three big balls sports	Swimming	Sports dance	Roller skating
Correlation degree	1.112	1.028	0.797	0.862	0.654

Above data Table 3 is schoolgirls body weight changes an physical exercises time correlation degree values when jogging, walking , taking three big balls sports, swimming, sports dancing and roller skating. Therefore, it is clear that jogging, walking, three big balls sports have larger impacts on weight changes.

DIFFERENT GENDERS PHYSICAL EXERCISES TO PHYSICAL QUALITY IMPACTS COMPARATIVE ANALYSIS

By researching on above different genders physical exercises habits, it can get following correlation degree data Table 4:

TABLE 4 : Correlation degree data statistical table

Gender	Jogging, walking	Three big balls sports	Swimming	Sports dance	Roller skating
Boy	1.082	1.046	0.857	0.757	0.662
Girl	1.112	1.028	0.797	0.862	0.654

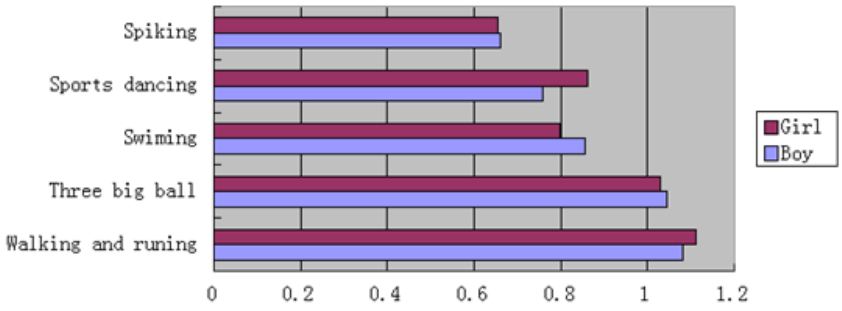

Figure 2 : The comparison of the data

Above bar Figure 2 is not enough to show physical exercises gender differences, to further analyze schoolboys and schoolgirls significant differences, now make variance analysis on above data, and then study and compare different physical exercises activities significant impacts on different genders.

Variance analysis model

Variance analysis is considering factors impacts on indicators. Research objects experiment result is indicator, control variable, condition that is factors. When research objects influence factors are two, it should consider two factors variance analysis. Set it has two influence factors A, B, make respective classification of A, B into some levels, and make several times test on every level, make variance analysis of data, and then research on A, B two influence factors respective significances on

research objects impacts. Sometimes, it should make further test whether A, B have significant interactive impacts on research objects.

Its mathematical model is :set A to take r pieces of level $A_1, A_2, \cdots, A_r$, B takes s pieces of level $B_1, B_2, \cdots, B_s$, under level combination(A_i, B_j), totality x_{ij} conforms to normal distribution $N(\mu_{ij}, \delta^2), i = 1, \cdots, r, j = 1, \cdots, s$. And under A_i, B_j,it makes t pieces of experiments, record result as x_{ijk} , x_{ijk} conforms to $N(\mu_{ij}, \delta^2), i = 1, \cdots, r, j = 1, \cdots, s, k = 1, \cdots, t$,and mutual independent. Decompose x_{ijk} into:

$$x_{ijk} = \mu_{ij} + \varepsilon_{ij}, i = 1, \cdots, r, j = 1, \cdots, s, k = 1, \cdots, t$$

Among them, $\varepsilon_{ijk} \sim N(\mu_{ij}, \delta^2)$, and mutual independent,record:

$$\mu = \frac{1}{rs}\sum_{i=1}^{r}\sum_{j=1}^{s}\mu_{ij}, \mu_{i\bullet} = \frac{1}{s}\sum_{j=1}^{s}\mu_{ij}, a_i = \mu_{i\bullet} - \mu$$

$$\mu_{i\bullet} = \frac{1}{r}\sum_{i=1}^{r}\mu_{ij}, \beta_i = \mu_{\bullet j} - \mu, \gamma_{ij} = \mu_{ij} - \mu - \alpha_i - \beta_i$$

Among them, μ is grand average , α_i is level A_i effect on indicator, β_i is level B_i effect on indicator, γ_{ij} is level A_i and level B_i interaction effect on indicator. Model table is:

$$\begin{cases} x_{ijk} = \mu + \alpha_i + \beta_j + \gamma_{ij} + \varepsilon i_j \\ \sum_{i=1}^{r}\alpha_i = 0, \sum_{j=1}^{s}\beta_j = 0, \sum_{i=1}^{r}\gamma_{ij} = \sum_{j=1}^{s}\gamma_{ij} = 0, \\ \varepsilon_{ijk} \sim N(0, \delta^2), i = 1, \cdots, r, j = 1, \cdots, s, k = 1, \cdots, t \end{cases}$$

Original hypothesis is:

$$H_{01} : \alpha_i = 0 (i = 1, \cdots, r)$$
$$H_{02} : \beta_j = 0 (j = 1, \cdots, s)$$
$$H_{03} : \gamma_{ij} = 0 (i = 1, \cdots, r, j = 1, \cdots, s)$$

If two factors have no interaction effects,let $t = 1$, process can simplify ,assume $\gamma_{ij} = 0$,then:

$$\mu_{ij} = \mu + \alpha_i + \beta_i, i = 1, \cdots, r, j = 1, \cdots, s$$

Now, model can be written as :

$$\begin{cases} x_{ij} = \mu + \alpha_i + \beta_j + \varepsilon i_j \\ \sum_{i=1}^{r} \alpha_i = 0, \sum_{j=1}^{s} \beta_j = 0 \\ \varepsilon_{ijk} \sim N(0, \delta^2), i = 1, \cdots, r, \ j = 1, \cdots, s \end{cases}$$

Below is test statistics:

$$\bar{x} = \frac{1}{rs} \sum_{i=1}^{r} \sum_{j=1}^{s} x_{ij}, x_{i\bullet} = \frac{1}{s} \sum_{j=1}^{s} x_{ij}, x_{\bullet j} = \frac{1}{r} \sum_{i=1}^{r} x_{ij}$$

$$S_T = \sum_{i=1}^{r} \sum_{j=1}^{s} (x_{ij} - \bar{x})^2$$

Among them, S_T is whole test data headquarter variation, and becomes total squares sum, decompose it :

$$\begin{aligned} S_T &= \sum_{i=1}^{r} \sum_{j=1}^{s} (x_{ij} - \bar{x})^2 \\ &= \sum_{i=1}^{r} \sum_{j=1}^{s} (x_{ij} - \bar{x}_{i\bullet} - \bar{x}_{\bullet j} + \bar{x})^2 + s \sum_{i=1}^{r} (x_{ii\bullet} - \bar{x})^2 + r \sum_{j=1}^{s} (x_{\bullet j} - \bar{x})^2 \\ &= S_E + S_A + S_B \end{aligned}$$

It can verify: in above squares sum decomposition, cross terms are 0.Among them:

$$S_E = \sum_{i=1}^{r} \sum_{j=1}^{s} (x_{ij} - \bar{x}_{i\bullet} - \bar{x}_{\bullet j} + \bar{x})^2$$

$$S_A = s \sum_{i=1}^{r} (x_{ii\bullet} - \bar{x})^2$$

$$S_B = r \sum_{j=1}^{s} (x_{\bullet j} - \bar{x})^2$$

Data analysis

Use MATLAB software to analyze Table 4 ,and then get following variance analysis data Table 5:

TABLE 5 : Variance analysis data table

Gender	Jogging, walking M ± SD	Three big balls sports M ± SD	Swimming M ± SD	Sports dance M ± SD	Roller skating M ± SD
Boy	1.082 ± 0.15	1.046 ± 0.21	0.857 ± 0.11	0.757 ± 0.06	0.662 ± 0.09
Girl	1.112 ± 0.13	1.028 ± 0.19	0.797 ± 0.09	0.862 ± 0.12	0.654 ± 0.02

By above variance analysis data, it can get conclusion: compare to above jogging and walking, three big balls sports, swimming, sports dance , roller skating variance size, from boy and girl genders, in the aspect of jogging and walking, three big balls sports, swimming, and roller skating, schoolboys variances are bigger than schoolgirls, and for sports dance variance, schoolgirls are obvious bigger than schoolboys; In view of itself, schoolboys ,schoolgirls three big balls sports variances are obvious bigger than jogging and walking, swimming, sports dance ,and roller skating variance, secondly is three big balls sports, swimming. It is clear that when carry on physical exercises, schoolboys exercises awareness is stronger, exercises time is longer, exercises intensity is bigger, while schoolgirls relatively are weaker, jogging and walking have significant impacts on improving schoolgirls' physical quality aspects, and three big balls sports have significant impacts on improving schoolboys' physical quality aspects.

CONCLUSION

Firstly, the paper establishes teenager exercises habits and physical quality study model, utilizes grey correlation degree method to make respectively analysis of different genders physical habits and their weight changes correlation degree size when carry on jogging and walking, three big balls sports, swimming ,sports dancing and roller skating five kinds of sports activities, by calculated correlation degree values, and gets conclusion : Schoolboys and schoolgirls proceed with physical exercises time, exercises amount are different, their weight changes are also different; jogging and walking, three big balls sports, swimming have bigger impacts on schoolboys, while jogging and walking, three big balls sports, sports dance have bigger impacts on schoolgirls.

Secondly , on the basis of correlation degree analysis, make comparative analysis of its data, utilizes variance analysis to establish different genders physical exercises habits to physical quality impacts significance model, and further compare jogging and walking, three big balls sports, swimming ,sports dancing and roller skating five kinds of sports activities differences in improving different genders' physical quality aspects.

REFERENCES

[1] Chen Po, Qin Zhong-Mei, Yin Ying, Xia Chong-De; Correlation Analysis of Current Situation of Regional Athletics Sports Development and Society Population Structure in China[J], Journal of Beijing Sport University, **30(12)**, 1610-1613 **(2007)**.

[2] Guo Hong; Summary on Chinese Sports Population Research Since 1980s[J], China Sport Science and Technology, **43(3)**, 36-40 **(2007)**.

[3] Li Hong, Xue Hai-Hong, Feng Wu-Long; Sociological Analysis of Comparison of Chinese Population with the Sports Population of Chinese[J], Journal of Xi'an Institute of Physical Education, **24(4)**, 25-28 **(2007)**.

[4] Li Lin, Yang Jie, Yang Tian, Xu Lie-hui; A Research on the Sustainable Development of Evaluation Index System of Regional Sports Industry[J]. Journal of Beijing Sport University, **9**, **(2010)**.

[5] Miao Zhi-Wen, Qin Chun-Lin; Sociological analysis of contemporary Chinese sports population structures[J], Journal of Physical Education, **13(1)**, 119-121 **(2006)**.

[6] Xiao Huan-Yu, Fang Li; Concept, Classification and Statistical Criteria of Sports Population[J], Sports Science Research, **26(1)**, 7-10 **(2005)**.

[7] Xiao Huan-Yu, Weng Zhi-Qiang, Chen Yu-Zhong; Basic Characteristics of Social and Sports Population Structures of Contemporary China[J], Journal of Shanghai Physical Education Institute, **29(2)**, 10-14 **(2005)**.

[8] Xue Jin-Xia, Wang Jing-Tong; Analysis on Development Level of Competitive Sports of Eastern China in the "Eleventh Five-Year" Period[J], Bulletin of Sport Science & Technology, **19(4)**, 57-59 **(2011)**.

[9] Yan De-Yi; Development of Sports for all under Circumstance of Building Well-Off Society[J], Journal of Wuhan Institute of Physical Education, **40(1)**, 15-19 **(2006)**.