

## Multivariate Regression Analysis on Data Reduction Based on SPSS Software

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**Abstract.** As a result of the increasing pressure in life and study in college, as well as the forming of bad habits, many college students have physique problem, which will not only have bad influence on their study lives, but also their future jobs. As a result, the paper does multiple projects testings and surveys about colleges students' physique in Tianjin, then arranges datum of findings by using SPSS software and does comparative analysis about data by using Frequencies module, does multiple regression analysis on condition that datum are ensured effective, and compares these datum with students' average level through multiple regression analysis. Finally, it puts forward to advice about how to enhance college students' physique.

### Introduction

Along with the social rhythm accelerate ceaselessly, university life is becoming tense and busy. Faced with the pressure of living and learning, many college students seldom take part in physical exercise, and also they develop a lot of bad habits, such as frequent meals, do not eat breakfast, smoking and drinking [1-3]. Even others are indulged in the network game and staying in front of computer so long. These series of problems lead them gradually deviated from the normal college students' physique health trajectories, which greatly affected the students' daily life and learning efficiency, resulting in the phenomenon that many students cut a class and fail test is serious [4-6]. Thus the whole society should pay close attention to students' physical health problems actively, only in this way, the college students' physique can be improved so they could do future work better and succeed finally [7,8]. The paper surveys and analyzes physique problems of college students in Tianjin through physical fitness measurement. We does data cleansing and linear-regression analysis by using SPSS software, compares these datum with students' healthy average level, and it comes a significant conclusion to provide a theoretical proposal for strengthening college students' physique in Tianjin.

### Current situation of college students' physique

At present many organizations have done a lot of investigations and studies on college students' health problems. But problems of college students' physique are still alive. Ministry of Education has once published the book Student Physical Health Standard in order to stress the issue of students' physique. In primary and middle school stage, schools are able to ensure the possibility of strengthening student's physical fitness by doing collective exercise, morning (setting-up) exercises and so many ways. However, in university stage, many universities have no exercise and exercise system due to lifestyle changes, space constraints. Undergraduates are easy to develop a large number of bad lifestyles. For instance, many students are addicted to the network, it is also associated with the improvement of current students household economic condition. In many college students dormitory, everyone has a computer basically, they play computer games, watch video, watch TV drama and entertainment programs, even choose truancy [9]. A lot of students' lives are slack, they keep late hours and do not eat breakfast. And very few students will take the initiative to participate in physical

exercise, to the contrary, many students are forming the habit of smoking and drinking, these bad habits have a serious impact on college students' body constitution. At present few schools require their students to do physical fitness measurement, attaching little importance to students' physique problem, which is an objective factor leading to student physique decline. According to statistics, college students' physical fitness and health standard has a long way to go to reach the health standard so that making each student has a healthy body is urgent to be resolved.

### Undergraduate's physique survey in Tianjin

This survey chooses random survey way selecting 20000 students to do physical fitness test from Tianjin University, in which 10000 boys, 10000 girls, covering a wide range of survey of school, the number of Tianjin city, it can reflect students' physique mean condition.

SPSS is a professional survey data analysis software, it can do many aspects of the analysis of the data. First of all, it does data cleansing about the testing data, on one hand, it removes deviation because the objective factors such as equipment error, on the other hand, it removes unreliable part of data.

#### Frequencies

The Frequencies module does comparative analysis about data. Illogical part is found in data through the frequency calculation, namely eliminating unreliable data.

Identify Duplicate Cases module does analytical processing about data. This module mainly analyzes data of the operation caused by the repeated data. First, it reads the data, identifies the various types of datum and removes the duplicate.

Summarizing data from three aspects after analyzing data:

TABLE I. PHYSIQUE FORM TABLE

Physique form	Height (mm)	Weight(Kg)
Boys	170.1 ± 5.61	56.28 ± 8.22
Girls	159.0 ± 5.72	47.29 ± 6.34

As shown in Table 1, compared college boys and girls' height and weight in Tianjin with the average value, the height of boys is lower than the national average, and the weight is lower than the national level. It indicates that overall level of boys need to continue to strengthen the training in the height in order to improve the overall level. However, weight aspect is better than average, showing that obesity is less. Girls' situation is substantially the same as boys, but range difference between girl students and average is relatively small [10].

TABLE II. PHYSIQUE MOTOR FUNCTION TABLE

Physique motor function	Vital capacity/ML	Step number
Boys	3820 ± 578	53.28 ± 7.26
Girls	2671 ± 521	50.29 ± 8.52

As shown in Figure 2, compared university students' vital capacity and the number of steps with the national average in Tianjin, boys' vital capacity is lower than the national average, and the same as the number of steps. The vital capacity and the number of steps represent a physical characteristics, only people who exercise regularly spirometry and a step number can be higher [12]. Therefore in the vital capacity, the boys ought to continue to strengthen the training so as to enhance the overall level. The result of girls and boys were roughly the same, but the girl students' vital capacity are than higher the average, in addition to the physical quality, the usual amount of exercise also plays an important role.

TABLE III. PHYSICAL MOVEMENT QUALITY TABLE

Physique motor function	long jump/mm	The power of gripping/Kg
Boys	227.23 ± 18.32	45.89 ± 8.34
Girls	166.39 ± 19.45	29.09 ± 4.56

As shown in Figure 3, compared college students long-jump and grip strength with average value in Tianjin, the result of boys jump is higher than the national average, and the grip is also higher than the national level. The long jump and the grip force represents a physical characteristics, also it has a direct relationship with basic characteristics of the body [11]. Of course, for those people who exercise regularly, their grip strength and long jump are higher. The result of girls and boys were roughly the same. In addition to the physical quality, usual exercise also plays an important role.

## SPSS software analysis on college students' Physique in Tianjin

In SPSS Linear Regression module, the module can be used for linear regression analysis. T, we can study various physical items on the final physical impact through multiple linear regression. Firstly, we introduce linear regression formula[12]:

$$B_i = \hat{B}_i + A_i = a_0 + a_1 x_{i1} + \dots + a_n x_{in} + A_i \quad (1)$$

$B_i$  is composed of two parts, and  $\hat{B}_i$  is estimated, it will change with the change of independent variable.  $A_i$  is a residual, it is the difference between  $B_i$  and  $\hat{B}_i$ .

The parameters in the formula is more, their value is the focus of the study. If a value is got one by one, they will have infinite models. Making  $(B_i - \hat{B}_i)^2$ , and accumulating them  $\sum (B_i - \hat{B}_i)^2$ , Using least square method to get the minimum value, the value is what we demand model. Thus it makes Formula (2) reach the minimum[13]:

$$C = \sum_{j=1}^n (B_i - \hat{B}_i)^2 = \sum_{j=1}^n B_i - [(a_0 + a_1 x_{i1} + \dots + a_n x_{in})] \quad (2)$$

Figure 1 is the SPSS software interface. Inputting data to it and then the linear regression analysis analysis of the results obtained can be used. Results can be drawings and do other operations.

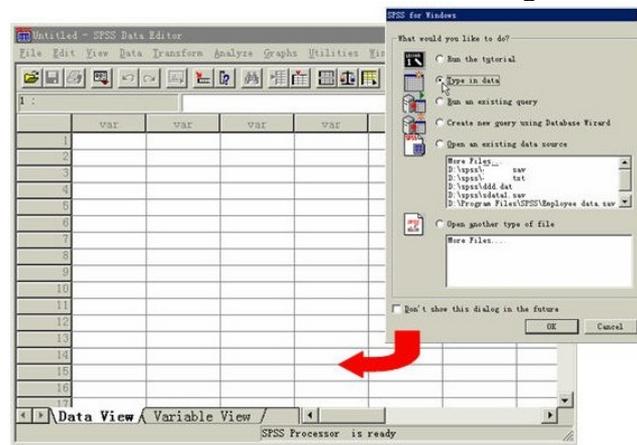


Figure 1. The interface of inputting data in SPSS software

## Suggestion about method of strengthening the college students' physique

### A. The school strengthens the morning exercise system

Whether to do morning exercise makes a big difference in person's physical quality. According to investigation statistics, people who take part in morning exercise regularly will have a lower risk of being attracted by cardiovascular and cerebrovascular diseases[14]. Their physical fitness is particularly good and in good health. Their efficiency and quality of life are higher than ordinary people. So the university should pay attention to the organization of early morning. On one hand it will enable students to develop good habits of keeping early hours. On the other hand, it can train students' vital capacity and heart rate, so that their constitutions can be improved. When dealing with the organization of morning exercise, school should pay attention to several issues: first, do not break, the discontinuous is not only doing little good to enhance the physical, but also counterproductive. Second, strengthen constitution propaganda to enable students to actively participate in morning exercise. Third, make the best system of related rules and regulations in order to make students be forced to take exercise actively.

### B. The school increased sports venues and sports equipment investment

Adequate sports facilities and rich sports equipment will greatly improve the students' sports enthusiasm, play a very good role in the student physique enhancement. First, increase the stadium construction so that make the students have a place to do physical exercise and try to make the stadium for free, so that students will increase the enthusiasm of physical activity in a relatively harmonious sports. The use of sport equipment is very important, many students are likely to use a variety of sports equipment to improve their physique, which not only improve the enthusiasm of sports, but also make the students is fully developed in all aspects of physical fitness.

### C. Schools provide rich and colorful sports course

Physical education is the best time for students physical exercise, physical education liberate students from the study pressure. On PE, students could choose which sports they attend according to their interests. But a lot of popular PE courses are limited to the number of participants, a part of

students are allowed to attend, which will greatly reduce the students' interest in class. So the school should reform the physical education curriculum, increase investment and pay attention to popular courses so that students can choose what physical education curriculum they like in PE class, and enhance their physique.

#### *D. Improve the students' physique monitoring system*

At present, there are few schools students of physical problems, there seldom are a special student's physique monitoring system and students could access to physical test while graduate. Usually, the school can not timely discovery of students' physical problems. The school should invest more in this area, because the students' study and life can be guaranteed only in good physique. A school physical fitness testing every term, and organizes special physical training for physical poor students, enhance the students' body, and these whose physique level is far below the average level of the students should be treated in time.

#### *E. Students get rid of bad habits by themselves*

Many students have bad habits of life such as internet addiction, keeping late hours. There are many students having bad habits of smoking and drinking and bad sanitary condition, which will seriously influence the students' body constitution. First of all, students should try to get rid of those bad habits to develop the healthy habits. Then the school should strengthen the management to keep students away from bad habits. School should regularly organize the dormitory health examination for students' healthy development, strengthening the management force of managing students' attendance, having a regular inspection of students skips. In the diet, school guides for students' rational nutrition, making them drink less and eat on time. The school plays a very important role in the forming of students' healthy living habit.

## **Conclusion**

This paper does physical fitness test for many undergraduate college and other colleges and universities in Tianjin, applying software SPSS into data cleansing of investigation results, rejecting the data duplication or obvious errors for instruments and other objective factors. It does multiple regression analysis on condition that datum are ensured effective, and compares these datum with students' average level through multiple regression analysis. Finally, it puts forward to many advices to enhance college students' physique.

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