PSYCHOLOGICAL INTERVENTION IN COLLEGE TEACHING OF PHYSICAL EDUCATION

Sangcheul Nam

Abstract
The physical and mental health of students are both important to their healthy growth. Thus, the integration between mental health education and physical education becomes a trend in teaching reform. This paper evaluates the effectiveness of psychological intervention in the teaching of physical education in colleges. The author carried out a control experiment in college students from Qingdao, China. The subjects were randomly divided into two groups, in which the experimental class received psychological intervention in physical education, while the control group only received traditional physical education. The mental health of the subjects was measured before and after the experiment with questionnaires, using symptom checklist 90 (SCL-90). The survey data were analysed statistically on SPSS13.0. The results show that the experimental group outperformed the control group in various dimensions of mental health; the psychological intervention has promoting effects on interpersonal relationship, anxiety, paranoia and the overall mental health of college students through physical education. The research results shed new light on the reform of physical education in colleges.

Key words: Physical Education, Psychological Intervention, Physical Health, Mental Health.
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INTRODUCTION
As an important part of school education, physical education should serve to promote the overall development of students; and the all-round development of students refers to the improvement of their overall health level, including both the physical and the psychological aspects such as the students’ physical consciousness, emotional will, moral character and psychological qualities (Franco & Coterón, 2017). A large number of sports-related literatures and research results of sports psychology at home and abroad show that sports are not only beneficial to physical health, but also have a positive role in promoting mental health. Regular sports exercise and physical activities have a beneficial effect on reducing mental stress and promoting psychological health. And the research results of foreign scholars have confirmed that sports can significantly regulate bad moods such as anxiety and depression, and produce benefits for people with psychological issues such as mental disorders (Cano-García, González-Ortega, Sanduvete-Chaves et al., 2017; Kirby, Byra, Readdy et al., 2015).

Mental health is an important part in the concept of complete health, which plays a crucial role in individuals’ health conditions, and it’s also a concrete manifestation of the individuals’ qualities. School mental health education is a new concept in the education reform movement of the 20th century. It is the product of the combination of modern psychology, pedagogy, sociology, physiology and other multi-disciplinary theories and school education practice (Sevil, J., Abós, Á., Aibar et al., 2016; Sundar, Løndal, Lagerlöf et al., 2018). As a modern educational concept and a new educational
activity, the theory and practice of school mental health education have made great progress in many countries and regions in the world. The International Conference on education pointed out that we should concurrently promote both mental health and teaching work which are the two links for the progress of modern schools (Chatzipanteli, Digelidis, & Papaioannou, 2015; Sanchez-Oliva, Pulido-Gonzalez, Leo et al., 2017). Thus, in a sense, school mental health education has become an important symbol of modern school education. Mental health has an important impact on the success of college students; a healthy psychology is the premise for them to accept ideological and political education and learn scientific and cultural knowledge, and it’s the basic guarantee for their normal learning, communication, living and growth during the college time. In terms of main signs and basic contents of mental health, school physical education integrating mental health education will promote the overall development of students more naturally and effectively than any other subject.

**EFFECT OF PHYSICAL EDUCATION ON THE PSYCHOLOGY OF STUDENTS**

Physical education not only has a bearing on the improvement of students’ physiques, but also directly affects the cultivation and enhancement of their mental health conditions. Generally speaking, physical education has the functions of preventing health problems and enhancing health conditions, which is conductive to alleviating the psychological pressure of students (Aparicio, Andrade, Camiletti-Moirón et al., 2015; Nawaiseh, & McIntosh, 2018). However, the present physical education in China is not perfect, therefore schools have the obligation to create a comprehensive and favorable environment for students.

1. Physical education is beneficial to cultivating healthy psychology of students
   Most physical education courses are characterized by strenuous exercise, hard work and fierce competition, which can well cultivate students’ willpower and spirit of self-reliance, that is to say, the courses can enhance students' mental health education in an all-round way. Moreover, various activities in PE lessons can free students from worries and all kinds of negative emotions, making them more positive and active, which is conducive to cultivating healthier and merrier psychology in them.

2. Physical education can alleviate students’ mental stress and eliminate their psychological obstacles. Physical education essentially provides a link in which students can express their emotions through motions and reflect their wills in their behaviours. As for students, they could relieve their tensions and improve bad moods to varying degrees via physical exercises.

3. Physical education can regulate emotions
   During physical activities, students are in an egoless state. The joy they felt brought by physical exercise could not be gained from living or learning. When students are doing exercises, their mental stress is alleviated gradually and unconsciously; in addition, physical exercise can also increase students’ chance of communicating with others (Telford, Olive, Cochrane et al., 2016) since they’ll have to cooperate and compete with each other in the process of training. This would promote the interaction and exchange among students, and they can make more friends during these activities.

**Figure 1. Carrying out mental health education in Physical Education**

![Diagram showing the process of carrying out mental health education in Physical Education](image)
The more they communicate, the better they can understand each other, and their communication adaptability is practiced in this process. Sports activities also reduce the academic pressure and life stress by enriching their spare time activities. The analysis of effective measures to carry out mental health education in physical education is shown in Figure 1.

Carrying out mental health education in physical education activities is helpful to stimulate students’ interests and cultivate their self-confidence and self-esteem. All activities of people are based on their thoughts. So, when students lack the interests in a sport, they won’t take the initiative to exhibit their abilities.

Sports can not only strengthen and shape the body, but also promote the normal development of students’ physical health, moreover, it’s also an important means for them to demonstrate themselves and cultivate their self-confidence and self-esteem. Developing mental health education in physical education activities can not only stimulate students’ interest in physical education, but also enable them to develop healthy physiques and good stamina by participating in physical education activities (Bustos, Olivares, Leyton et al., 2016). It can make students show their talents in sports, earn the recognition of teachers and other students, thereby enhancing their self-confidence and self-esteem, and in turn, promote the healthy development of psychology.

Carrying out mental health education in physical education activities is helpful for the cultivation of excellent volitional quality in students. Compared with other subjects, physical education has its unique teaching methods and characteristics. In teaching activities, it is necessary to cultivate the students’ courage and hard work spirit. Nowadays, most students are childish, they are prince or princess at their homes and have never suffered from hardship, so, once they encounter difficulties in life and study, they often choose to flee. As a result, it is necessary to cultivate and hone their will quality. In fact, school physical education is an important way to train students’ willpower and characters. In physical education teaching activities, teachers should influence students with their charms, so that they can have a positive attitude towards the problems or dilemmas they are facing, form strong spirit and tough willpower, so that they could bear hardships and stand hard work, dare in endeavours, which will have a positive impact on students’ future study and life (Park, Park, Koo et al., 2017).

Carrying out mental health education in physical education activities is helpful for students to establish good interpersonal relationships and cultivate social communication abilities. School physical education outperforms other subjects in its many activities that can’t be completed by one person, students have to cooperate with others to finish the tasks. For example, they often need to cooperate or compete with different people for different programs, and naturally they’ll have emotional exchanges in the process of competition and cooperation. This process enables students to produce correct self-awareness and mutual evaluation consciousness, which can not only cultivate their abilities in language and social communication, but also promote the development of healthy personality to a certain extent. The above analysis has clearly shown the importance of school physical education in cultivating students’ healthy psychology, and the significance of mental health education in physical education activities is shown in Figure 2.

**Figure 2. The significance of mental health education in physical education**
SUBJECTS AND METHODS

Subjects
366 female students from 4 classes of Qingdao higher vocational and technical college, Shandong Province, China were selected as the subjects, they were randomly divided into two groups: the experimental class, and the control group. There were 183 subjects in the experimental class and the control class each.

Methods

Literature review
Refer to relevant literatures, and analyze related data in detail; this method plays an important role in this research.

Experiment
This study applied physical education intervention into PE lessons and extracurricular activities, the experimental class was subject to the teaching intervention three times a week, including one PE lesson and two-time extracurricular activities. As for the control class, the subjects were taught by traditional teaching method, and the teaching times were the same as the experimental class. Before and after the experiment, all the indexes of the subjects were tested in the same way, the results before and after the experiment were compared vertically, and the results of the experimental class and the control class after the experiment were compared horizontally, so as to understand the influence of the physical education intervention strategies on the college students. The experimental period was from February 2019 to June 2019, lasted for one semester (4 months, 16 weeks).

Questionnaire survey
The symptom checklist 90 (SCL-90) was adopted to test the subjects’ mental health before and after the intervention. First, the teachers distributed questionnaires to the subjects according to the test requirements, and the subjects were required to finish the questions within 30 minutes, and all questionnaires were collected on the spot. Then one week later, 50 students were randomly selected and asked to fill in the questionnaires again. The correlation coefficient of the total score of the SCL-90 in the two-time survey results was 0.85, and the retest reliability was good.

Mathematical statistics
The original data was stored by Excel and a database was constructed. All data statistics were processed by SPSS13.0. The database of the measured data was constructed by the statistical software. The main methods are as follows:

1) The data of the SCL-90, the physical activity rating scale, and the physical exercise feeling scale were subject to descriptive statistics, and the average and standard deviations of each subscale were obtained;
2) Correlation analysis was adopted to study the relationship between variables;
3) Regression analysis was adopted to study the proportion of changes between dependent variables and independent variables.

Comparison between PE intervention teaching method and traditional PE teaching method

Table 1. Comparison between PE intervention teaching method and traditional PE teaching method

| Items                  | PE intervention teaching method                                      | Traditional PE teaching method                       |
|------------------------|-----------------------------------------------------------------------|-------------------------------------------------------|
| Nature                 | Modern scientific PE teaching method                                  | Traditional sports skill teaching                     |
| Objective              | Enhance physical fitness, health and achieve balanced development     | Master sports skills and improve performance          |
| Principle              | Human body movement, human body technology, human body technology     | Technology - human body - Technology                   |
| Diagnose health conditions – measure physical fitness – determine objectives – select sports programs – formulate prescriptions – implement exercises in the experimental class | Select programs – technical analysis – determine teaching tasks – select teaching methods – formulate teaching plans – implement sports teaching |
| Pay attention to changes in physiological load, heart rate and exercise intensity, and the changes in internal functions caused by the load PE teachers guide and teach scientific health theories and methods | Pay attention to the amount of exercise, duration of each exercise, exercise times, number of groups |
| PE teacher             | PSICOLÓGICA                                                          | PE teachers teach sports skills and methods           |
Advanced sports countries in the world have found that traditional PE teaching mode is not consistent with the goal of modern sports. With the development of sports science, modern PE teaching methods have been put forward based on the summery of previous achievements. This paper is an attempt of PE teaching reform, and the comparison between PE intervention teaching method and traditional PE teaching method is shown in Table 1.

It can be seen from the above table that the nature of PE intervention teaching method is scientificity, which is mainly reflected in the understanding of the students’ physical indicators and in the sports programs selected according to the students’ conditions. During the physical exercises under this teaching method, PE teachers controlled the exercise intensity through the heart rate of students, and the students feedback their feelings to the teachers after the class, then teachers gave reasonable opinions for the students, and students carried out the exercises more appropriately. In this way, students engaged in physical exercise more scientifically and their interests in the PE class had been greatly improved. In contrast, the traditional PE teaching method adopted the common procedures: teacher gives explanation to the teaching content, teacher gives demonstration, and then students practice the teaching content. During this process, there’s no intensity control, students just practice the movements blindly, and teachers only pay attention to the improvement of students’ sports skills, while ignore the mental health issues.

RESULTS AND ANALYSIS

To realize all-round development of people, scholars from counties around the world had put forward solutions and summarized purposes and tasks of the modern school physical education. According to Scott, the effect of school physical education on psychological development has seven aspects: (1) attitude affects bad behaviours; (2) social adaptability; (3) perceptual sensitivity and response accuracy; (4) self-interest; (5) mental relaxation; (6) physical and mental disorders are eliminated; (7) sports skills are acquired.

The relationship between college students’ mental health and extracurricular exercises

Martisen and Stephens reported that exercise therapy can reduce depression in patients, and similar results were reported in non-patient populations. North conducted a meta-analysis of the relationship between exercise and depression in 80 studies. The results supported the conclusion that there is a positive correlation between exercise and depression.

The purpose of this study is to explore the relationship between extracurricular physical exercise and mental health using PARS-3. There are three items in the scale, namely the intensity, the time and the frequency of the exercise. Each aspect was divided into 5 grades, intensity and frequency were scored 1-5 points and time was scored 0-4 points. The calculation method is: exercise amount=frequency×intensity×time. PARS-3 has a maximum score of 100 and a minimum score of 0.

By calculating the correlation coefficients between the exercise amount and the scores of SCL-90 factors, it can be seen that the scores of other SCL-90 factors and PARS-3 have a stable low degree negative correlation (P < 0.01 or P < 0.001), indicating that the greater the exercise amount, the better the mental health status, as shown in Table 2. The results are consistent with previous studies. The reason for the low correlation coefficients may be that physical exercise is not the only way to improve mental health, and it is very difficult for people with better mental health to continue to improve their mental health.

Table 2. The correlation between exercise amount and SCL-90 scores

| Dimension          | Somatization symptoms | Obsessive compulsive symptoms | Interpersonal sensitivity | Depressive symptoms |
|--------------------|------------------------|-------------------------------|---------------------------|---------------------|
| F value            | -0.097                 | -0.095                        | -0.128                    | -0.149              |
| P value            | 0.002                  | 0.005                         | 0.000                     | 0.000               |
| Dimension Anxiety  | Anxiety symptoms       | Hostility                     | Phobia                    | Paranoid            |
| F value            | -0.134                 | -0.025                        | -0.139                    | -0.092              |
| P value            | 0.000                  | 0.749                         | 0.000                     | 0.006               |
Comparison of mental health status of students with different amount of exercise

It is well known that physical exercise can enhance people’s mental health. But physical exercise must be scientific and reasonable, and the key for that is the proper exercise amount. Table 3 shows the comparison of SCL scores and SCL average scores of students with different exercise amounts. The comparison of F-values of different symptoms is shown in Figure 3.

Table 3. Comparison of SCL scores and average SCL scores of students with different exercise volumes

| Dimension                      | Somatization symptoms | Obsessive compulsive symptoms | Interpersonal sensitivity | Depressive symptoms |
|--------------------------------|-----------------------|-------------------------------|---------------------------|---------------------|
| F value                        | 7.53                  | 5.92                          | 7.81                      | 12.88               |
| P value                        | 0.002                 | 0.004                         | 0.000                     | 0.000               |
| Dimension                      | Anxiety symptoms      | hostility                     | Phobia                    | Paranoid            |
| F value                        | 9.49                  | 0.35                          | 10.52                     | 3.95                |
| P value                        | 0.000                 | 0.794                         | 0.033                     | 0.023               |

Table 4. LSD test on the differences in the SCL scores and subscale scores of students with different exercise amounts

| Dimension                      | Small | Medium | Large | Dimension                      | Small | Medium | Large |
|--------------------------------|-------|--------|-------|--------------------------------|-------|--------|-------|
| Somatization symptoms          | --    | --     | --    | Anxiety symptoms               | --    | --     | --    |
| Medium                         | -0.24 | **     | **    | Medium                         | -0.15 | **     | **    |
| Large                          | -0.26 | -0.03  | 0     | Large                          | -0.21 | -0.07  | 0     |
| Obsessive compulsive symptoms  | -0.23 | **     | **    | Phobia                         | -0.14 | **     | **    |
| Medium                         | --    | --     | --    | Medium                         | -0.21 | -0.07  | 0     |
| Large                          | -0.26 | -0.04  | 0     | Large                          | -0.15 | -0.07  | 0     |
| Interpersonal sensitivity      | -0.21 | **     | **    | Paranoia                        | -0.09 | **     | **    |
| Medium                         | --    | --     | --    | Medium                         | --    | --     | --    |
| Large                          | -0.31 | -0.11  | 0     | Large                          | -0.15 | -0.07  | 0     |
| Small                          | --    | --     | --    | Small                          | --    | --     | --    |
| Depressive symptoms            | -0.27 | **     | **    | Psychosis                       | -0.11 | **     | **    |
| Medium                         | --    | --     | --    | Medium                         | -0.17 | -0.07  | 0     |
| Large                          | -0.36 | -0.12  | 0     | Large                          | -0.17 | -0.07  | 0     |
Except for the hostility dimension, there were significant differences in other aspects (P < 0.001 or P < 0.01 or P < 0.05). LSD tests (see Table 4) showed that the scores of SCL subscales of students with large exercise amount were lower than those with small exercise amount (P < 0.001 or P < 0.01), and were lower than those with medium exercise amount, but the differences were not significant (P > 0.05). The results showed that the mental health level of the students with large exercise amount was the highest, followed by the those with medium exercise amount, and those with small exercise amount have the lowest mental health level. This result is consistent with the conclusion drawn by Jiang Biyan and others in their studies on the college and middle school students.

Relationship between mental health and feeling of physical exercise

SCL average scores and the scores of the physical exercise feeling subscale were subject to Multiple linear regression analysis (MLRA) with SCL average score as the dependent variable, and the spirit, quiet, active participation and fatigue as the independent variables. The results show that the reason why the sense of quietness and fatigue entering the equation while the sense of spirituality and active participation were eliminated is the tolerance, which was 0.640 and 0.651, respectively, both had largely exceeded the tolerance standard of 0.10 set by the system. The negative correlation coefficient was 0.213 and the determination coefficient was 0.045. The variance test of regression equation reached a very significant level (P < 0.001).

The equation is as follows:

\[ Y = 1.75 - 0.037X_1 + 0.049X_2 \]

Y is the average score of SCL, \( X_1 \) is the score of quiet feeling, \( X_2 \) is the score of fatigue feeling.

This equation shows that the sense of quietness and fatigue have an impact on the average score of SCL. The higher the score of quietness is, the lower the score of fatigue is, the lower the average score of SCL is, and the higher the level of mental health is. The comparison of mental health diagnosis indices between the control group and the experimental group is shown in Figure 4.

The coefficient of determination of the above equation is not too high, the reason may be that this study is a one-time experiment, and physical exercise is only one of the measures to promote mental health. However, from this equation, we can see that the more positive emotions the students experience during physical exercise, the less the negative emotions, and the higher the mental health level. Many research results show that sports pleasure is an important factor to maximize the effects of sports on mental health. This study also supports this viewpoint.

**Figure 4.** Comparison of mental health diagnosis indices between control group and experimental group
Relationship between students' liking for physical education and their mental health

In this study, students were asked to use 11-grade scoring method to evaluate the liking degree of physical education class in the questionnaire survey. 0-point means "boring", 10 points means "favorite". See Table 5 for the correlation between individual scores of students and calculated grades of each factor of SCL-90. The results showed that the scores of all SCL-90 factors were negatively correlated with the liking degree of physical education (P < 0.001), indicating that the more the students’ liking for physical education, the better their mental health conditions.

Table 5. Correlation between the students' liking for physical education and the scores of SCL-90

| Dimension               | Somatization symptoms | Obsessive compulsive symptoms | Interpersonal sensitivity | Depressive symptoms |
|-------------------------|-----------------------|-------------------------------|--------------------------|---------------------|
| Degree of affection     | -0.168                | -0.193                        | -0.244                   | -0.212              |
| P value                 | 0.000                 | 0.000                         | 0.000                    | 0.000               |
| Dimension               | Anxiety symptoms      | Hostility                     | Phobia                   | Paranoid            |
| Degree of affection     | -0.141                | -0.197                        | -0.182                   | -0.185              |
| P value                 | 0.000                 | 0.000                         | 0.000                    | 0.000               |

Table 6. Changes in college students' physical education burnout before and after the intervention

|                      | Low in spirit | Improper conduct | Low sense of achievement | Total score |
|----------------------|---------------|------------------|--------------------------|-------------|
| Before intervention  | 24.99±2.47    | 18.86±2.23       | 18.74±1.72               | 63±3.54     |
| After intervention   | 19.36±2.98    | 15.74±1.72       | 17.24±1.47               | 52±4.12     |

Figure 5. Comparison of college students' burnout before and after the intervention

Changes in college students before and after PE intervention

As shown in Table 6 and Figure 5, the total score of the pre-intervention scale is slightly higher than the theoretical median, indicating that there is a moderate degree of burnout in sports skill learning of college students. Low mood, low sense of achievement and high scores of improper behaviors indicate that students will often have or experience a low sense of achievement in the process of sports skill learning, often showing bad learning behaviors such as burnout, depression, truancy, laziness, and half-heartedness, etc. After the intervention, college students’ depression, misbehavior, low sense of achievement and total scores were significantly improved (P < 0.05, P < 0.01).
Table 7. Changes in college students’ motivation in sports situation before and after the intervention

|                         | Internal motivation | Identification principle | Externalization principle | Lack of motivation |
|-------------------------|---------------------|--------------------------|----------------------------|-------------------|
| Before intervention     | 14.6±3.53           | 13.24±2.86               | 13.49±2.99                 | 16.49±2.42        |
| After intervention      | 19.12±1.32          | 16.24±2.62               | 14.36±2.23                 | 12.36±2.93        |

Figure 6. Change in college students’ motivations before and after the intervention

After 4 months of psychological intervention, in terms of sports situations, there were significant differences in the dimensions of internal motivation, discrimination principle and lack of motivation (P < 0.05, P < 0.01), while there’s no significant difference in the dimension of externalization principle, as shown in Table 7 and Figure 6. Before the intervention, it showed that college students did not have the pressure of entering schools and lost their motivations, so the score of internal motivation was lower, while the score of lack of motivation was higher. After strengthening the cognitive education of sports results, college students are often more accurate in dealing with things, and there are differences in the dimension of the principle of identification before and after the intervention.

CONCLUSION

All in all, through the study of students’ psychological intervention, we found that the implementation of physical education is a long-term process, and it’s conducive to establishing a sound mental health teaching model. Since the sports activities have different characteristics and their impact on students is both good and bad, it requires us to carry out studies in this area, so that we can further reform and improve sports teaching activities and the students could exercise within a proper range. The implementation of physical education is directly related to students’ mental health level. We need to realize that talents are an extremely valuable resource in China. Only under the premise that talent can have a good psychological quality, can we provide more help and more powerful support for social development. Therefore, we must fully understand and master the actual situation, and implement scientific and effective measures to enhance and improve the psychological quality of students. The main conclusions of this paper are as follows:

The implementation of intervention strategy in physical education teaching has certain effects on improving "interpersonal relationship", "anxiety" and "paranoia", and the overall mental health of college students.

Mental health education is not only reflected in physical education, but also should be integrated into all aspects of education to form
an overall educational environment so that it could play a more crucial role in the reform of physical education.

In physical education, a main teaching method is to encourage and attract students through various ways, so that they can increase interests in physical exercises and actively engage in the activities.

It is a “long-term” process for the research on the intervention strategy of physical education to promote the mental health of college students. After the implementation of the intervention education, the questions of how to carry out scientific and objective evaluation are still worthy of further discussion.

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