
EXPERIMENTAL ANALYSIS ON MENTAL AND PHYSICAL IMPACTS OF PHYSICAL ACTIVITIES AMONG COLLEGE STUDENTS

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Abstract

The psychological effects of physical activity are an important aspect of psychological research. This paper empirically explores the influencing mechanism of Tai Chi (shadowboxing), a kind of traditional Chinese boxing with gentle and slow actions, on the physical activity and physical well-being of college students. The subjects were asked to attend an 18-week long training experiment of shadowboxing. The psychological indices of the subjects were then measured and subjected to statistical analysis. The results show that Tai Chi improves the physical health and interpersonal relationship, and alleviates the mind of hostility, depression and psychosis; Tai Chi has a slight positive impact on physical fitness, physical health and physical attractiveness; Tai Chi also enhances the mental health of college students; the emotional state directly affects the subjects, and its effect is more prominent than the physical activity of Tai Chi. The research findings shed new light on the relationship between physical activity and mental health.

Key words: Tai Chi, Physical Activity, Mental Health, Physical Well-Being, College Students.

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INTRODUCTION

The mental health level and physical well-being of college students are related to the quality of talent cultivation in higher education. In recent years, the mental health status of college students is not optimistic. No matter in China or in other countries, college students have a high incidence of psychological disorders, with the incidence of psychological problems ranging from 10%-40%. The mental health problem of college students has become a worldwide problem (Sarafino & Smith, 2008) The psychological effect of physical activity is one of the important contents of psychological research, and physical activity is the most direct means to promote physical well-being. As a multidimensional and multi-level concept, body

happiness is closely related to mental health by many variables, such as physicalization, self-esteem, mental health, self-worth, life satisfaction, health, attractiveness, physical exercise, body mass index, peer relationship and so on. As a part of psychological benefit research in psychology, the study of physical well-being pays more attention to emotional cognition at the individual level (Eith & Taylor, 1990). Tai Chi, as a kind of physical activity with unique Chinese national characteristics and extremely "mind-building" effect, is of great significance to affect the psychological benefits of college students, promote mental health and improve their own physical well-being by acting on people in the biological sense. Relevant studies show that Tai Chi's unique "mind-building effect" has a strong balancing effect on college students' psychological imbalance, and has its unique regulating effect on college students' spiritual loss (Fu, 2008). Current research focus mainly on tai chi chuan in terms of health and fitness, related research is more focused on physiological, biochemical, although in recent

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years about Tai Chi healthy heart research has increased, but the related research mostly stay in the theory of interpretation, psychological quality and mental health of individual research, promote mental health by physical activity and attention in the process of the little body of happiness research, and the relative lack of empirical research.

RESEARCH OBJECTS AND METHODS

Research objects

Jilin university of chemical technology has 240 undergraduate students of class 2018. The subjects are ordinary engineering college undergraduates who have optional Tai Chi classes and no basic training. Among them, 192 are male students and 48 are female students, aged from 19- 21, with an average age of 20.1 ± 0.91 years old.

Research methods

Of literature

According to the research objective, literature related to physical activity, mental health and the impact of relevant physical activities on mental health and physical well-being at home and abroad was reviewed to lay a theoretical foundation for the better development of this study.

Interviews

In this study, psychological and martial arts experts were interviewed for relevant information, and relevant experts were consulted to ensure the accuracy of the research, from topic selection to experimental investigation objects, self-evaluation scale design, experimental methods and means, statistical methods, results analysis and discussion.

Survey method

A total of 240 questionnaires were issued, 240 were collected, 6 invalid questionnaires were excluded, and 234 valid questionnaires were collected, with an effective rate of 97.5%. The scl-90 symptom self-rating scale, physical activity rating scale and sensory scale are widely used in psychological research, and their validity and reliability have been proved.

Experimental method

1) Experimental tools

Psychosomatic symptom self-rating scale was

used to measure the mental health level of college students, which involved 90 test items, including interpersonal, body, anxiety, compulsion, delusion, depression, terror, hostility, psychosis and other factors. The well-being scale (PSPP) was used to measure the level of physical well-being of the experimental subjects, which had a total of 30 questions, including 1 square scale -- body value and 4 subscales--physical tai chi skills, physical health status, physical attractiveness and physical strength.

2) Experimental design

Before and after the experiment, 240 college students were tested by psychological health and physical well-being questionnaire. This experiment adopted 24-style simplified tai chi as a means of physical activity. The test was conducted from march to July 2018 for a total of 18 weeks, with two periods of Tai Chi teaching once a week and after-class Tai Chi activities twice a week, each practice lasting 60min.

Statistics

The psychological evaluation and physical happiness survey data were statistically processed by SPSS 11.5 software package. Questionnaires obtained before and after teaching and extracurricular activities are processed. SPSS for Windows12.0 software package is used for statistical analysis of the obtained data, and relevant statistical software is used to provide data support for results analysis.

RESULTS AND ANALYSIS

The results

Comparison of mental health before and after physical activity of Tai Chi among college students

From the comparison of factor scores of SCL-90 scales before and after the physical activity of Tai Chi among college students (table 1), it can be seen that the psychological effect of college students after the 18 weeks of Tai Chi physical activity all factors have changes. Among them, the influence on obsessive-compulsive symptoms, anxiety, depression, terror and psychosis has reached a significant level ($*P < 0.05$), and the influence on the factors of body, anxiety, hostility and delusion, but the difference is not significant. The comparison of

Table 1. The scores of SCL-90 scale before and after the physical activity experiment of Tai Chi were compared

Factor	Before the trial	After the experiment	T value	P values
The body is changed	1.53± 0.459	1.41± 0.47	1.05	0.30
Forced	1.98± 0.68	1.76± 0.51	2.32	0.02 *
Depression	1.74± 0.59	1.51± 0.41	2.11	0.04 *
Interpersonal	1.95± 0.81	1.68± 0.52	2.42	0.03 *
Hostile	1.68± 0.74	1.59± 0.53	0.57	0.57
Anxiety	1.68± 0.59	1.53± 0.48	1.21	0.24
Delusion	1.81± 0.67	1.64± 0.62	1.10	0.28
errorist	1.60± 0.57	1.37± 0.39	2.41	0.02 *
Psychotic	1.567± 0.57	1.44± 0.41	2.53	0.02 *

Table 2. Comparison of different dimensions of body well-being before and after the physical activity experiment of Tai Chi for college students

The dimension	Before the trial	After the experiment	T value	P value
Physical tai chi skills	14.93± 2.93	16.26± 3.47	- 1.52	0.15
Physical health status	15.77± 2.81	17.14± 3.41	- 1.62	0.12
Body value	15.11± 1.97	15.96± 2.03	- 1.46	0.16
Physical attraction	14.41± 2.16	16.85± 2.76	- 1.77	0.09
Physical strength	14.38± 2.31	15.69± 2.89	- 1.57	0.13

the scores of various factors before and after the scl-90 experiment shows that the 18 weeks of Tai Chi physical activity plays a positive role in improving the mental health of college students.

Comparison of physical well-being of college students before and after physical activities of Tai Chi

Physical happiness is "individual" to the evaluation of different aspects of self body, it is a specific field of exercise psychology, physical well-being to the study of contemporary college students to participate in the activities of Tai Chi body in front of the psychological cause and psychological benefit has very important significance, have a certain physical well-being is one of the important sign of mental health (Bornstein, Davidson, Keyes et al., 2003). Subjects in the Tai Chi body well-being state changes before and after physical activity (table 2), according to the subjects of college students after 18 weeks of tai chi chuan and physical activities, in addition to the influence of perceived value to the body is not obvious, the body taichi skills, physical health, physical attractiveness and physical dimensions are improved, but did not reach significant level.

Discuss

It can be seen from the above research data that Tai Chi physical activity has a positive effect

on the mental health promotion of college students, but it does improve the physical happiness, but the effect is not significant. Participants' mental health improved after 18 weeks of tai chi physical activity. This study argues that Tai Chi influence on college students' mental health, physical activity is due to the Tai Chi, with particular emphasis on the human brain neural activity as the material basis of mental activities to focus on the fists of each process, and physical activity that embodies "soft gentle" aerobic type punch will be great help for people's physical health, that is to say, tai chi chuan physical activity for subjects of college students mental health and physical health to exert influence on the two aspects together as a result, at the same time, the mutual effect of the mental health and physical health and indirectly affect the physical well-being.

Interpretation and definition of relevant concepts

1) Physical activities of Tai Chi

According to the data search on the concept of physical activity, physical activity is a physical movement that leads to energy consumption higher than the metabolic level at rest, and it contains three basic elements, namely, body displacement generated by skeletal muscle, change of energy consumption from low to high,

and positive influence on physique (Caspersen, Powell, & Christenson, 1985). As a typical representative of Chinese wushu culture, Tai Chi is called "philosophical boxing" and "cultural boxing". So the concept of Tai Chi physical activity is a typical Oriental physical movement full of Chinese culture and philosophy. It should be noted here that physical activity and physical exercise are lumped together in many studies, which leads to the unclear definition of physical activity and physical exercise in relevant studies, leading to large differences in the results of many physical activities on mental health. For the accuracy of the research results, we analyze the two concepts as follows:

Physical activity is the development of the body, improve health, enhance physical fitness, spiritual sublimation and rich culture for the purpose of physical activity, physical exercise also include physical activity in the first two elements, but it is "to maintain and improve the constitution for the purpose of plan, content and repeated in the body movement", also known as the leisure time physical activity (Netz, Wu, Becker et al., 2005). In this way, physical exercise is the next level of physical activity. It is more purposeful, planned and regular physical activity. Therefore, the difference and connection between Tai Chi physical activity and Tai Chi physical exercise need to be deeply discussed from aspects of load intensity and load amount, so as to make a common conceptual basis for the research on the impact of Tai Chi physical activity (or exercise) on related physical well-being or mental health. In this study, the difference between the two is not considered for the time being, but the underlying concept of Tai Chi physical exercise as physical activity is understood, hereinafter referred to as Tai Chi physical activity.

2) Physical well-being

As a relatively broad concept, "happiness" is usually associated with "emotion" of psychological state (Maltby & Day, 2010). As for why physical activity and exercise can enhance happiness, some studies suggest that physical activity or exercise can cause chemical changes in the body. Some studies believe that physical exercise can buffer the impact of stress, so as to eliminate or reduce psychological emotional stress. For example, long-term and regular physical exercise can reduce the level of negative emotions such as anxiety, improve work efficiency and self-concept, improve

cardiovascular function, and thus improve people's physical happiness (Wang, 2010). At the same time, long-term exercise can also increase the frequency of communication with people, so as to achieve a certain social function and enhance the individual's sense of identity and happiness.

Adjustment analysis of Tai Chi's physical activities on college students' mental health

Sports can present rich and colorful physical activities, and these rich and colorful physical activities bear the great function of enriching modern people's senior emotional life. Meanwhile, this kind of physical activities is also an important means for people to pursue and experience the positive sense of honor and the affinity of mutual communication. A large number of studies have shown that physical activity does promote mental health, but not all physical activity is good for mental health. According to Jiang Juan et al., physical activities that last too long or have too high intensity will not produce good psychological effects. In order to improve the level of mental health, aerobic physical activities are generally selected, and anaerobic exercises should be avoided as far as possible, while exercises suitable for their own physical conditions should be selected (Jiang, Gou, Guan et al., 2006). Aerobic exercise or moderate physical activity can help reduce the degree of mild and moderate depression, have a therapeutic effect on depression or anxiety patients, and help prevent depression or anxiety, improve self-esteem, etc. The psychological effect of physical activity will increase with the increase of the total practice time and practice times. College students are a special group in the society. College is a key period for college students to grow up, and an important stage for them to form their world outlook, outlook on life and mature psychologically. At present, college students are not optimistic about mental health problems, which are manifested as weak will, unstable mood, lack of self-confidence, strong dependence, poor psychological endurance, and uncoordinated interpersonal relationships. The number of college students with psychological barriers in China has increased by 10% every year since the 1980s (Wu, 2015). Therefore, it is urgent to find an effective physical activity means to regulate or alleviate the mental health problems commonly existing in college students.

As we know, Tai Chi sports have special

requirements for people's thinking and consciousness activities: "your heart is quiet", "mind action", "mind as the master" and other boxing techniques can be found everywhere, which shows that Tai Chi's physical activities are always manifested in the process of people's spiritual activities. Before instructing the Tai Chi physical activities of the tested and experimental college students, the experimenter in this study reminded the tested students to focus all their thinking and consciousness activities on Tai Chi without considering other things unrelated to the exercise. At the same time, in the continuous physical activities of Tai Chi, when the body of the tested college students is performing more delicate movements, we especially emphasize that the thinking activities of college students must continuously focus on every detail of the movements. On the one hand, it is necessary to eliminate all kinds of internal and external interference in physical activities and focus attention on the movements of Tai Chi at all times to ensure the uninterrupted internal thinking and external movements. Need to be tested, on the other hand, the college students to perceive the body's muscles, joints, etc in the process of Tai Chi movement time and space position, and then feel the Tai Chi movement route, specifications, form the correct and body relaxation, etc., to ensure the right of action, not the slightest distractions, can appear otherwise Tai Chi action does not reach the designated position or wrong phenomenon, which affect the experimental skill and fitness effect to the body. Is analyzed from the theory, it will need to be tested when college students of the brain in processing the information concentration, methodically, benign information related to the in tai chi chuan physical activity of the brain to respond effectively advantages are formed when excited, this advantage is excited and inhibited the other oven has nothing to do with the craft of the incoming bad information, interrupted the bad information and the nerve center of the channel, cut off its original focus of bad information on the stimulation of the brain. Therefore, through the 18-week test, the students were able to temporarily exclude mental activities unrelated to boxing from their brain activities once they performed Tai Chi physical activities. In this way, the students' attention naturally shifted to tai chi through the high combination of internal consciousness and external body movements. The stimulation

energy generated by the physical activities of Tai Chi occupied all the consciousness of the subjects, and the human brain had no time to take into account the stimulation from other aspects of the outside world, thus cutting off the connection between the central nervous system and the adverse stimulation events in the outside world, effectively dispelling the attention generated by other stimuli. Due to this effect by 18 weeks of continuous accumulation, gradually, the subject of college students in the process of the usual study and life the ability to block or eliminate adverse psychological stimulation can be enhanced, which is college students after 18 weeks of tai chi chuan physical activity in the body, interpersonal, hostility, paranoia, force symptom and anxiety, depression, terror and psychosis had a positive effect, and it is also can improve the subjects the direct cause of college students' mental health level.

Analysis on the regulation of Tai Chi physical activities on college students' physical well-being

The results of this experiment found that after the 18-week Tai Chi physical activity intervention, the subjects' college students improved their physical Tai Chi skills, physical health status, physical attractiveness and physical strength dimensions, except for the insignificant effect on the body value. As the non-professional sports university students subjects, tai chi chuan physical activity is not the most important goal, at the core of activities and programs, they are more hope that through Tai Chi body activities for their health and physical attractiveness and so on to get more ascension, to be able to plan for related to academic goal auxiliary value of each system is more important to highlight this is the most concerned about college students under test. In addition, the influence of physical exercise on happiness may be mediated by physical happiness, that is, how to evaluate the well-being of oneself as the basis, physical exercise can objectively achieve the goal of enhancing physical fitness, thereby improving individual physical happiness (Chen & Liu, 2006). However, as college students are in their youth, their physical condition is generally good and they are less troubled by diseases. Therefore, the influence of Tai Chi physical activity on the sense of physical value through physical happiness is quite limited. Although Tai Chi's physical activities have little influence on

the sense of body value, the relationship with emotions is more prominent. Its emotional state also directly affects the adjustment of Tai Chi's physical activities to the physical well-being of college students.

The investigation on the emotional and physical well-being of the college students tested in this study found that nearly one third of the students have feelings of loneliness, and one half of the students often have irritable, depressed and suspicious psychological performance. At present, there are many reports on the use of physical activity as an intervention to regulate emotional state. It focused on the emotional benefits of long-term physical activity and one-time physical exercise. Many studies have found that physical activity can effectively improve participants' bad emotional state and maintain a good psychological state. Ju mitai et al., through the research review on the intervention mode of psychological disorders in college students, have studied the control effect of physical activity on anxiety. Progressive relaxation exercises can reduce anxiety as effectively as physical activity. Physical activity reduced trait anxiety more effectively than progressive relaxation exercises. Anaerobic exercise does not reduce anxiety; Long-term and one-time aerobic exercise can effectively reduce state anxiety; Physical activity must be maintained for more than 10 weeks to effectively reduce trait anxiety (Ju & Zhang, 2005). In 1991, McDonald and Hodgdon conducted a large number of meta-analysis on the effects of fitness physical activity on mood based on a large number of previous studies, and proposed that different types of fitness physical activity had certain positive effects on mood, regardless of age or gender, but the degree and intensity of the effects were different (McDonald, & Hodgdon, 1991). According to Stephens' research, moderate intensity aerobic training can improve aerobic quality and self-sense ability to adapt to stress to a large extent, and increase happiness, so that there is a positive correlation between the level of physical exercise and physical happiness (Stephens, 1988). The emotional benefits of physical activity do not occur automatically. Currently, a review of research shows that physical activity associated with emotional benefits includes: pleasant and interesting physical activity; Aerobic exercise or rhythmic abdominal breathing physical activity; Physical activity without interpersonal

competition; Controlled physical activity; Moderate physical activity; Each workout lasts at least 20-30 minutes; Long-term persistence and habit formation (Yao, Zhang, Li et al., 2008). This study argues that Tai Chi as a form of Chinese unique national character and the "mind" extremely efficacy of physical activity, requires a rhythm, a regular "deep, slow long, thin, uniform," such as abdominal breathing, and heart rate in the process of boxing are basically maintain between 120 ~ 140 times/min, is very good aerobic physical activity. Tai Chi is to achieve the unity of "form" and "spirit" through physical activities from inside to outside and from outside to inside. At the same time, Tai Chi also advocates "focusing on internal practice", and always emphasizes "peace of mind, sincerity of mind" and "cultivation of art and morality", so as to cultivate "noble integrity", improve spiritual cultivation and finally achieve the state of "unity of body and mind". All these indicate that Tai Chi adjusts and improves the emotional state of the tested college students through the cultivation and exercise of inner heart and mind, which indirectly affects the physical happiness of the tested college students.

CONCLUSION

Tai Chi physical activities can effectively improve the mental health of college students

Tai Chi is one of the most representative in the traditional culture of our country to "philosophy", she embodies the unique way of physical activity of the Chinese nation, in line with the unique philosophy and approaches, more important is its pay attention to the guide of "mind", so the students effectively strengthen their control of the body consciousness, the psychological adjustment of students have a huge effect. As a group with higher cultural level in society, it is a good choice for college students to adjust their psychological state by the way of physical activities of Tai Chi. But it should be noted that this psychological adjustment needs to be insisted on at least twice a week, each time lasting 20~30min. Only long-term practice of Tai Chi can have a good effect on college students' mental health. At the same time, college teachers should pay more attention to improve the mental health level of college students from the special thinking mode and idea guidance level of Tai Chi.

Physical activities of Tai Chi can indirectly improve the physical well-being of college students

Through the data show and analysis in this study, taiji boxing can improve the physical skills of college students, improve their physical health and improve their physical attractiveness. This also shows that Tai Chi physical activity can create conditions for the improvement of the physical status of college students. Therefore, it can be considered that its impact on physical well-being is potential and long-term. What's more, through the 18-week experiment, Tai Chi physical activity has an important influence on easing the tension and cultivating the positive and optimistic spirit of the tested college students. In general, emotions and physical activity also interact. Positive emotions can enhance people's tolerance to pain, which enables students to stick to Tai Chi physical activities, thus eliminating tension, so as to experience more positive emotions, and finally achieve the existence of a physical happiness. However, we should also realize that the influence of Tai Chi physical activities on the physical well-being of college students is not decisive, especially such physical activities cannot change the individual's learning and life status, and its influence is relatively limited.

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