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An Experimental Study of the Interventional Effects of Qigong Exercise on College Students with Different Personality Types

Lingling Yu[1], Xiaolei Liu[2]*, Yunbi Shou[3], Bingcan Wang[4]

[1]Institute of Physical Education, Inner Mongolia Normal University, Huhhot 010010, China; [2]Baduanjin Culture Research Center, Beijing Sport University, Beijing 100084, China; [3]Capital Normal University, Beijing 100089, China; [4]School of Mathematics and Statistics, Tianshui Normal University, Tianshui 741001, China (Corresponding Author: Xiaolei Liu, Email: liuxiaolei99@hotmail.com)

Abstract—This paper explored the effects of practicing Qigong, a traditional Chinese fitness method which includes the imitation of the Five-animal exercise, on the psychological adjustment of college students with different personality types. Through the study of 220 college students aging from 19 to 22 a study of the responses made on the Eysenck Personality Questionnaire (EPQ) and Symptom check list-90 (SCL-90)] provided scientific data that supported the idea that Chinese traditional health preservation exercises can improve the mental health of college students. Specifically, after 12-week Qigong exercise, the total symptom index, interpersonal sensibility, obsessive-compulsive, paranoid-anxiety, depression, psychoticism and anger-hostility of the participants significantly differed from baseline. There were also significant differences in somatization and anxiety. In the female participants in the experimental group, there was a very significant difference in terms of anger-hostility, and there were also significant differences in terms of paranoid-anxiety and psychoticism, and in somatization, depression and the total symptom index. Further improvements are described.

Keywords: Qigong, college students, personality, mental health, intervention

1. Introduction

Technology and the world's economy have grown by leaps and bounds in the twenty-first century, the information environment has changed rapidly and social competition has become increasingly fierce. When facing various new phenomena, such as academic pressures, employment pressures, and an almost ubiquitous addiction to virtual (online) poor social communication skills, college students tend to have many psychological problems, such as sensitiveness, anxiety, inferiority complexes, depression and obsessive-compulsive disorder, which can disturb their daily lives and seriously influence their mental health.

Although college students attach great importance to their mental health and have a positive attitude and understand the benefits of psychological counseling, because of the sensitive nature of psychological problems in terms of personal privacy, they are negative and evasive when it comes to accepting psychological counseling: A resistance that can sometimes result in cognitive and behavioral conflicts.[1] Thus, colleges and students are looking for more appropriate, psychological adjustment methods. With the improvement in the public's awareness toward exercise prescription, there is now an abundance of exercises to improve physical and mental health, and with so many participating in sport, it now possible for scholars to more easily study the influence of sports on mental health.

International research involving multi-dimensional studies of personality traits, emotional adjustment strategies and mental health have attracted a great deal of attention. Methods and strategies of emotional

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adjustment have become important targets of psychological intervention as well as one of the hot-spot issues in psychological research.[2-5] It is known that physical activity can alleviate pessimistic moods in teenagers and they can also have a certain therapeutic effect on anxiety and depression.[6,7] Different groups adopt different sports to regulate their psychological states, such as practicing yoga and Baduanjin exercise for extended time periods, which can promote women sleep quality during pregnancy, relieve tension[8] and have regulating as well as mediating effects on mental health.[9] Moreover, Baduanjin exercise has a better regulating effect on college student's mental health than many other sports. At the same time, an increasing number of studies have discussed the mediating effect of different intensity and frequency of exercises on emotional adjustment and strategy[10] Domestic studies have further confirmed that physical exercises have a direct regulating effect on mental health[11] and are also effective, applicable and feasible for college students with depression.[12] It was also found that the mental health status of people who participate in aerobic exercise was better than that of people who do not exercise regularly. The relieving effect of aerobic exercise on negative psychological symptoms was proved to be significant.[13] At present, it is widely recognized by researchers that physical exercise has a direct regulating effect on mental health and can improve mental health through the cultivation of the emotional regulation of self-efficacy and emotional adjustment strategies. The relevant studies showed that 40% of psychological studies adopted the Symptom check list-90 (SCL-90) questionnaire[14] to assess mental health and the Eysenck Personality Questionnaire (EPQ) to evaluate personality trait tendencies and emotions.[15,16]

As a traditional Chinese sport, Qigong has been favored by people for thousands of years. The Qigong exercise we used in this experiment was mainly adapted from Five-animal exercise (FAE), which is the imitation of the movements and expressions of five animals (the tiger, deer, bear, ape and bird), to achieve the functions of; strengthening the body, preventing diseases, dispelling diseases and adjusting emotions. It also has potential applications in the prevention and treatment of various diseases. Therefore, increasing numbers of people have begun to advocate the application of Qigong to alleviate mental illness. The literature shows that practicing FAE for 10 to 16 weeks can improve the psychological state of the middle-aged, elderly people and college students, and it also works better in women than men. The literature additionally shows that positive mood and attention are significantly promoted by FAE among the elderly. Especially those who often participate in other sports are more likely to experience the improvement in mental health produced by FAE.[17] Meanwhile, the self-rating anxiety scale (SAS) of new nurses was significantly improved.[18] moreover, FAE can alleviate the psychological fatigue of competitive athletes[19] Several research results also showed that sports such as Baduanjin, Tai Chi and Yi Jin Jing have a better regulating effect on college student's mental health than any other sport that has been studied.[20-25] However, there is still a lack of research on the effect of FAE on the psychological adjustment of college students with different personality types.

For this experiment, this study recruited 220 college students with ages ranging from 19 and 22 to practice FAE for 12 weeks as an interventional method, and was aimed at observing and revealing emotional adjustments on various college students with different personality types. The results provided scientific data and a theoretical bases to support the idea that schools should offer FAE courses to enhance the emotional adjustment of the college students and alleviate their mental problems.

2. Materials and Methods

2.1 Participants

The participants were undergraduate students from freshmen to senior students at Inner Mongolia Normal University who were between 19 to 22 years old and were taking various majors other than physical education. The participants voluntarily chose one of the physical education courses through the university course selection platform. The 136 students who selected the Qigong exercise course constituted the experimental group. Another 113 students took part in regular physical education course and were taken as the control group.

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Inclusion criteria: (1) Participants enrolled in the Qigong exercise course voluntarily; (2) Participants had never attended Qigong exercise or other systematic intervention exercise before; (3) Without major physical diseases or disorders of consciousness; (4) Without past medical history of mental illness.

Exclusion criteria: (1) Physical disability; (2) Returned to school after suspension due to mental problems; (3) Unable to participate in intense sports due to trauma or chronic disease; (4) The occurrence of any negative events over the previous two months, including divorce of parents, the death of relatives, family financial difficulties, emotional frustration and other factors.

2.2 SCL-90 and EPQ

The self-rating SCL-90[26] translated by Wang Xiangdong (1999)[27] was adopted as the psychological questionnaire. Due to its objectivity, simplicity and convenience, this scale has gradually been combined with other psychological scales to operate in many research fields such as public psychology, clinical psychology, education and physical education. In this experiment, the participants filled in the questionnaires based on self-perception generated recently or within a week. By scoring from 1 to 5, any factor scored greater than 2 was regarded as positive.

EPQ[28] is a self-report inventory developed by the British psychologist H. J. Eysenck[29] which is an objective scale for personality surveys,[30] and has been widely used in various fields.[31] The adult questionnaire is used in this study, which includes 85 questions.

The four subscales are the introversion and extroversion scale (E), neuroticism scale (N), mental quality scale (P), and cover-up scale (L). According to the total scores obtained by the participants on each scale, the standard T-score (T=50+10×(X-M)/SD) was calculated according to the norm, and the personality characteristics of the participants were analyzed.[28,31,32]

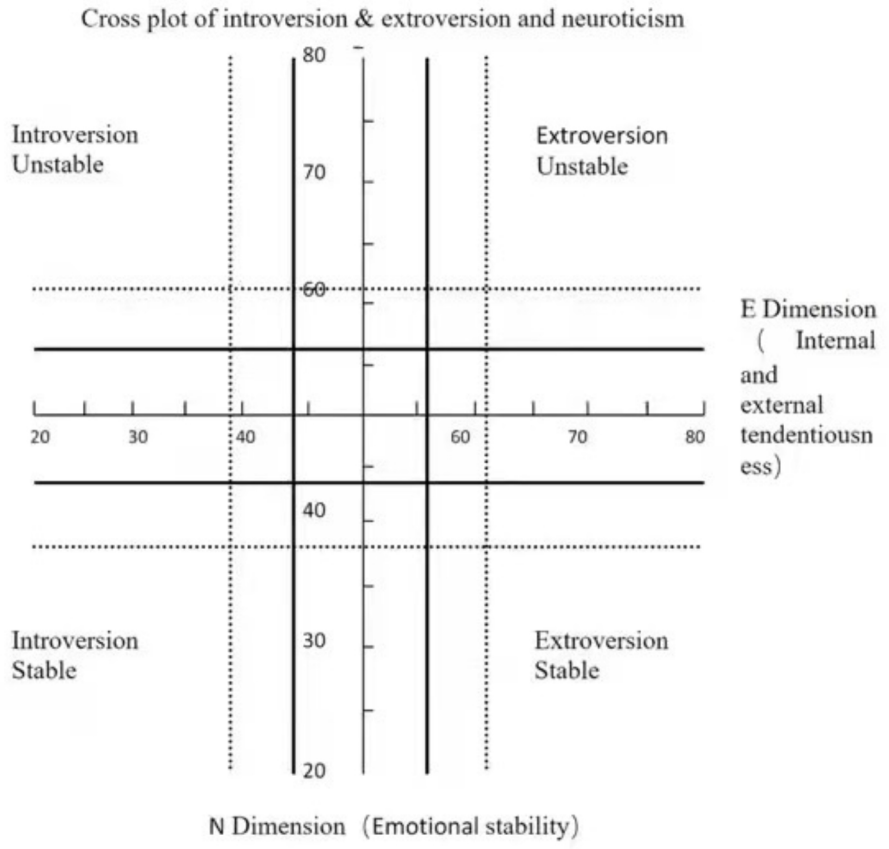

Fig. 1 Cross plot of introversion & extroversion and neuroticism.

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2.3 Interventions

The participants in the experimental group were randomly assigned to a teaching class and none of them had any former experience of Qigong exercise. The teaching material was Qigong (adapted from FAE), and the participants were taught by the teachers who had the skills. The participants were taught in one class. The participants were required to do the Qigong exercise twice a week for 12 weeks, with the course lasting for 90 minutes each time. The first three weeks of teaching were at the stage of learning the skills, and focusing on the mastery of motor skills. From the fourth to twelfth week, the participants were dedicated to repeated practice of the movements. In accordance with the requirements of college physical education, the participants in the control group only undertook the regular physical education courses offered by the school, with no fixed training time, duration or choice of sports. Physical activities were not requested specifically.

Before the experiment, 136 copies of the EPQ and SCL-90 questionnaires were distributed to the experimental group and collected on site. At the same time, 113 copies of the SCL-90 questionnaire were distributed to the control group and collected on site. After the experiment, 230 copies of the SCL-90 questionnaire were distributed to the experimental group and the control group, and 230 copies were collected on site. After eliminating invalid questionnaires that had only one answer, omissions, or incomplete basic information, 220 valid questionnaires were selected. A real-name code was adopted for the test.

2.4 Statistical analysis

After the real-name encoding of the questionnaire, a one-to-one correspondence was established to identify the responses of specific students before and after the experiment. Microsoft Excel 2010 was used to build the database. The results of the EPQ and SCL-90 questionnaires were calculated according to the norm, and the T-score was analyzed by SPSS21. The mean±standard deviation method is used for measuring data.

Norm value	Norm %	Description	General scale n-%	E scale n-%	N scale n-%	P scale n-%	L scale n-%
＜38.5	12.5	Typical type	15-13.64	14-12.73	11-10.00	21-19.09	15-13.64
38.5-43.3	12.5	Tendency type	11-10.00	11-10.00	17-15.45	16-14.55	22-20.00
43.3-56.7	50.0	Middle type	57-51.81	53-48.18	51-46.37	51-46.36	39-35.45
56.7-61.5	12.5	Tendency type	11-10.00	18-16.36	12-10.91	8-7.27	25-22.73
＞61.5	12.5	Typical type	16-14.55	14-12.73	19-17.27	14-12.73	9-8.18
	100		110-100	110-100	110-100	110-100	110-100

Table 1 The distribution of T-scores on the four scales of EPQ in the experimental group(n=110).

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3. Results

3.1 Measurement of the EPQ of the participants in the experimental group

The results (Table 1) demonstrated the T-scores of the experimental group on the four scales conformed to the normal distribution of the EPQ 85-question version using the standard T-scores.[28,33]

3.2 Personality types of the participants in the experimental group

The EPQ was used to assess the personality tendency and characteristics of the participants according to the T-score in each dimension. By combining the introversion and extroversion with the neuroticism, the scale detected four personality traits: stable extrovert, unstable extrovert, stable introvert, and unstable introvert, with transitional types between them (Figure 1).

It turned out that the personality types of the college students in this study were composed of 42.73% stable extroverts, 36.66% unstable extroverts, 11.82% stable introverts, and 9.09% unstable introverts (Table 2).

Personality type	Sample size	%
Stable extrovert	47	42.73
Unstable extrovert	40	36.36
Stable introvert	13	11.82
Unstable introvert	10	9.09
Total sample size	110	100

Table 2 Personality types of the college students in the experimental group (n=110).

3.3 Results of the SCL-90 in both groups before and after the experiment

The SCL-90 questionnaire was distributed to both the experimental group and the control group before and after the experiment. The experimental group practiced Qigong for 12 weeks, while the control group completed the routine college physical education course, during the same period. Before the experiment, there was no difference between the SCL-90 factors for the experimental group and the control group ($P>0.1$). After the experiment, the factors of the total symptom index, obsessive-compulsive, interpersonal sensibility, depression, anger-hostility, paranoid-anxiety and psychoticism among the experimental group were significantly different from those of the control group ($P\leq0.01$). Somatization, anxiety and phobic-anxiety were significantly different ($P\leq0.05$) (Table 3). The correlation analysis of the effect between genders in the experimental group before and after the experiment is shown in Table 4. Before the experiment, no factors were affected by gender ($p>0.1$). After the experiment, the female students showed improvement with respect to the total symptom index, somatization and depression compared with that of the male students ($P\leq0.1$). The paranoid-anxiety and psychoticism were significantly improved ($P\leq0.05$), and anger-hostility was very significantly improved ($P\leq0.01$).

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Table 3 Results of the SCL-90 in the experimental group and the control group (n=220).

Influence	Before experiment			After experiment		
Factor(f)	Experimental group(x±s)	Control group(x±s)	sig	Experimental group(x±s)	Control group(x±s)	sig
Total symptom index	1.63±0.47	1.69±0.47	0.37	1.51±0.44	1.70±0.47	0.00***
Somatization	1.45±0.51	1.50±0.52	0.52	1.38±0.50	1.53±0.50	0.02**
Obsessive-compulsive	2.03±0.63	2.06±0.63	0.77	1.79±0.55	2.06±0.63	0.00***
Interpersonal sensibility	1.82±0.62	1.87±0.63	0.61	1.65±0.50	1.88±0.63	0.00***
Depression	1.59±0.54	1.69±0.54	0.16	1.48±0.47	1.72±0.53	0.00***
Anxiety	1.57±0.53	1.66±0.62	0.26	1.51±0.51	1.69±0.62	0.02**
Anger-hostility	1.59±0.57	1.64±0.57	0.54	1.47±0.52	1.65±0.56	0.01***
Phobic-anxiety	1.52±0.49	1.56±0.51	0.54	1.48±0.49	1.59±0.50	0.07**
Paranoid-anxiety	1.59±0.54	1.65±0.54	0.39	1.42±0.47	1.69±0.53	0.00***
Psychoticism	1.53±0.53	1.58±0.54	0.52	1.42±0.46	1.61±0.53	0.01***
Sleep and dietary	1.58±0.45	1.61±0.48	0.55	1.54±0.54	1.64±0.47	0.17

Experimental group n=110, control group n=110, ***P≤0.01, **P≤0.05, *P≤0.1.

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Table 4 Results of the SCL-90 between genders in the experimental group(n=110).

Influence	Before experiment			After experiment		
Factor(f)	Experimental group(x±s)	Control group(x±s)	sig	Experimental group(x±s)	Control group(x±s)	sig
Total symptom index	1.63±0.47	1.69±0.47	0.37	1.51±0.44	1.70±0.47	0.00***
Somatization	1.45±0.51	1.50±0.52	0.52	1.38±0.50	1.53±0.50	0.02**
Obsessive-compulsive	2.03±0.63	2.06±0.63	0.77	1.79±0.55	2.06±0.63	0.00***
Interpersonal sensibility	1.82±0.62	1.87±0.63	0.61	1.65±0.50	1.88±0.63	0.00***
Depression	1.59±0.54	1.69±0.54	0.16	1.48±0.47	1.72±0.53	0.00***
Anxiety	1.57±0.53	1.66±0.62	0.26	1.51±0.51	1.69±0.62	0.02**
Anger-hostility	1.59±0.57	1.64±0.57	0.54	1.47±0.52	1.65±0.56	0.01***
Phobic-anxiety	1.52±0.49	1.56±0.51	0.54	1.48±0.49	1.59±0.50	0.07**
Paranoid-anxiety	1.59±0.54	1.65±0.54	0.39	1.42±0.47	1.69±0.53	0.00***
Psychoticism	1.53±0.53	1.58±0.54	0.52	1.42±0.46	1.61±0.53	0.01***
Sleep and dietary	1.58±0.45	1.61±0.48	0.55	1.54±0.54	1.64±0.47	0.17

Male n=28, Female n=82, ***P≤0.01, **P≤0.05, *P≤0.1.

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Table 5 Results of the SCL-90 in the extroverts of the experimental group (n=87).

	Unstable extrovert			Stable extrovert		
Factors(f)	Before exercise(x±s)	After exercise(x±s)	sig	Before exercise(x±s)	After exercise(x±s)	sig
Total symptom index	1.88±0.52	1.66±0.47	0.04**	1.40±0.29	1.37±0.35	0.62
Somatization	1.69±0.62	1.53±0.56	0.07*	1.26±0.32	1.24±0.36	0.64
Obsessive-compulsive	2.31±0.70	1.95±0.63	0.00***	1.80±0.46	1.64±0.45	0.03*
Interpersonal sensibility	2.13±0.66	1.79±0.52	0.00***	1.51±0.41	1.50±0.45	0.97
Depression	1.85±0.58	1.59±0.49	0.00***	1.34±0.38	1.36±0.44	0.85
Anxiety	1.83±0.62	1.67±0.56	0.11	1.32±0.32	1.34±0.38	0.76
Anger-hostility	1.87±0.59	1.64±0.59	0.01***	1.33±0.33	1.32±0.43	0.91
Phobic-anxiety	1.66±0.49	1.58±0.46	0.35	1.36±0.41	1.36±0.46	0.94
Paranoid-anxiety	1.86±0.61	1.55±0.52	0.00***	1.38±0.36	1.32±0.39	0.36
Psychoticism	1.81±0.61	1.58±0.50	0.01***	1.26±0.26	1.27±0.31	0.85
Sleep and dietary	1.79±0.51	1.71±0.63	0.38	1.40±0.31	1.38±0.38	0.72

Unstable Extroverts n=40, Stable Extroverts n=47, ***P≤0.01 , **P≤0.05 , *P≤0.1

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Table 6 Results of the SCL-90 in the introverts of the experimental group(n=23).

	Unstable introvert			Stable introvert		
Factor(f)	Before exercise(x±s)	After exercise(x±s)	sig	Before exercise(x±s)	After exercise(x±s)	sig
Total symptom index	1.95±0.35	1.92±0.65	0.84	1.38±0.21	1.35±0.22	0.86
Somatization	1.69±0.65	1.72±0.97	0.92	1.26±0.21	1.15±0.19	0.09*
Obsessive-compulsive	2.68±0.56	2.27±0.35	0.14	1.68±0.24	1.58±0.24	0.45
Interpersonal sensibility	2.33±0.65	2.19±0.51	0.24	1.64±0.28	1.44±0.36	0.11
Depression	1.96±0.34	1.95±0.46	0.95	1.29±0.24	1.33±0.26	0.72
Anxiety	1.63±0.43	1.82±0.67	0.36	1.27±0.22	1.34±0.31	0.29
Anger-hostility	1.94±0.52	1.89±0.62	0.81	1.31±0.27	1.33±0.36	0.91
Phobic-anxiety	1.86±0.64	1.93±0.81	0.77	1.44±0.49	1.41±0.51	0.87
Paranoid-anxiety	1.89±0.34	1.69±0.82	0.48	1.20±0.25	1.33±0.31	0.31
Psychoticism	1.77±0.40	1.83±0.97	0.82	1.38±0.31	1.29±0.19	0.37
Sleep and dietary	1.67±0.38	1.83±0.82	0.56	1.33±0.25	1.40±0.33	0.50

Unstable Introvert n=10, Stable Introvert n=13, ***P≤0.01, **P≤0.05, *P≤0.1

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4.Discussion

4.1 Personality types and emotion manifestation of participants

Eysenck distinguished the personality types by two dimensions, introversion/extroversion and neuroticism and divided into normal personality and psychopathic personality. People who are neurotically unstable tend to be moody and easily excited while people who are neurotically stable react slowly and moderately and recover easily. The more unstable the people are, the more mental problems tend to appear. The more introverted the personality is, the more noticeable the mental problems are.[34-36]

In this experiment, the extroversion, which is expressed as being sociable, lively and cheerful, accounted for 79.09%. The unstable, which is manifested as a lack of trust, suspicion, anxiety, nervousness, anger, and a tendency to have prominent psychological problems, accounted for 45.45%. People who are stable extroverts are likely to be calm, cheerful and positive, and can adjust their negative emotions to the baseline quickly, while people who are unstable extroverts show the characteristics of desire for stimulation and adventure, impulsiveness, and have a strong emotional reaction. People with stable introversion are silent, steady, and gentle. However, people with unstable introversion seldom attack others, and they are always worried as well as moody.

According to Eysenck's study, neuroticism is associated with the function of the autonomic nervous system, especially the sympathetic nervous system. When anxiety, irritability and tension occur, it can easily cause the disorder of the autonomic nerves, and somatic symptoms such as chest tightness, headache, dizziness, and systemic fatigue caused by muscle tension.[37] At the same time, there is no universally recognized and feasible clinical objective index for the diagnosis of autonomic nerve dysfunction. Therefore, the neurotrophic drugs and the neuroleptic drugs are usually applied to treatment, which can easily lead to prolonged drug dependence.[38]

On the basis of the theory of Traditional Chinese Medicine, such disorders are usually caused by excessive anxiety, overexertion, unfulfilled desires, depression, anger, and so on. This generally happens more to women than to men.[39] Some scholars believed that the key to the disorders lay in effective early treatment and psychological advice. By balancing qi and blood as well as regulating the functions of the viscera, the pathological and hyperactive state of the sympathetic nervous system will recover to a normal level, and the symptoms of autonomic nerve disorders will be cured from the root.

4.2 Effect of Qigong on the factor changes in the SCL-90

4.2.1 Effect of Qigong on the factor changes in the SCL-90 between groups

The results showed that after the experiment, the factors of the SCL-90 in the experimental group were very significantly improved compared with the control group in terms of total symptom index, obsessive-compulsive, interpersonal sensibility, depression, anger-hostility, paranoid-anxiety, and psychoticism and were significantly improved in somatization, anxiety, and phobic-anxiety. The Qigong exercise was shown to be more effective than other sports in regulating emotions.

In the practice of Qigong, in addition to the emphasis on the range of movement, change of direction, rhythm of action, and coordination of limbs, people should also integrate the thoughts of five animals into the action, so that the actions and breath can be coordinated. Moreover, people can strengthen the visceral functions and soothe the qi and blood circulation through active-breathing methods such as reverse abdominal breath, abdominal breath and holding one's breath so as to achieve the effects of benefiting the internal organs as well as the external body. The autonomic nervous system would also be affected by the concentration of thoughts, meditation, getting quiet and so on. Thereby the visceral activities can be regulated and the emotion can be adjusted.

Some studies have examined the harmfulness of the psychological trauma given by negative emotions. The Canadian physiologist Han Selye believed that when

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the men's adaptation ability to stress reaches the stage of exhaustion under the strain, men would lose the ability to respond to changes and suffer from anxiety, headaches, elevated blood pressure, and other symptoms, leading to physical and mental diseases. Strong emotional changes (fear, anger, etc.) can cause animals to have a "fight or flight" response. Modern cognitive neuroscience has shown that internal organs of the monkey would fester to death because of the chronic stress, anxiety and fear. Meanwhile, clinical cases have shown that working overtime without rests and being urged, scolded, and threatened would lead to the breakdown of one's physical system as well as the mental diseases such as anxiety, fear and depression.[40]

Quite a number of patients with autonomic nerve dysfunction have higher excitability in nerve system and poorer stability in nerve function than that of the ordinary people, which is manifested by high intensity and fast speed of reaction and being more emotional.[41] People with paranoid-anxiety, anger-hostility, obsessive-compulsive, interpersonal sensibility and psychoticism may be emotionally sentimental, lacking in trust, and it is difficult for them to be persistent. They are often in a state of stress and nervousness, which restricts their cultivation of positive qualities and makes it harder for them to be self-discipline.[42]

However, it is said that Qigong exercise emphasizes the regulation of the spirit in the long term, which can enhance the brain's ability to regulate the autonomic nerves and the glands, and thus improve the secretion function of the glands, and finally achieve the unity of the body, qi and spirit. Moreover, the Qigong exercise can balance the physical and mental health and adjust negative emotions so as to improve the autonomic nerve dysfunction and relieve the sympathetic hyperactivity, which is good for the mental health.

4.2.2 Effect of Qigong on the factor changes in the SCL-90 between genders

For teenagers in adolescence, given that the gonads develop and mature constantly, the autonomic nervous system is likely to be unstable which is manifested as abnormal mood swings. Compared with males, females tend to go through huge mood swings caused by the physiological phenomenon, such as menstruation, which could lead to anxiety, depression and anger-hostility.[43] It is also clinically visible that autonomic nerve function disorders are 2 to 10 times common in females than in males.[44]

In this study, the results of the SCL-90 in the female participants improved when compared with the male participants, for example, the anger-hostility was very significantly different, the paranoid-anxiety and psychoticism were significantly different, the depression, somatization and total symptom index were different. This also proved that Qigong exercise has a better influence on females than on males in mental health.

4.3 Effect of Qigong on the participants with different personality types

4.3.1 Effect of Qigong on the unstable extroverts

Due to Eysenck personality theory, extroversion, neuroticism and psychoticism are the important factors which affect mental health.[45] Individuals with high scores of neuroticism are more sensitive and tend to have relatively poor emotional stability. At present, under the pressures of study and employment, many college students are suffering stress by the heavy demands to work faster and harder. Intense competition, overloading information, interpersonal tensions and study pressures can all cause increased emotional problems, leading to the autonomic nerve function disorder and various psychological problems.[41]

Qigong has a measurable effect on people with the unstable types, especially in terms of its positive impacts on the viscera, joints and nerves. People who practice Qigong can relax their bodies by combining the soft and deep breath with the gentle movements. The meditation of the mind generates direct effects on the autonomic nervous system, and buffers the stimulation of negative emotions on the brain.

In this experiment, after 12-week intervention, the unstable extroverts showed very significant improvement in terms of the obsessive-compulsive, interpersonal sensibility, depression, paranoid-anxiety, psychoticism and anger-hostility. The overall

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symptom index improved significantly. This also confirmed the results that showed a positive correlation between obsessive-compulsive and the emotionality(N) in the Eysenck questionnaire.[46-48]

Some scholars have proposed that when choosing emotional regulation strategies, different personality traits should be taken into consideration.[49] People who are extroverts can actively use emotional adjustment to improve their mental health, whereas the people with high neuroticism tend to use ineffective emotional adjustment strategies[50,51] Personality may indirectly put impacts on individuals' mental health through different ways of reacting.[52] Qigong, as a positive way of physical and mental adjustment, has a positive role in the regulation of irritability, anger and impatience among the unstable extroverts.

4.3.2 Effect of Qigong on the stable and unstable introverts

The emotion characteristics of the introverts such as unwillingness to communicate, suspiciousness, phlegmatic indifference to people, anxiety, worry, and depression can easily lead to alexithymia. Studies have found that the alexithymia is not conveyed to the cerebral cortex, which is expressed through language signs, but through the autonomic nerve and forming the so-called "organ expression".[53] Such "organ expression" would cause physical aggression which is manifested as the palpations, shortness of breath, chest tightness and elevated blood pressure. Therefore, neuroticism is positively correlated with hypertension and coronary heart disease (Jokela, Pulkki-Rback, Elovainio, & Kivimäki, 2014; Turiano, Pitzer, Armour, Karlamangla, & Mroczek,2012),[54,55] and somatic discomforts such as fatigue and nausea.[37,56] People with neurotic personality types are more likely to use "organ expression" to release negative emotions and produce somatic reactions.

In this experiment, somatization among the stable introverts was significantly improved. It was believed that the somatic improvement in "organ language" owed to the regulation of Qigong on the autonomic nerves, which also further demonstrated the overall effects of Qigong on the body and mind. If the frequency and intervention time of the exercise, and the sample size of the experiment are increased, this may also lead to the improvement of the unstable introverts. In this case, further studies are required.

5. Conclusion

After 12-week Qigong exercise, the total symptom index, interpersonal sensibility, obsessive-compulsive, paranoid-anxiety, depression, psychoticism and anger-hostility of the participants were very significantly different when compared with the baseline. There were also significant differences in somatization and anxiety. Meanwhile, the female participants in the experimental group showed a very significant difference in terms of anger-hostility and there were significant differences in terms of paranoid-anxiety and psychoticism and differences in terms of somatization, depression and the total symptom index. The improvement in the factors of the SCL-90 among the unstable extroverts in the experimental group were as follows (with the results ranked from the strongest differences to the weakest): obsessive-compulsive, interpersonal sensibility, depression, anger-hostility, paranoid-anxiety, and psychoticism; the total symptom index was significantly different; and the somatization was different. There was also difference in somatization among the stable introverts.

These results suggest that Qigong exercise would be conducive to college students' physical and mental health. Moreover, it also expands new ways to regulate the mental health of college students.

Qigong plays a positive role in promoting the coordinated development of the college students' physical and mental health. People can engage in appropriate practices to ameliorate their poor emotions. Qigong can also meet the demands of the college students' mental health in daily life, where students routinely experienced pressure to study non-stop for many hours and suffer the effects of intense competition.

This argues that modern scientific theories should be integrated into the basis of traditional health culture. Research on the theory of skills and practical applications should be strengthened, in order to provide the theoretical basis and scientific data to support the idea that traditional Chinese sports can improve the mental health of college students. This

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being very important to satisfy the needs to develop a population that is comfortable in the high-paced life of modern society.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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