Research on the Relationship between Physical Exercise, Psychological Flexibility and Positive Emotion of College Students Based on Computer Mathematical Model

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Abstract. In the 1970s and 1980s, the study of mental resilience emerged in the field of psychology in the United States and quickly became a hot topic in the field of international psychology. The field studies the psychological adaptation and development of children, adolescents (and later adults) in adversity. The extensive research on the psychological resilience of college students can enlighten the complexity of their psychological development. Throughout life, people inevitably encounter setbacks and adversities, and are under pressure from all sides at all times. With the development of society and the intensification of competition, college students are facing more and more pressure. Some college students can adapt to pressure and grow up healthily, while others cannot adapt to adversity, which leads to psychological problems. In the era of computer big data, relevant experience shows that physical exercise has certain help in forming mental resilience and positive emotions. Therefore, this paper analyzes the relationship between physical exercise, mental resilience and positive emotions of college students by using computer technology and mathematical model, so as to provide help for college students to form healthy psychology.

Keywords: Physical Exercise, Psychological Resilience, Positive Emotions

1. Introduction
In the 20th century, psychologists began to pay more attention to children's psychological diseases and mental disorders in the context of stress and adversity. Then, the research on the relationship between risk factors and psychological and behavioral problems was rapidly heated up. But they ignored those children who grew up in adversity and made great achievements in adulthood. Until the 1970s, the focus of scholars began to shift, "why do these children grow up better in adversity, what kind of psychological mechanism plays a role in their growth process", and this kind of problem continued to ferment. Therefore, Rutter's theory has been noticed by the academic circle that more and more scholars begin to study psychological elasticity, which is the foundation and development period of psychological elasticity research, that is, the qualitative research stage of psychological elasticity, which mainly studies the identification of individual's psychological elasticity; the 1990s is the rapid
development period of psychological elasticity theory, and various theoretical frameworks and models appear one after another, which has application value Measurement tools emerge in endlessly, and the extension and connotation of psychological elasticity research are constantly enriched, which plays a key role in the next step of development; from the end of last century to now, it is a period of reflection and deepening of psychological elasticity research, and scholars feel that the essence of psychological elasticity is more and more difficult to grasp, so the concept of psychological elasticity has been widely debated in this period\[1\].

1.1. Overview of resilience
The concept of resilience is inspired by the research of physics. Elasticity holds that "materials or objects have the characteristics of deformation due to the action of external forces and the deformation disappears with the removal of external forces". Since then, the mechanical concept of elasticity has been introduced to measure physiological quality as an important weight in biology, which happens to be similar to the functional adaptability of organism, flexibility and elasticity of muscle, cardiovascular diastolic function and functional tension of organism. From the definition of individual quality, the stable individual psychological characteristics are the ability or characteristics of the individual to adapt to pressure, heal trauma, deal with setbacks and other non active learning life accidents. Howard, a scholar, agrees with and supports this view. He points out that the ability of an individual to constantly adjust himself appropriately to withstand setbacks is psychological resilience\[2\]. Turner agrees with this view and also puts forward his own view. He believes that psychological resilience is an outstanding ability, which can help himself with a positive and healthy attitude, constantly fight against adversity and overcome difficulties\[3\]. At the same time, psychological resilience. At the forefront of the academic world, the definition of American Psychological Society is also very representative: psychological resilience is the ability of an individual to adapt well to difficult situations, external threats, traumatic events, hardship and other uncontrollable pressures. From the definition of adaptation process, psychological resilience is a dynamic process of interaction between individuals and environment. Rutel believes that psychological resilience is a dynamic process, that is, individuals can still adapt well under the stress situation; Richardson's view is different. He points out that psychological resilience is a dynamic process, which is the role of life stress events and protective factors, adversity and protective factors. Therefore, through the interpretation of the first two scholars, we can conclude that psychological resilience is a dynamic process, which means that individuals get a good adaptation by interacting with the environment in the face of life stress events.

1.2. Overview of positive emotions
The term "positive emotion" has been frequently mentioned in early emotional studies, but there is still no definite concept. The dispute about the definition mainly focuses on two aspects. Many investigators feel that positive performance for individuals has the characteristics of pleasure and happiness. Fredrickson, for example, thinks that "positive emotions are immediate responses to things that are meaningful to an individual, and they are temporary pleasures.". Larsen &amp; Diener believes that positive emotion is a kind of emotion with positive value. According to the cognitive theory of emotion, "when people want to get the recognition of others, they also want others to evaluate themselves positively, the feeling at this time". There are also some psychologists think that the action of intentionally approaching or the emotion with this tendency can be called positive emotion. For example, in Ren Jun's opinion, positivity includes explicit and implicit positivity; Professor Meng Zhao, a psychological expert, believes that positive emotions are closely related to whether a need is met, usually accompanied by a predetermined subjective experience, and can improve the individual's enthusiasm and activity ability. Now more researches tend to the latter's explanation of positive emotions\[4\].
2. Practical research

2.1. Sample situation
This study takes the relationship between physical exercise, psychological flexibility and positive emotions of college students in Western Hunan as the research object, adopts the method of cluster random sampling, selects 1200 college students from three universities of A / B / C as the research object. In this study, 1200 questionnaires were issued, 1073 of which were actually recovered, with a recovery rate of 89.42%. The invalid scales were removed, and the remaining 964 were effective scales, with an effective rate of 89.84%. See Table 1 for the specific composition of the student sample (in this paper, Liang Deqing's physical exercise grade table of Wuhan Institute of physical education and Yu Xiaonan's revised psychological flexibility table are used). The Chinese version of cd-risc revised by Yu Xiaonan and Zhang Jianxin has 25 questions, which are divided into three dimensions: tenacity, strength and optimism. The scale uses 5 points to score, from "never" to "almost always" to score 4 points. The α coefficients of resilience, strength, optimism and total scale were 0.88, 0.80, 0.60 and 0.91, respectively [5]. The total scale was significantly related to the neuroticism, extroversion, openness, agreeableness and seriousness of Rosenberg Self-Esteem Scale (rse), life satisfaction index (SCL-90) and NEO-FFI. The overall retest reliability of the questionnaire was 0.85.

The subjective exercise experience scale consists of three dimensions: positive well-being, psychological distress and fatigue. It has 12 items in total. By using Likert's 7-level scoring method, one point is scored for very inconformity, seven points for very inconformity and four points for middle score. The items and evaluation methods of each subscale are as follows: the positive well-being subscale includes 1, 4, 7, 10, 4 items, the higher the score is, the stronger the positive well-being experience is; the psychological worry subscale includes 2, 5, 8, 11, 4 items, the higher the score is, the more serious the worry is; the fatigue subscale includes 3, 6, 9, 12, 4 items The higher the scores, the more fatigued they are. The internal consistency reliability of each subscale was 0.86, 0.85 and 0.88, respectively, with good structural validity. And it is suitable for college students.

2.2. Data analysis
Conduct unified audit on the recovered questionnaires. After removing invalid and blank questionnaires, code and input according to the pre-designed coding method. All the data are initially counted by Excel, and then imported into spss20.0 for analysis and processing. In the process of statistical analysis, descriptive statistics, independent sample t test (student's t test), analysis of variance (ANOVA), correlation analysis and other statistical methods are used. Due to the limited space, this paper will not analyze the calculation process too much [6].

Table 1. Basic situation analysis of subjects

| Project | Features | A University | B University | C University | Total number |
|---------|----------|--------------|--------------|--------------|--------------|
| Gender  | Male     | 234          | 153          | 31           | 418          |
|         | Female   | 236          | 286          | 24           | 546          |
| Grade   | Freshman | 103          | 142          | 25           | 270          |
|         | Sophomore| 138          | 30           | 101          | 269          |
|         | Junior   | 125          | 116          | 25           | 256          |
|         | Senior   | 75           | 64           | 24           | 163          |

Taking the subjective exercise experience scale as the dependent variable and the variable of different grades as the independent variable, the following results are obtained through the comparison of one-way ANOVA:
Table 2. Correlation between physical exercise and mental resilience of college students

| Exercise intensity | Toughness | Strength | Optimism | Total score |
|--------------------|-----------|----------|----------|-------------|
| Exercise time      | 392       | 230      | 228      | 318         |
| Exercise frequency | 276       | 263      | 280      | 303         |
| Exercise program   | 288       | 299      | 256      | 320         |

In order to explore the relationship between psychological resilience and grade variables, we take psychological resilience as the dependent variable, grade as the independent variable, and carry out one-way ANOVA. There are significant differences in tenacity, optimism and total score in grade variables, among which the difference between tenacity and total score in grade variables is very significant. Tenacity: Grade 3 > grade 4 > grade 2 > grade 1; strength: Grade 3 > grade 4 > grade 2 > grade 1; optimism: Grade 4 > grade 3 > grade 1 > grade 2.

Table 3. Comparison of mental resilience in age variables

| Number   | Toughness | Strength | Optimism | Total score |
|----------|-----------|----------|----------|-------------|
| Freshman | 270       | 31.11±7.232 | 18.97±4.305 | 11.01±2.271 | 61.33±12.666 |
| Sophomore| 269       | 33.12±7.384 | 20.66±4.098 | 10.51±2.588 | 65.21±12.421 |
| Junior   | 256       | 36.01±7.235 | 21.54±4.215 | 10.35±2.897 | 67.79±12.589 |
| Senior   | 163       | 34.55±7.636 | 21.44±4.123 | 10.57±2.465 | 66.45±12.787 |
| F        | 7.516     | 3.821     | 3.453     | 5.343       |

Psychological elasticity is the predictive variable, regression analysis is carried out, and regression equation is obtained:

\[ CAR = cRES + e1 \]  \hspace{1cm} (1)

Then, regression analysis was carried out with the variables of emotional criterion and psychological elasticity as the prediction variables, and regression equation 2 was obtained:

\[ PA = aRES + e2 \]  \hspace{1cm} (2)

Finally, regression analysis with physiological recovery as the criterion variable, psychological resilience and positive emotion as the predictor variable, the regression equation 3 is obtained:

\[ CAR = c' RES + bPA + e3 \]  \hspace{1cm} (3)

This phenomenon may be because: for freshmen, entering the university campus is from a familiar environment to a very strange environment. Everything about the new environment is very novel, they are very positive and confident in themselves. But when they face difficulties, they have no experience and can't overcome the difficulties smoothly, which will hit their self-confidence to a large extent, They feel frustrated; through a period of adaptation and learning, their self-confidence in the new life, which is also the reason why the psychological flexibility will rise during sophomore year and junior year, but in the fourth year, the psychological flexibility of senior students will decline after facing a series of pressures and blows, such as employment, postgraduate entrance examination or not. The results of correlation analysis of psycho elasticity, positive emotion and physiological recovery showed that the correlation coefficient of psycho elasticity and physiological recovery was - 0.75, P < 0.01, which indicated that the higher the psycho elasticity was, the shorter the time of physiological recovery was, which provided the possibility to test the intermediary effect of positive emotion.

In order to further understand the influence of physical exercise on psychological elasticity, the total score of psychological elasticity is taken as the dependent variable, and the three indexes of physical exercise are taken as the independent variables to carry out the stepwise regression analysis. The results show that the prediction effect of physical exercise duration on psychological elasticity is the best, and its prediction of psychological elasticity is positive; it indicates that the duration and
frequency of physical exercise also have the same effect on psychological elasticity. To a certain extent, both of them can predict 19.1% of the total psychoelastic variation. This shows that college students' long-term physical exercise can improve their psychological flexibility, physical exercise has a positive predictive effect on psychological flexibility, and the duration and frequency of exercise are important predictive variables. College students should pay attention to the reasonable arrangement of physical exercise time and frequency when they carry out physical activities. College Students' long-term physical exercise can improve the level of psychological flexibility, and physical exercise can positively predict psychological flexibility. In order to improve the level of psychological flexibility and protect themselves, college students should reasonably arrange the duration and frequency of exercise.

3. Conclusion
At present, the research on psychological resilience mainly focuses on the protection factors and risk factors, as well as the relationship between psychological resilience and cognition, personality, coping style, subjective well-being, etc. There are few researches on the relationship between physical exercise and psychological resilience.

1. The scale has good reliability and validity. It can be used as a measurement tool for physical exercise and psychological resilience research.
2. College students who participate in physical exercise have higher psychological flexibility than those who do not, which is manifested in their interpersonal communication ability, problem-solving ability, positive cognition, self-acceptance, emotional stability and control ability.
3. Physical exercise can not only directly affect the psychological flexibility of college students, but also affect the psychological flexibility of college students through self-efficacy, coping style and other intermediary variables. In conclusion, the author thinks that physical exercise can help the individual's positive psychology, promote the exerciser to adopt the positive coping style, reduce the negative coping style, and improve the individual's physical quality, and improve the individual's psychological flexibility positively. This paper discusses physical exercise and psychology. The relationship of flexibility provides reference for perfecting and enriching the theory of exercise psychology.

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