A TWO-FACTOR MATHEMATICAL MODEL FOR THE MEASUREMENT OF PSYCHOLOGICAL HEALTH OF COLLEGE STUDENTS

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Abstract
The measurement of psychological health of college students provides a good reference for mental health education in colleges. However, most of the existing methods rely on psychopathological indicators, failing to accurately reflect the psychological health of college students. To solve the problem, this paper measures and evaluates the psychological health of college students from two dimensions, namely, positive psychology and negative psychology, constructs a two-factor mathematical model for the measuring the psychological health of college students, and proposes the mindfulness-based cognitive intervention based on the model. Experimental results show that college students generally have a good psychological health, which is affected by various factors; the two-factor mathematical model provides a clear contrast between positive and negative factors of the psychological health of college students; the mindfulness-based cognitive intervention can significantly improve the psychological health of college students. The research results provide new insights into the mental health education of college students.

Key words: psychological Health Level, Positive Psychology, Negative Psychology, Two-Factor Mathematical Model, Mindfulness-Based Cognitive Intervention.

INTRODUCTION
With the rapid development of the times, the society has put forward higher requirements for college students. Under the high demand and high pressure, the competition among college students is increasingly fierce so that college students are subject to tremendous psychological pressure and the negative psychological phenomenon has continuously emerged (Byrd & Mckinney, 2012). College students are in a critical period of growth and personality improvement. Their world outlook, outlook on life and values are developing, and the psychology and physiology are gradually becoming mature. It is urgent to improve the psychological health and strengthen the psychological health education of college students (Keyes, Eisenberg, Perry et al., 2012). It is necessary to regularly carry out the measurement of the psychological health level of college students, which can obtain the quantitative data through psychological measurement and analysis and can provide the data for the theoretical research of psychological health education. Furthermore, it is also beneficial to promote the comprehensive application of psychological health education research methods and the systematicness and scientificity of the theoretical research on psychological health education (Selvaraj & Bhat, 2018; Marsh & Wilcoxon, 2015). The measurement of college students' psychological health level should be objective, indirect, relative and accurate and the commonly used measurement methods include observation method, interview method, questionnaire method and scale method (Covarrubias, Romero, & Trivelli, 2015).

The two-factor mathematical model of
psychological health refers to the psychological health model that incorporates both positive and negative psychological indicators into the evaluation dimension. The two-factor mathematical model changes the psychological health evaluation method of pathology in the past, emphasizing the comprehensive evaluation of the intrinsic potential and advantages (Yao, Han, Zeng et al., 2013; Cai, Xu, Cheng et al., 2015). For college students, psychological health is a continuous state. The two-factor mathematical model of psychological health takes subjective well-being as a positive psychological indicator and psychopathological indicator as a negative psychological indicator (Brittian, Umana-Taylor, Lee et al., 2013). According to the two-factor mathematical model of psychological health, existing studies classify the psychological health into four types: completely psychological health, susceptible, symptomatic but satisficer and disease patients (Lemieux, Plummer, Richardson et al., 2010). This paper measures and evaluates the psychological health of college students from two dimensions, positive psychology and negative psychology, and constructs a two-factor mathematical model suitable for the measurement of college students' psychological health. This paper provides a new mathematical model and evaluation indicator for the evaluation of the psychological health of college students.

**STUDENTS’ PSYCHOLOGICAL HEALTH LEVEL**

At present, the psychological measurement for college students mainly includes the personality measurement and psychological health measurement. The personality measurement is an important part of psychological measurement and the psychological health measurement plays an important role in preventing and reducing the psychological health problem of college students (Eklund, Dowdy, Jones et al., 2010). Under healthy psychological state, college students have stronger vitality, positive inner experience, and it is more likely for them to exert their physical and psychological potential and positive social functions. The healthy psychological state does not mean that there is no psychological problem, but also includes that individuals can use their own positive strength to adapt to the society (Masuda & Boone, 2011). Figure 1 shows the problems in the measurement of college students' psychological health level. Many scholars currently have mistaken cognitions on the measurement of psychological health level, which is mainly reflected in the excessive dependence on the measurement scale of psychological health level; there are relatively few studies on the measurement of psychological health level; there are relatively few studies on the measurement of psychological health level; especially localized studies. Also the measurement personnel is low in their professional level and weak in the strength; the formalization and scientificity of each aspect of psychological assessment are poor.

**PROBLEMS IN THE MEASUREMENT OF COLLEGE STUDENTS’ PSYCHOLOGICAL HEALTH**

At present, the psychological measurement for college students mainly includes the personality measurement and psychological health measurement. The personality measurement is an important part of psychological measurement and the psychological health measurement plays an important role in preventing and reducing the psychological health problem of college students (Eklund, Dowdy, Jones et al., 2010). Under healthy psychological state, college students have stronger vitality, positive inner experience, and it is more likely for them to exert their physical and psychological potential and positive social functions. The healthy psychological state does not mean that there is no psychological problem, but also includes that individuals can use their own positive strength to adapt to the society (Masuda & Boone, 2011). Figure 1 shows the problems in the measurement of college students' psychological health level. Many scholars currently have mistaken cognitions on the measurement of psychological health level, which is mainly reflected in the excessive dependence on the measurement scale of psychological health level; there are relatively few studies on the measurement of psychological health level; there are relatively few studies on the measurement of psychological health level; especially localized studies. Also the measurement personnel is low in their professional level and weak in the strength; the formalization and scientificity of each aspect of psychological assessment are poor.

**Figure 1. Problems in the measurement of College Students’ psychological health**

- **Wrong understanding of the measurement of mental health level**
- **Misuse of mental health measurement**
- **Abuse of mental health measurement**
- **Over dependence on the measurement of mental health**
- **Less basic theoretical research**
- **Single choice of evaluation method**
- **Lack of localization research**
- **The shortage of professional teachers in mental health education**
- **Lack of professional knowledge and skills**
At present, the psychological health measurement scale is the most widely used psychological health evaluation method. However, the subject is under the impact of subject or objective factors, so it is difficult to truly reflect the actual situation of the subject. Furthermore, the psychopathological symptom scale is mostly used for the evaluation, so the psychotic symptoms of the subject cannot be truly reflected, resulting in a large discrepancy in the evaluation results (Brook, Lee, Balka et al., 2014). For college students, the direct personnel responsible for the evaluation of psychological health level is the counselor. However, due to the instability of the counselor group, the psychological health evaluation and education of college students will be affected (Wu, Ge, Emond et al., 2018). The psychological health level of college students is affected by the timing of evaluation. To be more specific, the evaluation results at the beginning and end of the semester are different and the evaluation results before and after exercise will also be different. That is to say, the results of psychological health evaluation of college students are related to the timing, physical and psychological conditions of college students. Furthermore, the environmental conditions and time control of the evaluation will also affect the normal psychological health evaluation of college students. After the evaluation, the evaluation personnel generally does not give a comprehensive explanation and the explanation is often too rigid, so that it will lead to greater emotional fluctuation and psychological burden of college students.

CONSTRUCTION OF COLLEGE STUDENTS’ PSYCHOLOGICAL HEALTH LEVEL BASED ON TWO-FACTOR MATHEMATICAL MODEL

Research purposes and methods

A large number of literature studies have shown that at present, the measurement of the psychological health level of colleges and universities in China is limited to psychopathological characteristics, and positive psychological factors are not included in the evaluation system, resulting in insufficient attention to the college students. This paper constructs a mathematical model by introducing positive factors of psychological health, focusing on the applicability of the two-factor mathematical model in the measurement of college students’ psychological health. The two-factor mathematical model is shown in Figure 2, in which negative factors are classified into psychopathological symptoms and negative emotions and positive factors are classified into life satisfaction and positive emotions.

In this paper, the random sampling method and questionnaire method are used and 500 college students are randomly selected for the research. This study eliminates the impact of extra environment on the psychological health of college students. Table 1 is the basic data of college students, which mainly explores the impact of gender, grade, student cadre, major and academic achievement on the psychological health of college students using the two-factor mathematical model. The whole evaluation is based on the five-point system. The higher the score of negative factors, the more significant of the negative psychology of college students, indicating lower psychological health level. The higher the score of positive factors, the more significant of the positive psychology of college students, indicating higher psychological health level.

**Figure 2. Two factor mathematical model**

**Table 1. Basic information of College Students**

| Types          | Classification | Quantity | Proportion |
|----------------|----------------|----------|------------|
| Gender         | Male           | 276      | 55.2%      |
|                | Female         | 224      | 44.8%      |
| Grade          | Grade one      | 120      | 24%        |
|                | Grade two      | 128      | 25.6%      |
|                | Grade three    | 132      | 24.4%      |
|                | Grade four     | 130      | 26%        |
| Student cadres| Yes            | 87       | 17.4%      |
|                | No             | 413      | 82.6%      |
| Major          | Science and engineering | 374 | 74.8% |
|                | Liberal arts   | 126      | 25.2%      |
| Academic record| Excellent      | 101      | 20.2%      |
|                | Good           | 288      | 57.8%      |
|                | General        | 111      | 22.2%      |

Research results and analysis

In addition to psychopathological symptoms, this paper introduces the life satisfaction and the emotion indicator and the life satisfaction is taken as the core indicator of subjective well-being. Compared with the emotional indicator, the evaluation result is more stable and can be used as an indicator to evaluate the psychological health of...
college students. Figure 3 shows the score of college students’ psychological health. It can be clearly seen that college students have higher life satisfaction score and lower psychopathological score, and the score of positive emotion is higher than that of negative emotion, indicating that the two-factor mathematical model can achieve the better comparison of positive and negative factors. The survey results show that college students have more positive psychological health level.

**Figure 3. Score of psychological health level of College Students**

Figure 4 shows the impact of various factors on the score of college students’ psychological health. Figure 4 (a) shows the gender factor. It can be clearly seen that male college students have more positive psychological health than female college students, and each dimension of these two factors shows a significant difference in the gender factor. Figure 4(b) shows the grade factor. It can be clearly seen that college students in the lower grade have higher level of positive psychological health, which is mainly related to interpersonal relationship and social pressure among college students. Also, each dimension of these two factors shows a significant difference in the grade factor. Figure 4(c) shows the student cadre factor. It can be clearly seen that if student cadres have higher score of life satisfaction and positive emotion. To be more specific, student cadres have higher level of positive psychological health. Also, each dimension of these two factors shows a significant difference in the student cadre factor. Figure 4(d) shows the major factor. It can be seen that college students majoring in science and engineering show stronger positive emotions and negative emotions and they show richer emotions, while college students in the major of liberal arts show higher life satisfaction. Degree and psychopathology scores. Figure 4(e) shows the academic performance factor. It can be clearly seen that students with academic performance tend to have higher score of life satisfaction and positive emotion. Also, each dimension of these two factors shows a significant difference in the academic performance factor. Compared with the evaluation results of the psychological health of college students in existing studies (mainly using the psychopathological indicator), this paper uses the two-factor mathematical model for the evaluation and the psychological health level of college students seen in this paper will be more positive. Because the psychological health level of college students is not constant and positive psychology and negative psychology coexist. In theory, it is believed that as long as the positive psychology is more significant than negative psychology, it can be regarded as a positive psychological health level on the whole. Therefore, the two-factor mathematical model given in this paper will be more applicable.

**RESEARCH ON COLLEGE STUDENTS’ PSYCHOLOGICAL HEALTH INTERVENTION BASED ON TWO-FACTOR MATHEMATICAL MODEL**

It can be seen from the analysis of two-factor mathematical model that the psychological health status of college students is susceptible or symptomatic but satisficer and there are many psychological unhealthy symptoms. Through the investigation in the previous chapter, it can be seen some college students so have some psychological health problems. This study attempts to intervene in the above-mentioned psychological health problems of college students by systematic psychological training and mindfulness-based cognitive intervention to improve their psychological health. According to the two-factor mathematical model, the intervention process acts on the psychological prediction of the positive state of psychological health. Both intervention measures are aimed at enhancing the psychological quality and psychological cognition of college students so as to achieve the goal of improving the psychological health.
Figure 4. The influence of various factors on the scores of College Students’ psychological health

Figure 5 shows the results of psychological health evaluation of college students before and after the psychological training intervention. It can be seen that the life satisfaction and positive emotion of college students have been improved after the intervention of systematic psychological training, but the overall improvement effect is not significant. Figure 6 shows the results of psychological health evaluation of college students before and after the mindfulness-based cognitive intervention. According to the two-factor mathematical model, the improvement effect of mindfulness-based cognitive intervention on the psychological health of college students is more significant than systematic psychological training.
Figure 5. The measurement results of psychological health level of college students before and after systematic psychological training intervention

Figure 6. Psychological health of college students before and after mindfulness cognitive intervention

CONCLUSION

This paper measures and evaluates the psychological health of college students from two dimensions, namely positive psychology and negative psychology, and constructs a two-factor mathematical model suitable for the measurement of college students’ psychological health level. The specific conclusions are as follows:

(1) The results of the psychological health level of college students are related to the timing of the test, the physical and psychological conditions of the college students, and also related to the environmental conditions and time control during the test. After the evaluation is over, the reviewer explains the incompleteness of the evaluation results. Too rigid characteristics will increase the emotional fluctuations of college students and cause a greater psychological burden.

The results of psychological health evaluation of college students are related to the timing, physical and psychological conditions of college students. Furthermore, it is also related to the environmental conditions and time control of the evaluation. After the evaluation, the comprehensive and rigid explanation of the measurement results given by the evaluation personnel will lead to greater emotional fluctuation and psychological burden of college students.

(2) The two-factor mathematical model can achieve the better comparison of positive and negative factors. Compared with existing psychopathological evaluation, the two-factor mathematical model given in this paper will be more suitable for the measurement of the psychological health level of college students.

(3) The two-factor mathematical model is used for the evaluation, it is concluded that the psychological health level of college students is more active and subject to the impact of gender, grade, student cadre, major and academic performance. According to the two-factor mathematical model, the improvement effect of mindfulness-based cognitive intervention on the psychological health of college students is more significant than systematic psychological training.

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