

Measurement and Correlation Analysis of the Structure of College Students' Self-Efficacy in Physical Education

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Abstract: This article adopted the methods of the questionnaire survey, and statistical analysis to study the cognitive structure of Chinese college students' self-efficacy in physical education. The results show that the structure of self-efficacy in physical education among college students has four dimensions, the "sense of efforts", the "sense of control", the "sense of competence", and the "sense of environment". According to the correlation matrix analysis, there are some differences in the degree of correlation between the four dimensions and the cognition of self-efficacy in physical education, and the correlation coefficients of the dimensions are the "sense of effort"(0.805), the "sense of control"(0.733), the "sense of competence"(0.785), and the "sense of environment"(0.720). There is no significant difference($P>0.05$) in the cognitive level of physical education self-efficacy of college students of different genders, while there are significant differences ($P<0.05$) in that of students from different regions or with different attitudes. The purpose of this research is to further identify college students' self-efficacy in physical education, to enhance the level of college students' self-efficacy in physical education, and to improve students' athletic abilities and form a lifelong habit of exercise.

Keywords: College Students; Physical Education; Self-Efficacy; Measurement

Introduction

To implement "The Central Government's Decision for Deepening Educational Reform and Promoting Quality Education", the new curriculum reform not only requires teachers to teach students knowledge of physical culture and sports skills but also requires students to acquire knowledge of subject culture and actively participate in the inquiry process through self-learning. Self-efficacy plays an important role in the human self-regulatory mechanism. It has a direct effect on students' persistence and effort in their academic work and regulates students' behavioral activities through their individual cognitive, emotional, decision-making, and motivational processes. Existing research shows that self-efficacy is not only a crucial factor affecting students' academic achievement, but also significantly connected with other factors in students' learning, and serves as a mediator for those other factors affecting students' learning^[1]. However, it seems there has been little research on students' self-efficacy in physical education remains blank in China.

Since self-efficacy plays an important role in physical education, this study aims to develop a scale of college students' self-efficacy in physical education, and attempts to identify the structure of college students' self-efficacy in physical education. On this basis, the scale is further used to assess the current state of college students' self-efficacy in physical education, as well as the gender and grade level differences therein, so as to help them develop their positive self-cognition in physical education and to provide theoretical references for better teaching effects of physical education teachers and improving the athletic ability of college students.

1.Methodology

1.1Research subjects

In this research, the research subjects are students selected from different departments of several universities in Chongqing, including Chongqing Normal Universities, Chongqing University of Science and Technology, Chongqing City Management College, Southwest University, and Chongqing Jiaotong University. All these students were asked to complete the questionnaire under the guidance of the teachers, following fixed methods and principles of answering the questions.

1.2Methods

1.2.1Literature research

Based on the review of Chinese and foreign literature on self-efficacy collected from CNKI and the Web of Science, and the reading of books on cognitive psychology, academic self-efficacy, and statistics, we constructed a preliminary measurement of self-efficacy in physical education, providing a theoretical basis for this research.

1.2.2Questionnaire

The data were collected primarily through a designed questionnaire. The questionnaire was measured with a 5-point Likert scale ranging from "1(totally disagree)" to "5(totally agree)". Students chose the answer to each question according to their perception of the actual situation to complete the survey. All data were collected to form a valid database.

1.2.3Statistical analysis

The collected data were mainly processed and analyzed through factor analysis, confirmatory factor analysis, T-test, one-way analysis of variance(ANOVA), and AMOS7.0 Structural Equation Modeling(SEM).

2.Development and screening of the Scale of College Students' Self-Efficacy in Physical Education

2.1Development of the scale

2.1.1Theoretical assumptions on the structure of self-efficacy in physical education

Self-efficacy theory comes from Bandura's "triadic reciprocal causation", which views the independent and linked nature of individual factors, external environment, and personal behaviour. Bandura highlighted the function of human emotional processes, cognitive processes, and physiological factors in human behavioral activities, before going into more detail about the interactions between the individual, behaviour, and environment [2]. In this sense, self-efficacy in physical education, a personal component, is also the result of the interaction of the three elements. It also affects other individual factors, as well as the "sense of control" over behaviour and environmental perceptions of the person. Therefore we cannot leave out Bandura's "triadic reciprocal causation" when we study the inner structure of self-efficacy in physical education.

3.Structural analysis of "Scale of College Students' Self-Efficacy in Physical Education"

3.1Item analysis of the formal scale

Item analysis was employed to analyze the 20 items of the "Scale of College Students' Self-Efficacy in Physical Education", and there were two main indicators. In order to determine whether there were any "floor effects" or "ceiling effects," we first determined the mean value and standard deviation of each questionnaire item. "Floor effects" refers to the low scores of most students as the questionnaire items were too difficult for students. On the contrary, "ceiling effects" refers to the high scores of most students as a result of the easy items. The correlation coefficients between each questionnaire item and the overall scale score as well as between the item and the relevant dimension's total score were then determined. Then,

the coefficients were used to examine item discrimination. Table 1 reveals the following findings. First, the mean value of each item ranges from 2.93 to 3.76 and the standard deviation ranges from 0.850 to 1.064, which means that there were no "floor effects" or "ceiling effects" and all questionnaire items were normal and legitimate. Second, the correlation coefficient between each item and its corresponding dimension ranges from 0.588 to 0.785, and that between each item and the scale's overall score ranges from 0.440 to 0.612. Since all these correlation coefficients have reached their significant levels, the items in this scale are all highly differentiated. Therefore, we considered that all items in the "Scale of College Students' Self-Efficacy in Physical Education" had met the metrical requirements.

4. Reliability and validity of "Scale of College Students' Self-Efficacy in Physical Education"

4.1 Reliability analysis of the scale

Reliability refers to the consistency and stability of test results by the same tools. It's an indicator of the fidelity of the tested characteristics^[3]. The Cronbach α was used to conduct reliability analysis on the scale. The results are shown in Table 2. Cronbach α of the total scale is 0.879, and the value of each dimension ranges from 0.609 to 0.727. These results suggest that each dimension in the "Scale of College Students' Self-Efficacy in Physical Education" has high reliability. However, the Cronbach α of the dimension of the "sense of environment"(Factor 4) is relatively lower than other dimensions. This may be due to the fewer questionnaire items included in the dimension of the "sense of environment". Therefore, the overall reliability of the "Scale of College Students' Self-Efficacy in Physical Education" has reached the metrical requirements.

Table 2 Cronbach α of each subscale and total scale

Dimension	Items	Cronbach α
F1	A1、 A2、 A3、 A4、	0.700
F2	A5、 A6、 A7、 A8、 A9 A10、 A11、	0.770
F3	A12、 A13、 A14、 A15、 A16、	0.769
F4	A17、 A18、 A19 A20、	0.650
Total scale	A1.....A20	0.879

4.2 Validity analysis of the scale

4.2.1 Content validity

Content validity refers to the extent to which the examined items accurately represent their subjects. Questionnaire items in the "Scale of College Students' Self-Efficacy in Physical Education" were built on the basis of open-ended questionnaires and literature research. Some experts and scholars with high academic attainments were invited to evaluate these items. According to them, the questionnaire covered the key areas of college students' physical education, was effective in measuring the college students' self-efficacy in physical education, and its items were representative.

5. Conclusion

5.1 Limitations and prospects

However, the "Scale of College Students' Self-Efficacy in Physical Education" needs to be further improved. We should collect samples from a wider spectrum of subjects to make them more representative. Most of the items in this scale were modified items borrowed from the academic scales of other subjects, and self-developed items based on self-efficacy and related theories. It needs to be further examined whether or not these altered and self-developed items are appropriate for the application in the discipline of physical education. In terms of the application of the scale, we should look further into the self-efficacy in physical education of students with different family backgrounds (parents' educational levels, sports interests, etc.), as well as students from different regions (development levels of different regions) in order to learn the various characteristics shown by the self-efficacy of different types of students; to verify whether the different types of schools have

any influence on students' self-efficacy and whether there are significant differences in the self-efficacy of those students; to find out whether there are significant differences in the self-efficacy of students from different regions, and if so, what are the responsible factors? All these issues are what we should pay attention to in future research.

So far, most of the research on self-efficacy in physical education has remained theoretical, while little research has focused on practice. Therefore, we should widely apply the self-developed scale in practical application to understand the status of college students' self-efficacy in physical education and guide college physical education teachers to develop effective teaching schemes. Meanwhile, the application of the scale also helps to construct positive self-recognition systems for college students in physical education, to improve their athletic abilities and form a lifelong habit of exercise.

References

- [1] Bian YF. Self-efficacy of learning [M. Zhejiang: Zhejiang Education Press. 2004.
- [2] Bian YF. Preparation and application of learning the self-efficacy scale [D]. Shanghai: East China Normal University, 2003:65.
- [3] Chen YL, Chen SH, et al. Reliability, validity assessment and modification opinions of the TCM medicine syndrome rating scale during the acute withdrawal period of opioid addiction [J]. Chinese Journal of Drug Dependence, 2010,19 (3): 210- -216.
- [4] Zheng RC, et al. Psychometry [M]. Beijing: People's Education Press, 1998.