



# Intervention Effects of Motivation Interviewing Chinese Modified on the Mental Health of College Students with Exercise Dependence

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## Abstract

Exercise dependence is a psychological problem that cannot be ignored and is positively related to anxiety and depression of college students. However, only a few effective intervention methods are available to deal with exercise dependence. This study aims to investigate the intervention effects of motivation interviewing Chinese modified on the mental health of college students with exercise dependence. Thirty college students with exercise dependence were selected from Hunan University of Science and Technology in Hunan province of China to participate in the experiment. The participants were divided equally into the intervention and control groups. A three-week motivation interviewing Chinese modified session was conducted in the intervention group, whereas no intervention was carried out in the control group. This strategy allowed for the vertical and the horizontal comparison of the intervention objects' situation before and after the experiment. The State-Trait Anxiety Inventory and other Scales were used to evaluate the effects of the intervention and explore the intervention effects of motivation interviewing Chinese modified on the mental health of college students with exercise dependence. After three weeks of motivation interviewing Chinese modified, differences in state anxiety, depression, self-satisfaction, negative emotion, energy, and positive emotion in the intervention and control groups before and after the intervention appear to be statistically significant ( $P < 0.05$ ). Motivation interviewing Chinese modified can improve the mental health level of college students with exercise dependence. Hence, motivation interviewing Chinese modified is good for the treatment of addiction behaviors and provides a reliable intervention method for exercise dependence.

**Keywords** Mental health · Motivation interviewing Chinese modified · Exercise dependence · Intervention

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## Introduction

With the rapid development of the social economy, exercise has been generally accepted by people as an important regiment of healthy lifestyle and is considered a basic lifestyle or behavior. However, people who engage in excessive exercise suffer from exercise dependence [1]. “Exercise dependence” is a form of behavioral addiction, which refers to the physiological and psychological symptoms emerging in individuals who are passionate about and participate excessively in exercise. Exercise dependence can lead to negative physiological effects, such as withdrawal and tolerance, and psychological effects, such as depression and anxiety, thereby affecting physical and mental health and social life [2]. For people with exercise dependence, exercise is the most important thing in daily life. Once regular exercise stops, symptoms are like withdrawal from substance addiction, such as insomnia, anxiety, loss of appetite, and cruelty. Even people who have been injured because of exercise are unwilling to stop exercising, leading to considerably serious injuries [1]. In a study on Chinese college students, college students with exercise dependence have higher levels of anxiety and depression than other ordinary college students [3]. Long-term anxiety and depression usually induce various physical and psychological barriers and even cause depression or suicide [4]. Therefore, exercise dependence has become a psychological and behavioral issue that cannot be ignored.

The treatment and intervention of exercise dependence are the focus of researchers. The current limited research includes drug treatment and psychological intervention. On the basis of theoretical research, Cumella [5] believed that psychological treatment methods (such as behavioral correction counseling) are the most effective ways to treat exercise dependence. Given the lack of empirical research to treat exercise dependence, Adams [6] proposed to attach importance to the similarity between exercise dependence and other addictive behaviors and to use those psychotherapy approaches designed to treat similar addictive behaviors. For instance, cognitive behavioral intervention therapy should be an enhanced treatment. Weinstein [7] affirmed that the treatment of exercise dependence should be based on cognitive behavioral intervention therapy. Hence, research lacks on the use of psychological intervention to treat exercise dependence, especially empirical research on psychological intervention. As the limited research concentrates on theoretical discussion, in-depth and extended research in this field is needed.

Motivational interviewing (MI) is a new method developed by Miller et al. in the process of treating alcoholics and promoting behavioral changes. As an interviewee-focused method aimed at guiding interpersonal communication, MI helps interviewees find and overcome their ambivalence, thereby leading to behavioral changes [8]. MI is a psychological intervention method widely applied in foreign countries. Initially used to treat addiction and substance abuse, MI has been proven more effective than traditional drug-based cognitive behavioral therapy, and the effect has been consolidated for a longer time [9]. Hence, MI has been widely used in interventions in alcohol addiction [10], smoking cessation [11], and other addition behaviors and has achieved positive results. Through combining the basic ideas and techniques of western motivational interviewing with Chinese culture and clinical experience, Professor Deng [12] proposed the motivation interviewing Chinese modified. Motivation interviewing Chinese modified applies to the same areas of motivational interviewing including addiction and substance abuse behaviors, as well as changes in extensive maladaptive behaviors, such as diet control, children’s rebellious behaviors, improvement of doctor–patient relationships, and treatment compliance. Thus, interviewing can be applied to the medical field and changes in maladaptive behaviors in education and management. One of the features of motivation

interviewing Chinese modified is that no fixed requirements are needed on the occasion, time, frequency, and procedure. The process can have different characteristics and use varied methods for various behaviors, individuals, treatment experiences, and frequencies [12]. Motivation interviewing Chinese modified is easy to operate and can be mastered by medical workers and educators who do not specialize in psychotherapy [13]. In this study, motivation interviewing Chinese modified was used in the intervention of college students with exercise dependence and to explore effective methods to treat exercise dependence and provide the basis for exercise-dependence treatment.

## Methods

### Participants

30 college students with exercise dependence were selected from Hunan University of Science and Technology in Hunan of China to participate in the experiment voluntarily. The students were divided into the intervention and control groups, with 15 participants each. Motivation interviewing Chinese modified was conducted in the intervention group, whereas no intervention was carried out in the control group, to make a vertical and a horizontal comparison of the intervention objects' situation before and after the experiment. The intervention group participated in a three-week intervention of motivation interviewing Chinese modified. The participants were between 20 and 22 years old, averagely  $20.8 \pm 0.9$  years. This group comprised nine male and six female students. The control group, which was not intervened, included 8 males and 7 females, with an average age of  $21.2 \pm 0.9$  years. After their health situation was determined and analyzed, the participants with severe physical or mental illness were excluded. Differences were analyzed before the experiment. No significant differences were observed between the two groups in age and gender ( $P > 0.05$ ). At the end of the experiment, exercise dependence and the mental health of the two groups of college students were compared.

### Measures

- (1) State-Trait Anxiety Inventory [14]: The State-Trait Anxiety Inventory (STAI), which was developed by Spielberger et al., is a self-assessment scale that is convenient to use and can be easily accepted and mastered by the objects. The STAI can assess state and trait anxieties separately and consists of an instruction and two subscales, comprising 40 items. The first 20 questions belong to the State Anxiety Inventory (S-AI), including 10 items that describe negative emotions and 10 items that describe positive emotions. The questions are mainly used to assess feelings or experiences of nervousness, anxiety, nervous temperament, and fear at the time being or in a recent specific time or situation. Questions from 21 to 40 belong to the Trait Anxiety Inventory (T-AI). These questions assess people's regular emotional experiences, with 11 describing negative emotions and 9 describing positive emotions. A Likert 4-point scoring is used for rating, and each item is scored from 1 to 4 points. All positive emotion items are scored in reverse, and then the total scores of the two subscales of S-AI and T-AI are calculated. The maximum score of the scale is 80 points, and the lowest score is 20 points, respectively, reflecting the degree of state or trait anxiety. A low score indicates a low anxiety level. The scale is consistent,

- convergent, discriminative, and structural at a satisfactory degree and, therefore, could effectively assess one's anxiety level [15].
- (2) The Center for Epidemiological Studies Depression Scale [16]: The Center for Epidemiological Studies Depression Scale (CES-D), which was developed by Radloff in 1977 [16], evaluates the current frequency of depressive symptoms. The focus of the scale is on the assessment of depressive moods or emotions because the scale is used to assess depressive moods rather than the entire depression syndrome. The CES-D is applied to screen depressive symptoms and is, therefore, more suitable for investigating the general population than patients. Several studies at home and abroad have demonstrated the applicability of the CES-D in adolescents. The CES-D contains 20 questions, including 4 reverse-scoring questions. The objects are asked to use 0–3 points to assess the frequency of the symptoms within the last week, resulting in a total score of 0–60 points. Generally, 16 points are the cut-off line. Respondents with less than 16 points are considered free of depression, those with 16–19 points may have depression, and those with 20 or more points must be depressed. The scale's validity has an internal consistency of 0.90, split-half of 0.77, test–retest of 0.67, and the scale has good criterion validity [16].
  - (3) Subjective Well-Being Scale [17]: The Subjective Well-Being Scale is used to measure the college students in the study. The scale was compiled by Ji and consists of 41 items in 8 dimensions, namely self-satisfaction (10 items), negative emotions (3 items), life satisfaction (7 items), social behaviors (5 items), energy (4 items), positive emotions (5 items), interpersonal relationships (4 items), and family satisfaction (3 items). A Likert 5-point scoring is used to give a score from 1 (completely inconsistent) to 5 (fully consistent). The internal consistency coefficient of the total scale is 0.937, and the test–retest reliability is 0.864. The criterion and construct validities and the confirmatory factor analysis of the scale indicate that the scale has good validity.

## Procedure

### Distribution and Collection of the Questionnaire

From November to December 2013, an experiment study was carried out in a university in Hunan Province. Copies of the questionnaire were distributed twice to the students with exercise dependence who had been screened as the experiment objects. In the first round, 30 copies of the questionnaire were distributed and collected. All the returned 30 copies were valid. Similarly, in the second round, the 30 distributed copies were all returned and were all valid as well.

In the above investigations, to avoid the objects' reservations in answering questions because of concerns and to avoid the failure of reflecting their feelings, in addition to being specifically noted in the explanatory part of the questionnaire, the following contents were explained verbally on site when the questionnaire was distributed: "This investigation was conducted for the purpose of study. The investigation would not involve interest disputes or the privacy of the public. The investigation results are very important. Please fill in it carefully. The questionnaire should be completed independently by the respondents within 5–8 minutes." To increase the efficiency of the questionnaire, the researchers were urged to appraise roughly the quality of the questionnaire when collecting the questionnaire on site. If an option

was found missing, a polite reminder was provided separately to invite the object to answer before the copy was collected.

### Basic Steps of the Intervention Experiment Process

Motivational interviewing draws on the trans-theoretical model (TTM). This model describes the five stages that are commonly required for behavioral change, namely, pre-intentional, intentional, preparatory, action, and maintenance [18]. Motivation interviewing Chinese modified is, therefore, used to achieve the phase changes of the interviewees' behavior according to the stage of behavioral change. Particularly, motivation interviewing Chinese modified consists of four basic steps, which are establishing the relationship, defining the goal, building the motivation, and implementing the plan. The stage of the interviewees' behavioral change decides in which step the interview intervention should enter. In practical applications, the four steps may be conducted in a linear manner or may also infiltrate one another and circulate back and forth.

- (1) Establishing the relationship: A truly harmonious interview relationship is established under the basic requirements of equality and acceptance. Establishment of the relationship aims to understand the experiment object's attitude towards exercise and motivation to participate in exercise.
- (2) Defining the goal: The behavioral goal is determined through interviewing and consulting the experiment object. The autonomy of the experiment object is respected. Guided communication leads the experiment object to understand the benefits of regular exercise and the disadvantages of excessive exercise.
- (3) Building the motivation: The experiment object is guided to establish the motivation for change and to discover the importance of change, thereby strengthening the confidence in making and consolidating the changes.
- (4) Implementing the plan: With adherence to the principle of equal cooperation and respect to the basic spirit of self-reliance, the experiment object is supported to formulate the change plan, discuss ways to control the intensity and time of exercise, and overcome difficulties in the change process.

### Statistical Analysis

The data were analyzed by SPSS 15.0 statistical software. Chi-square test was used to compare the qualitative data between groups. The quantitative data were expressed as mean  $\pm$  standard deviation. The cross-group comparison of the quantitative data between groups was conducted using independent sample t test. The intra-group comparison of the data before and after the intervention was carried out using paired t-test. The effects of intervention between groups were evaluated by comparing the changes of scores in different dimensions before and after the intervention.  $P < 0.05$  was considered statistically significant.

**Principle of Ethics** The study procedures were carried out in accordance with the Declaration of Helsinki. The survey was examined and approved by Institutional Review Board of the Third Xiangya Hospital, Central South University. The questionnaires were distributed in strict accordance with the principle of informed consent.

## Results

In this study, 30 copies of the questionnaire were distributed before the intervention, and 30 copies were collected and validated. The researchers checked the copies one by one and finally collected 30 valid copies. The recovery rate of effective copies is 100%. The questionnaire was distributed for the second time within three days after the end of the intervention experiment. Given the short intervention time and the relatively stable life of the college students, no object withdrew from either the intervention or the control group during the intervention, and no object was lost. Consequently, 30 copies of the questionnaire were distributed for the second time, and 30 valid copies were collected, which resulted in a valid recovery rate of 100%.

### Comparison of General Information between the Intervention Group and Control Group

Table 1 shows that the differences in gender and age between the intervention and control groups are not statistically significant ( $P > 0.05$ ). Hence, the two groups are comparable in terms of general information.

### Intervention Effect of Motivation Interviewing Chinese Modified on Anxiety

Table 2 shows that, in the aspect of state anxiety, before the intervention, the difference between the intervention and control groups was not statistically significant ( $P = 0.642$ ). After the intervention, the score of the intervention group in state anxiety decreased significantly, and the difference with the score before the intervention was statistically significant ( $P < 0.001$ ). No significant difference was observed between the scores of the control group in state anxiety before and after the intervention, and the difference was not statistically significant ( $P = 0.084$ ). Hence, the motivation interviewing Chinese modified intervention experiment relieved state anxiety. The difference between the two groups in their changes before and after the intervention was statistically significant ( $P < 0.001$ ). In terms of trait anxiety, no significant difference was found in comparing the intra- and cross-groups and in the differences before and after the intervention ( $P > 0.05$ ).

### Intervention Effect of Motivation Interviewing Chinese Modified on Depression

Table 3 shows that, in the aspect of depression, before the intervention, the difference between the intervention and control groups was not statistically significant ( $P = 0.940$ ). After the intervention, the score of the intervention group in depression decreased significantly, and the difference with the score before the intervention was statistically significant ( $P < 0.001$ ).

**Table 1** Comparison of general information between the intervention and control groups

Group	Cases	Gender		Age
		Male	Female	
Experimental Group	15	8(53.3%)	7(46.7%)	20.8 ± 0.9
Control Group	15	9(56.7%)	6(43.3%)	21.2 ± 0.9
Statistics		$\chi^2 = 0.14, P = 0.713$		$t = 1.21, P = 0.235$

**Table 2** Assessment of the effect of the motivation interviewing Chinese modified intervention experiment on anxiety

Indicator	Group	Before intervention	After intervention	Difference before and after intervention	Intra-group comparison	Cross-group difference comparison
State anxiety	Experimental Group (n = 15)	63.3 ± 8.0	54.3 ± 7.3	9.1 ± 2.4	P < 0.001	P < 0.001
	Control Group (n = 15)	62.0 ± 7.5	60.9 ± 7.1	1.1 ± 2.4	P = 0.084	
Trait anxiety	Experimental Group (n = 15)	54.5 ± 6.9	54.3 ± 4.4	0.2 ± 4.0	P = 0.850	P = 0.413
	Control Group (n = 15)	57.3 ± 8.1	55.8 ± 6.5	1.5 ± 4.3	P = 0.210	

No significant difference was observed between the scores of the control group in depression before and after the intervention, and the difference was not statistically significant ( $P = 0.338$ ). The difference between the two groups in their change before and after the intervention was statistically significant ( $P = 0.013$ ).

### Intervention Effect of Motivation Interviewing Chinese Modified on Subjective Well-Being

Table 4 shows that the difference between the intervention and control groups was not statistically significant before the intervention ( $P > 0.05$ ). In self-satisfaction, negative emotions, energy, and positive emotions, the score of the intervention group increased significantly after the intervention, and the difference with the score before the intervention was statistically significant ( $P < 0.001$ ). No significant difference was observed between the scores of the control group in self-satisfaction before and after the intervention, and the difference was not statistically significant ( $P = 0.574$ ). The difference between the two groups in their change before and after the intervention was statistically significant ( $P = 0.018$ ). In terms of social behaviors, the difference between the intervention and control groups was not statistically significant before the intervention ( $P = 0.698$ ). The scores of the intervention group in social behaviors increased slightly after the intervention, but the difference in the scores before the intervention were not statistically significant ( $P = 0.149$ ). No significant difference was observed between the scores of the control group in social behaviors before and after the intervention, and the difference was not statistically significant ( $P = 0.573$ ). In life satisfaction, interpersonal relationships, and family satisfaction, no significant difference was found in the comparison of the intra- and cross-groups and in the difference before and after the intervention ( $P > 0.05$ ).

**Table 3** Assessment of the effect of the motivation interviewing Chinese modified intervention experiment on depression

Indicator	Group	Before intervention	After intervention	Difference before and after intervention	Intra-group comparison	Cross-group difference comparison
depression	Experimental Group (n = 15)	18.2 ± 4.2	15.5 ± 3.7	2.7 ± 2.6	P = 0.001	P = 0.013
	Control Group (n = 15)	18.3 ± 5.4	17.9 ± 4.9	0.5 ± 2.0	P = 0.338	

**Table 4** Assessment of the effect of the motivation interviewing Chinese modified intervention experiment on subjective well-being

Indicator	Group	Before intervention	After intervention	Difference before and after intervention	Intra-group comparison	Cross-group difference comparison
Self-satisfaction	Experimental Group (n = 15)	32.3 ± 6.9	34.9 ± 5.9	-2.6 ± 2.1	P < 0.001	P = 0.018
	Control Group (n = 15)	30.7 ± 5.1	31.1 ± 3.8	-0.4 ± 2.7	P = 0.574	
Negative emotions	Experimental Group (n = 15)	12.5 ± 2.0	10.2 ± 1.8	2.3 ± 2.2	P = 0.001	P = 0.004
	Control Group (n = 15)	12.9 ± 2.1	12.8 ± 1.2	0.1 ± 1.5	P = 0.737	
Life satisfaction	Experimental Group (n = 15)	26.1 ± 4.3	26.9 ± 3.7	0.7 ± 1.8	P = 0.135	P = 0.076
	Control Group (n = 15)	25.4 ± 1.8	25.1 ± 1.8	-0.3 ± 1.1	P = 0.364	
Social behaviors	Experimental Group (n = 15)	18.7 ± 3.9	19.5 ± 2.4	-0.9 ± 2.2	P = 0.149	P = 0.133
	Control Group (n = 15)	18.1 ± 4.6	17.8 ± 3.3	0.3 ± 1.8	P = 0.573	
Energy	Experimental Group (n = 15)	15.1 ± 2.4	16.4 ± 1.4	-1.3 ± 1.8	P = 0.016	P = 0.034
	Control Group (n = 15)	14.4 ± 2.3	14.3 ± 1.9	0.1 ± 1.6	P = 0.758	
Positive emotions	Experimental Group (n = 15)	18.5 ± 3.4	20.1 ± 2.2	-1.7 ± 2.7	P = 0.031	P = 0.027
	Control Group (n = 15)	19.3 ± 4.2	19.2 ± 3.2	0.3 ± 1.3	P = 0.433	
Interpersonal relationships	Experimental Group (n = 15)	14.7 ± 3	14.7 ± 1.6	-0.1 ± 2.1	P = 0.905	P = 0.787
	Control Group (n = 15)	15.7 ± 2.8	15.6 ± 1.5	0.1 ± 1.9	P = 0.788	
Family satisfaction	Experimental Group (n = 15)	9.1 ± 2.9	8.9 ± 1.8	0.2 ± 1.6	P = 0.638	P = 0.607
	Control Group (n = 15)	9.9 ± 2.2	9.8 ± 1.9	0.1 ± 1.3	P = 0.999	

## Discussion

### Motivation Interviewing Chinese Modified Can Effectively Promote Patients' Behavioral Changes

As an interviewee-focused method aimed at guiding interpersonal communication, MI helps interviewees find and overcome their ambivalence, thereby leading to behavioral changes [19]. Making behavioral changes is difficult. Traditional health education methods are mainly aimed at providing simple advice, achieving only a 5% to a 10% success rate in changing behaviors and yielding little result [19]. In recent years, considerable attention has been paid to the role of individuals' internal motivation in promoting behavioral changes. For instance, Miller believed that motivation is not an individual's inherent trait but the individual's desire to change behaviors [20]. People can influence the individual's motivation and lead the individual to change in a specific direction [20]. In the process of engaging alcoholics in psychotherapy, Miller et al. recognized the importance of motivation and, thus, developed a new method to promote behavioral changes, namely, motivational interviewing. In the subsequent development in more than 30 years, this method has obtained a positive effect in various fields. MI emphasizes the conflict in the interviewee's belief, goal, hope, and problematic behaviors, changes the interviewee's emotion, understanding, and reaction to these problematic behaviors, and further enhances the interviewee's awareness of the necessity to change the behaviors to build the motivation of behavioral changes and achieve behavioral changes [21].

The most compelling evidence for the validity of MI is the use of MI in intervention studies on the abuse of alcohol and other substances [22]. A large-scale intervention study of alcoholics affirmed that treatment with MI takes less time and is more effective than cognitive behavioral therapy [22]. MI has been proven effective in helping perinatal women quit smoking [23] and in increasing the smoking cessation rate of cancer patients from 18% to 29% [24]. MI can significantly improve treatment compliance and glycemic control in diabetic patients [25]. Further, MI plays an important role in improving the activities of elderly patients with heart failure and reinforcing the effect of physical activities [26]. MI has evident effects in enhancing the compliance behavior of patients with mental disorders. Specifically, patients with anxiety and depression are likely to resist cognitive behavioral therapy, but MI can relieve this resistance emotion [27]. D'Amico et al. corroborated that, for patients who do not consider changing current conditions, MI has a better effect than general methods [28]. These studies prove that MI is a psychological intervention method that has good intervention effect and potential in solving many health problems. Furthermore, researchers are working to extend MI to broad areas of behavioral changes, enabling several people to master this intervention technique. Researchers from various countries are encouraged to develop a localized intervention technique that suits their own national characteristics.

China's unique social and cultural background has shaped the special ways of living and cultural differences with Western societies. Given these cultural differences, MI, which has been well applied in the context of Western culture, may not fully play its role in the context of China's culture. In this context, exploring the influence of cultural factors in the intervention process is significant, and efforts should be exerted to localize MI. Motivation interviewing Chinese modified (Chinese Modified MI) is a localized motivational interviewing technique developed by Professor Deng. The technique is based on the basic ideas and techniques of western motivational interviewing and years of clinical experience to fit Chinese social and cultural background. Non-psychiatric or spiritual medical workers can easily learn, master, and

use motivation interviewing Chinese modified. The basic principle of motivation interviewing Chinese modified includes “knowing both parties, responding appropriately, being true and harmonious, and being positive and enterprising.” The core idea is equal cooperation, patient autonomy, and proper motivation. Motivation interviewing Chinese modified can effectively promote changes in patients’ behaviors, alter the traditional way of communication between doctors and patients, and contribute to the harmonious doctor–patient relationship [12].

### **Intervention Effect of Motivation Interviewing Chinese Modified on the Mental Health of College Students with Exercise Dependence**

The most direct goal of using motivation interviewing Chinese modified to intervene in college students with exercise dependence is to improve their mental health. Table 1 exhibits that no difference was indicated between the experiment and control group in gender and age.

Before the intervention, the scores in anxiety and depression did not differ between the intervention and control groups. After the intervention, the scores of the intervention group in state anxiety and depression decreased significantly, but no change was shown in trait anxiety. Further, no significant differences in the scores of the control group in anxiety and depression were observed after the intervention. However, differences were noted in the changes of the scores of the experiment and the control groups in state anxiety and depression before and after the intervention, but no difference was seen in trait anxiety. Hence, motivation interviewing Chinese modified intervention experiment has an improvement effect on state anxiety and depression but no effect on trait anxiety.

Before the intervention, the intervention and control groups had no differences in the eight dimensions of subjective well-being. After the intervention, the scores of the intervention group in the four dimensions, namely, self-satisfaction, negative emotions, energy, and positive emotions, were significantly higher than the results before the intervention. Compared with those in the control group, the differences between the changes before and after the intervention are significant. After the intervention, no significant changes in the scores of the intervention group were observed in the four dimensions of life satisfaction, social behaviors, interpersonal relationships, and family satisfaction. Hence, motivation interviewing Chinese modified intervention has certain effects on self-satisfaction, negative emotions, energy, and positive emotions but has no effect on life satisfaction, social behaviors, interpersonal relationships, and family satisfaction.

MI has been widely used by many foreign researchers since the time of its first application to the treatment of addiction and substance abuse, and MI has been proven effective. MI has also been proven to have good effects on smoking cessation, alcohol abstinence, diabetes, depression, and many other mental and physical diseases. Nevertheless, due to the great gap between Chinese and Western cultures, MI would have difficulty to play fully its role in the context of China’s culture. Under this background, motivation interviewing Chinese modified was developed according to the basic ideas and techniques of western motivational interviewing and China’s national conditions and cultural background. Motivation interviewing Chinese modified, as Chinese localized motivational interviewing, was used in this study to intervene in the mental health of college students with exercise dependence. After three weeks of motivation interviewing Chinese modified intervention, the anxiety and depression levels of the intervention group decreased significantly. This result validates that motivation interviewing Chinese modified can relieve the anxiety and depression of college students with exercise dependence.

The formation of exercise dependence among college students is mainly attributed to their pursuit of a perfect body shape and outstanding athletic ability, which may lead to excessive exercise and even exercise dependence. Motivation interviewing Chinese modified is an interviewing method that changes motivation to promote behavioral changes. This method was used in this study to intervene in college students with exercise dependence, change their understanding of exercise, adjust their goal of exercise, build the motivation to change exercise dependence, promote the change of exercise dependence behaviors, and, thus, improve mental health. In face of the low degree of improvement in many indicators after the intervention, achieving fairly good results of psychological health intervention in a short time is difficult. In addition, changes in behaviors require a process, and this process usually involves many iterations.

## Conclusions

This study confirms that motivation interviewing Chinese modified can effectively improve the mental health of college students with exercise dependence, but no significant differences are seen in several assessment indicators of the mental health of college students with exercise dependence before and after the treatment. The reasons may include the short duration of treatment and the lack of enhancement on change motivation. Therefore, further study should pay attention to the following aspects: First, intervention time should be extended, and motivation for change should continuously be strengthened as well to achieve improved treatment effects. Second, this study has only a few of the objects treated. Expanding the sample for further study can be done in the future. Third, studies are few on psychological intervention in exercise dependence. Future study can add experiment groups and use multiple intervention methods to treat exercise dependence to explore the best treatment option for treating exercise dependence.

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## Compliance with Ethical Standards

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical. The survey was examined and approved by Institutional Review Board of the Third Xiangya Hospital, Central South University.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

**Conflict of Interest** The authors declare that they have no conflict of interest.

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