

## research protocol

### Project summary

This study investigates the comparative effectiveness of mindfulness training, folk-dance therapy, and a combined intervention in alleviating academic burnout among rural Chinese left-behind children (LBC). A single-blind randomized controlled trial design was employed, with 100 participants randomly assigned to four groups: mindfulness training, folk-dance therapy, combined intervention, and control. Each intervention group received four sessions per week over 12 weeks. The mindfulness program, adapted for primary school children, focused on developing focused attention skills, reframing stress, and managing negative emotions. Sessions included guided mindfulness exercises and reflective discussions. The folk-dance intervention aimed to reduce stress through structured dance sessions, incorporating warm-up, dynamic formations, and relaxation exercises. Participants wore heart rate monitors to maintain moderate intensity. The combined group integrated both mindfulness and folk-dance components. The control group received no specific intervention but underwent the same monitoring procedures. Academic burnout was assessed at baseline, immediately post-intervention, and at a 6-week follow-up using validated measures. Data were analyzed using repeated-measures ANOVA with Bonferroni correction. This study evaluates the efficacy of these interventions in addressing academic burnout among LBC, with potential implications for school-based mental health programs.

### General information

- Intervention Effect of Mindfulness Interventions Combined With Folk-Dance on Academic Burnout Among Left-Behind Children in Rural China
- Hunan Normal University

### Rationale & background information

- the present study aims to compare the efficacy of folk-dance intervention with mindfulness-based intervention, while also exploring the potential synergistic effects of combining these two approaches. By systematically evaluating their individual and combined impacts on academic burnout, this research seeks to identify optimal intervention strategies for addressing the unique needs of left-behind children.

### Study goals and objectives

This study examined the comparative effectiveness of three distinct interventions—a dance-based intervention, a mindfulness-based intervention, and a combined intervention integrating both strategies—in alleviating academic burnout among a sample of rural Chinese left-behind children.

### Study design

This study is an evaluator-blinded, randomized controlled trial (RCT) designed to assess the efficacy of three interventions—mindfulness, folk-dance, and a combined mindfulness and folk-dance approach—in

reducing academic burnout among rural left-behind children. The trial included a 12-week intervention period, during which the three experimental groups were compared to assess their relative effects on academic burnout symptoms. The intervention study was registered at the Chinese Clinical Experimental Center (ID: ChiCTR2500098927).

The study design was meticulously developed by a multidisciplinary research team, comprising an experienced professor specializing in sports rehabilitation and clinical psychology, four postgraduate students in folk-dance, and four postgraduate students in psychology. This collaborative approach ensured a comprehensive and well-rounded study protocol. The trial adhered to the ethical principles outlined in the Declaration of Helsinki and received formal approval from the Ethics Committee of Hunan Normal University (Approval No. 2022 No. 309). Written informed consent was obtained from the caregivers of the participants, and assent was collected from the child participants and their legal guardians following a detailed explanation of the study's objectives, procedures, and potential risks.

## Methodology

### *Participants*

Before initiating the study, researchers utilized G\*Power software (version 3.1.9.7) to determine the required sample size. With a power of 0.9, an alpha level of 0.05, and an estimated effect size of 0.32, the analysis indicated that a minimum of 21 participants per group was necessary. To accommodate a potential 20% attrition rate, the recruitment process enlisted a total of 100 child participants from grades 4 and 5 at Huangdu Primary School in Shaodong City, China. Participants were sorted alphabetically by last name and randomly assigned to one of four equal-sized groups ( $n = 25$  per group) using an online randomization tool (<http://www.randomizer.org>): the M group, D group, combined intervention group, and the control group (CG). Inclusion criteria were as follows: (1) a score above the clinical cutoff on the Academic Burnout Inventory (e.g.,  $\geq 4.0$  on the emotional exhaustion subscale or  $\geq 3.5$  on the reduced personal accomplishment subscale), (2) enrollment in grades 4 or 5, and (3) current enrollment at the recruitment site. Exclusion criteria included participation in mindfulness training within the past year, sustained daily meditation practice, serious physical illness, current medication or surgery for a psychiatric condition, participation in another behavioral or pharmacological trial, or involvement in an instructor-led exercise program.

### *Group assignment*

Participants were randomly assigned to either the treatment groups (DG, MG, or combined intervention group) or the control group. The intervention spanned 12 weeks, with students attending four 40-minute (from 16:00 to 16:40) sessions per week, totaling approximately 80 hours of group practice and instruction. Children in the treatment groups were temporarily removed from their regular classroom activities to participate in the intervention sessions, which were conducted in a dedicated intervention room to maintain a focused and consistent therapeutic environment. In contrast, the control group continued with their regular school activities without any intervention. During the study period, the treatment groups followed their standard school curriculum outside of the intervention sessions, ensuring minimal disruption to their academic routines.

## Data management and statistical analysis

Statistical analyses were performed using IBM SPSS Statistics (version 26.0; IBM Corp., Armonk, NY, USA) and GraphPad Prism (9th edition). Data were expressed as mean  $\pm$  standard deviation for continuous variables and as frequencies (%) for categorical variables. All statistical tests were two-tailed, with a significance level of 0.05. The analytical approach was structured into two phases. In the first phase, baseline differences across the four groups (MG, DG, DMG, CG) were examined using one-way ANOVA for continuous variables and chi-square tests for categorical variables. In the second phase, a repeated-measures ANOVA was applied to evaluate the effects of the intervention programs on social anxiety levels in LBC. This analysis utilized a 4 (group: MG, DG, DMG, CG)  $\times$  3 (time: pre-intervention [T<sub>0</sub>], post-intervention [T<sub>1</sub>], 6-week follow-up [T<sub>2</sub>]) design. Post hoc tests were performed to further investigate significant main effects and interactions. Data are presented as mean  $\pm$  standard deviation (M  $\pm$  SD), with p < 0.05 considered statistically significant.

## **Expected outcomes of the study**

The findings revealed that all three intervention strategies effectively reduced academic burnout in the treatment groups compared to the control group. Sustained benefits were evident in follow-up assessments. Notably, the combined intervention strategy demonstrated the greatest reduction in academic burnout, surpassing the dance-only intervention, which in turn showed superior outcomes compared to the mindfulness intervention alone.

## **Ethics**

The trial adhered to the ethical principles outlined in the Declaration of Helsinki and received formal approval from the Ethics Committee of Hunan Normal University (Approval No. 2022 No. 309).