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# Choreography as a factor in the adaptation of first-year students to the university environment

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***Abstract.*** *Introduction.* The adaptation period associated with the transition to higher education is marked by a significant increase in psycho-emotional stress among students. This highlights the need to identify and implement effective strategies that facilitate successful adaptation. *Aim.* The present study *aimed* to assess the impact of a 45-week dance intervention on the somatic status, psychophysiological performance, and academic outcomes of first-year students. *Methodology and research methods.* The study involved 236 first-year students. To assess the effectiveness of the intervention, a comprehensive diagnostic tool was employed, encompassing somatic, psychophysiological, and academic indicators. To test the statistical hypotheses, Student's t-test was used to compare mean values in both dependent and independent samples, alongside correlation analysis (Pearson's r) to identify relationships between the parameters studied. *Results.* The participants demonstrated statistically significant reductions in stress levels, and the academic performance results indicate a positive effect of the intervention on students' cognitive functions. *Scientific novelty.* For the first time, evidence has emerged to support the view that a structured dance programme can serve as an effective contributing factor to students' cognitive and psycho-emotional adjustment. *Practical significance.* The *practical significance* of this study lies in the potential for direct implementation of the developed 45-week model within the university physical education system, which underscores its value for higher education practice.

***Keywords:*** dance-motor intervention, mental well-being, academic performance, freshman adaptation, psychometric testing, cognitive function

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# Хореография как фактор адаптации студентов-первокурсников в университетской среде

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***Аннотация.*** *Введение.* Адаптационный период, сопряженный с переходом к обучению в высшем учебном заведении, характеризуется значительным увеличением психоэмоционального напряжения у студентов. Данное обстоятельство актуализирует задачу поиска и внедрения эффективных средств, способствующих успешной адаптации. *Целью* исследования является оценка влияния 45-недельной танцевальной интервенции на соматический статус, психофизиологические показатели и академические результаты студентов первого курса. *Методология, методы и методики.* В исследовании приняли участие 236 студентов-первокурсников. Для оценки эффективности интервенции применялся комплексный диагностический инструментарий, включавший соматические, психофизиологические и академические показатели. Для проверки статистических гипотез применялись t-критерий Стьюдента для сравнения средних значений в зависимых и независимых выборках, а также корреляционный анализ (коэффициент Пирсона) для выявления взаимосвязей между изучаемыми параметрами. *Результаты.* У испытуемых зафиксирована статистически значимая положительная динамика в снижении уровня стресса, результаты академической успеваемости свидетельствуют о положительном влиянии примененной интервенции на когнитивные функции студентов. *Научная новизна.* Впервые получены данные, подтверждающие, что структурированная танцевальная программа может рассматриваться как эффективный фактор, способствующий когнитивной и психоэмоциональной адаптации студентов. *Практическая значимость* работы определяется возможностью прямого внедрения разработанной 45-недельной модели в систему университетского физического воспитания, что обуславливает ее ценность для практики высшей школы.

***Ключевые слова:*** танцевально-двигательная интервенция, психическое благополучие, академическая успеваемость, адаптация первокурсников, психометрическое тестирование, когнитивные функции

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***Для цитирования:*** Муканбетова Ж.Т., Габдрахманова Ш.Т., Жансейтов А.Т. Хореография как фактор адаптации студентов-первокурсников в университетской среде. *Образование и наука.* 2026;28(2):35–55. doi:10.17853/1994-5639-2026-8599

## Introduction

The well-being of university students has turned into a real concern in today's fast-paced and demanding academic environment. Numerous first-year students find the transfer to university life overwhelming, especially as they come across academic expectations, social challenges, and the necessity to negotiate their recent freedom. Moreover, newcomers from other countries can have more pressure on them because they are not familiar to new place, culture and so on.

Dance can improve these mental health markers by facilitating emotional control, stress reduction, and improved social connections. This study intends to add to the current body of information by evaluating the impact of dancing on physical fitness measures, the mental health and academic performance of first-year university students from India.

The following frameworks are evaluated: physical fitness parameter is body mass index (BMI); mental health indicators are stress scale, depression scale, anxiety and fatigue; academic performance parameters are exam marks and grade point average (GPA).

This study's findings can potentially inform university administrators, educators, and mental health experts on the benefits of introducing dance activities into university curriculums and support systems, to help students manage the hurdles they come across.

*Research problem:* despite the recognised benefits of physical activity for mental, physical health and academic performance, traditional physical education programmes often overlook the advantages that dance choreography can offer. Specifically, the effects of various types of dance on the physical fitness, mental health and academic performance of first-year students remain under-researched, making it difficult to develop optimal curriculums that enhance these aspects.

*Research aim:* to investigate the effects of dance programmes on physical fitness parameter, mental health and academic performance in first-year students within the context of faculty lessons.

***Research objectives:***

1. To analyse existing scientific data on the impact of dance programmes on the physical fitness, mental health and academic performance of students.

2. To assess the impact, negative or positive, dance programmes have on student mental health, including stress levels, anxiety, and emotional well-being.

3. To identify changes and dynamics on physical fitness parameter.

4. To evaluate academic performance progress during the project.

5. To develop recommendations for integrating dance choreography into physical education curriculums to enhance physical fitness, improve the mental health and academic performance of first-year students.

The hypothesis of the paper is that dance effects physical fitness parameters and mental health in first-year students.

*The research question is the following:*

How does dance choreography effect physical fitness parameters, mental health and academic performance in first-year students?

## Literature Review

P. Sanderson defines dance as a multidimensional, unique experience that contributes decisively to the individual's integrated development, educating them in a way that combines feelings and emotions with logic and practical motor skills [1]. J. Karff[1], M. Joyce[2], J. L. Hanna[3], J. Adshead, P. Hodgens, V. Briginshaw et al. [2], and S. Stinson[4] believe that dance promotes the healthy development of self-image, body awareness, self-esteem, and self-control.

The success of a vocational training programme is directly related to the mental health and psychological well-being of students. Known risk factors include known problems with the transition to the first year and academic stress during the semester. One of the critical areas of work with students is educational projects that aim to identify and expand students' opportunities in sports, creativity, and volunteering. As noted by S. I. Khromina and N. N. Malyaruk [3], L. S. Vygotsky's ideas serve as a methodological basis for incorporating a physical educational environment. The famous Soviet psychologist Lev Vygotsky said: "Art is a very important place in both one's biology and social behaviour in society, it is a way of balancing people and the world" [3]. It reduces the risk of adaptation to the scientific foundations of human behaviour developed by L. S. Vygotsky.

After studying the literature, understanding of how exercise has many benefits increased, from basic happiness to improved health and well-being. Regular exercise helps in treating and preventing various diseases, greatly reduces the likelihood of heart disease, high blood pressure, diabetes, stroke and other serious diseases, and it also plays an important role in preventing dementia. Daily physical activity is essential to improve the cognitive and vocational learning of students on campus. Systematic physical activity stabilises overall body function and promotes health.

[1] Karff J. Dance in the urban school. *Journal of Physical Education, Recreation & Dance.* 1969;50:43–44.

[2] Joyce M. *First Steps in Teaching Creative Dance to Children.* Palo Alto, CA: Mayfield Publishing Company; 1980. 226 p.

[3] Hanna J.L. *Dance and Stress: Resistance, Reduction, and Euphoria.* New York, NY: AMS Press Inc; 1988. 195 p.

[4] Stinson S. *Dance for Young Children: Finding the Magic in Movement.* Reston, VA: National Dance Association/ American Alliance for Health, Physical Education, Recreation; 1988. 161 p.

It is known that, as noted by G. Lykesas, D. Chatzopoulos, V. Neratzoulou et al., a structured exercise programme can effectively improve daily life and mobility, while eliminating physical limitations in students [4]. According to D. Tao, Y. Gao, A. Cole et al. [5], regular physical exercise increases muscle strength, strengthens skeletal muscles, increases tissue density, and improves blood circulation. Additionally, choreographic training can reduce the risk of accidental injury and resistance, particularly with age.

Dance, as mentioned by X. Gao and S. Cao [6], is known for its ability to enhance physical fitness, emotional well-being, and cognitive skills by acting as a form of physical activity and creative expression. According to S. C. Koch, R. F. Riege, K. Tisborn et al. [7], the stability of rhythmic exercises, music, and social interactions combines physical and psychological needs, providing all the necessary incentives for students. J. Marich and T. Howell [8] emphasised that such practices contribute to the harmonisation of the psychophysical state. In addition, G. Lykesas, D. Chatzopoulos, V. Neratzoulou et al. [4] indicated that dancing has a positive impact on a wide range of demographic groups, including children, adolescents, and adults.

G. C. Dos Santos, J. do Nascimento Queiroz, A. Reyshak-Oliveira et al. [9] analysed the effect of dancing on the physical activity of children and adolescents and confirmed these findings. Similar results are reported by P. Sil [10] investigated the effect of aerobic dancing on the health indicators of schoolgirls. In turn, T. May, E. S. Chan, E. Lindor et al. [11] demonstrated the importance of dancing for the development of cognitive and social skills in children with disabilities. However, insufficient attention was paid to the degree of dance development among a particular group of first-year students at the university.

A. G. Gilbert [12] pointed out that dance is an effective form of physical activity that can be used as a warm-up or as a basic, consistent exercise for all ages and learning levels. Dance practices, according to the author, teach students how to align the body, rebuild the central nervous system, develop concentration, improve social skills, and reduce stress. A. G. Gilbert [12] also emphasised that when transferring to university, students face a more sedentary lifestyle and high levels of stress caused by academic demands and the need for social adaptation. In these conditions, dance, as an interactive and engaging form of physical activity, becomes the best option for first-year students in the process of adapting to university life.

A. Carballo-Fazanes, J. Rico-Díaz, R. Barcala-Furelos et al. [13] explained that university students are the most likely to stay alive because of their social background. For example, 608 students (64.6% female, 35.4% male), from the University of Santiago de Compostela, Spain, were selected at random to participate in a study by completing questionnaires on lifestyle and physical activity. 69.6% of the student participants answered that they participate in physical activity. The main reasons for stopping or not starting exercise were lack of physical fitness and health and lack of time. The majority of university students participated in some form of physical activity, which was associated with less sedentary behaviour, but the influence of school physical activity and relative attitudes played an important role [13].

Mental health is a critical factor for students' ability to cope with the pressures of academic life. As stated by D. Tao, Y. Gao, A. Cole et al. [5], mental health plays a crucial role in educational success and adaptation. According to a study by D.A.T. Popa [14], the psychometric results provide a deeper understanding of the psychological profile of students. In turn, J. L. Morejón [15] emphasised the importance of parameters such as anxiety level, irritability, emotional stability, and social variations.

## Theoretical Framework

Group dance and movement styles have been shown to mostly have a good effect on mood and mental health (Table 1). The kinds of group dance studied so far have been different, including traditional Chinese dance, Turkish folk dance, circle dance, and group dance performances. Like in partner dance studies, instead of looking directly at changes in depression symptoms, many studies focus on other factors that might relate to depression. However, participants preferred dancing in-person classes over doing an at-home programme, finding in-person sessions more motivating and enjoyable. This insight is important for designing dance programmes and suggests that looking into motivation and enjoyment could help understand how group dance affects mental health.

Table 1

Theoretical framework

| № | Author, year | Research design, Target group, Type of movement, Duration | Relevant psychological outcome measure, Number of participants | Summary points |
|---|---|---|---|---|
| 1 | B. T. West, K. B. Welch, A. T. Galecki, 2022 [16] | Experimental design, College students at Reed College, US African dance versus Hatha yoga versus biology lecture | Perceived stress scale (PSS) and PANAS. Total is 69 (21 African dance, 18 Hatha yoga, 30 biology lecture control) | In this study of college students in the United States examining perceived stress and positive and negative affect by comparing African dance, Hatha yoga, and a non-movement academic control, while participants in both the African dance and yoga conditions showed decreased perceived stress following their activities, positive affect increased in African dance, decreased in the academic classroom setting, and showed no significant change in the Hatha yoga condition, which suggests a case for different mechanisms of mental health improvement for different arts-based movement exercises. |

| | | | | |
|---|---|---|---|---|
| 2 | L. Douse, R. Farrer, I. Aujla, 2020 [17] | Mixed methods, Intergenerational participants in Bedford, UK Worked together to produce dance performance and photography exhibit | Confidence and willingness to interact with others helped to mitigate the negative stereotypes older adults held about working with young people. Total is 54 (older adults: 12 experimental, 6 control, young people: 23 experimental, 13 control) | When intergenerational participants (older adults and youth) worked together to produce a dance performance and photography exhibit in the United Kingdom, the older generation reported enjoying the younger students' company and feeling encouraged and supported by them; in this study, that corresponded to an increased trend in social relatedness, affect, and social well-being over time. |
| 3 | N. Arman, E. Turkmen, 2021 [18] | Quasi-experimental (no control group) Physiotherapy students, Dance Therapy course practice, 8 weeks | Academic motivation (AMS), anxiety (STAI), body language and dance-related self-efficacy with the Body Language and Dance Self Efficacy Assessment Form (BLDSEAF), stress level (Perceived Stress Scale). Total participants are 102 | Physiotherapy students who completed a dance therapy course were purported to have significant increases in academic motivation and dance-related self-efficacy and decreases in anxiety and stress level (N. Arman, E. Turkmen [18]). However, as there was no control group in this study, the dance therapy course cannot be concluded to be the only factor responsible for students' mental health and motivational changes over the relevant period. |
| 4 | Kong S., 2022 [19] | Quasi-experimental, students with depression 12 weeks of "dance performance experimental group", also called "dance performance therapy" and "psychological intervention" versus "psychological intervention control group" | Self-rating depression scale (SDS), self-rating idea of suicide scale (SIOSS). Total number of participants are 500 | While not expressly DMT, both students with depression allocated to a TAU plus performing dance condition versus students that just underwent TAU improved with respect to mood from pre-intervention to postintervention, but those allocated to performing dance and TAU improved to a greater extent. |

Source: developed by authors

Thus, the analysis of literature and theoretical foundations shows that dance is considered by researchers as a complex phenomenon that affects not only physical development, but also mental health, social adaptation, and cognitive functions of students. At the same time, existing studies have not sufficiently studied the impact of dance programmes on the academic performance of first-year students, which determines the relevance and novelty of this study.

## Methodology

### *Design and Context of the Study*

The study was performed as a controlled longitudinal study with parallel cohorts and repeated measurements during 45 weeks of one academic year (01/10/2023–07/31/2024). One cohort took standard physical education classes (control), the other a structured dance programme (intervention). The single-centre format provided

a unified academic calendar, consistent exam requirements, and standard measurement procedures, which enhanced the internal validity of the primary assessment of complex intervention in a real educational environment and corresponded to the updated framework for the development and evaluation of complex interventions (MRC/BMJ)[1]

***Participants and Recruitment***

The study involved 236 first-year students of the International Medical Faculty of Karaganda Medical University (Kazakhstan) (age ⩾ 18 years), most of whom are Indian citizens, and therefore, the article focuses on the Indian student audience. Dance culture occupies an essential place in the life of this group, which makes participation in the programme natural and culturally significant. All students signed an informed consent form. The participants were divided into two comparable groups (118 people each): experimental (dancing) and control (standard physical education). Participants were recruited through electronic mailings, poster announcements, and brief personal presentations at introductory classes.

Inclusion criteria: admission to regular physical activity; availability of initial psychometric assessments; registration in the official academic information system.

Exclusion criteria: medical contraindications to physical activity; participation in other structured exercise programmes; incompleteness of key outcomes at the starting point.

A single educational context (one course, an agreed schedule, and uniform assessment procedures) reduced the inter-contextual variability and increased the comparability of cohorts, which was critical for correct longitudinal comparison in natural conditions.

***Intervention***

The dance programme included two classes per week (~ 60 minutes) under the guidance of a qualified instructor. The content covered modern, hip-hop, and traditional dances; the workload progressed in coordination and rhythmic complexity, providing an aerobic component, coordination development, and social interaction. The choice of the format was based on a recent systematic review with meta-analysis (Sports Medicine, Springer), which showed that structured dance (⩾ 6 weeks) in young adults is comparable to other types of exercise and in some cases surpasses them in individual psychological and cognitive outcomes (motivation, certain aspects of memory, social cognition, reduction of distress), despite the fact that the severity of the benefits varies by domain. It justified the assessment of the effect on the student population in a university setting [21].

To work with repeated measurements and possible omissions, we also used modern manuals on linear mixed models [16].

***Outcomes and Measurement Tools***

The list of outcomes was set before the analysis began and grouped into three blocks to ensure strict consistency of “Methods” and “Results” and comparability with external literature.

[1] World Health Organization. *Obesity: Preventing Managing the Global Epidemic. Report on a WHO Consultation on Obesity.* Geneva; 1997. Accessed December 21, 2024. https://iris.paho.org/handle/10665.2/43000

1. Somatic outcome – body mass index (BMI, kg/m2). Height and body weight were measured according to a single protocol; BMI was calculated as mass/height 2. Current CDC guidelines (adult categories, updated in 2024) and materials on obesity and overweight (fact sheet, updated in 2025) were used for interpretation, which ensured international comparability and uniformity of interpretations of thresholds[1], [2].

*Physical form.* Endurance was assessed by an aerobic performance test (running/walking of a fixed duration) with a record of the distance covered; flexibility was assessed by a sit – and-reach test; muscle strength was assessed by hand grip (manual dynamometer); body composition was evaluated by height and weight with BMI (kg/m2). All measurements were performed according to standard protocols before and after the 45 weeks – equipment: track marking/tape measure, manual dynamometer, height meter, and calibrated floor scales.

2. Physical Health – stress, tension, depression (DASS-21), and condition (FAS-10). The Dass-21 scale was used for three subscales and a summary index on leadership and recent psychometric evidence of validity/reliability in cohorts close to students (BMK Psychology/Springer, 2023). The fatigue scale (FAS-10), a short one – factor scale with quantitative and qualitative indicators, was established [22].

*Psychological indicators.* Validated self-report scales were used to assess mental health. The DASS-21 questionnaire was used, which includes three subscales: stress, depression, and anxiety. All subscales demonstrated high internal consistency in previous studies on student samples (Cronbach's $\alpha > 0.80$). Additionally, fatigue was measured using the Fatigue Assessment Scale (FAS-10), which is a concise one-factor tool with proven reliability and applicability in academic contexts.

3) Academic results – rating scores and the average grade of the matriculation certificate. The indicators were automatically uploaded from the university's official digital system, which reduced the risk of self-report errors and ensured comparability between semesters.

***Procedures: Measurement, Data Management, and Statistical Analysis***

*Measurement schedule.* All outcomes were recorded at the starting point (before classes start) and at week 45. Monthly measurements were additionally performed for BMI and psychometry, which made it possible to describe the trajectories and rate of change during the year.

*Standardisation and quality control.* Anthropometry was performed by trained personnel using the same equipment; the questionnaires were administered face-to-face under uniform instructions and checked for completeness before uploading to the database. Academic data was imported directly from the digital registry without manual input. Identifying information was replaced with codes; access to the bundle of identifiers was limited to authorised employees.

*Preprocessing.* The data was checked for omissions and outliers; within each block of outcomes, consistency of scales and directions was ensured (in particular,

[1] CDC. *Adult BMI Categories.* BMI. July 1 2024. Accessed December 21, 2024. https://www.cdc.gov/bmi/adult-calculator/bmi-categories.html

[2] Obesity and Overweight. Accessed December 21, 2024. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

a single interpretation of "higher value – more pronounced symptom/indicator", where appropriate). Monthly series were used to illustrate the dynamics with 95% confidence intervals graphically; the main quantitative comparisons were based on changes between the baseline and the 45th week, where completeness is maximum.

*Primary analysis.* Intragroup changes (starting point → week 45) were assessed by paired t-tests (or the Wilcoxon criterion for abnormal differences on Q–Q graphs and the Shapiro–Wilk test on differences). Changes in Δ = post-baseline assessed intergroup differences. Δ=post-baseline (two-sample t-test; with heterogeneity of variances, the Welch test; the Levene test checked homogeneity of variances). The family error of the first kind in multiple comparisons across the DASS-21 and FAS-10 subscales was controlled by the Holm step-by-step procedure, recognised as a more powerful alternative to the classic Bonferroni correction[1].

*Sensitivity analysis and longitudinal modelling.* To verify the stability of the conclusions, the calculations were repeated: (i) except extreme values; (ii) with alternative assumptions for normality/variance; (iii) if necessary, within the framework of linearly mixed models of repeated measurements (Group, Time, Group×Time as fixed effects; random interception of the participant) – a recognised approach to longitudinal data with partial gaps and uneven intervals [16].

*The software environment.* Analytical procedures were performed in SPSS 29 and Stata 17 (basic comparisons, background diagnostics, and multiple comparisons); R 4.x (RStudio) was additionally used for reproducible scripts and longitudinal visualisations. This multimodal approach allowed cross-validation of results in different software implementations and corresponded to modern practices of transparent reporting.

***Validity and Applicability***

The single-centre design ensured high standardisation of the context (uniform training requirements, calendar, procedures), which enhanced the internal validity of the assessment and reduced the risk of systematic discrepancies between groups unrelated to the intervention. The applicability of the results to similar educational settings was supported by matching the protocol with modern reviews of dance interventions in young people (Springer; additionally, studies and reviews in the Taylor & Francis portfolio on student well-being and dance education in higher education). In particular, studies in Taylor & Francis journals have documented the association of participation in dance with improved mood, community, and well-being in a university environment, including online formats, which is consistent with our chosen outcomes and the frequency of measurements [23].

The interpretation of the somatic outcome was based on the commonly used WHO/CDC epidemiological guidelines (BMI), which provided internationally comparable thresholds and a single reporting language.

With the subsequent expansion of the study, it is advisable to use multicentre/cluster designs to verify the external validity and assess the contextual variability of

[1] Holm S. A simple sequentially rejective multiple test procedure. Scandinavian Journal of Statistics. 1979;6(2):65–70. Accessed December 21, 2024. http://www.jstor.org/stable/4615733

effects, which is consistent with current recommendations on the phasing of complex interventions.

***Ethical Aspects***

The protocol was approved by the Local Ethics Committee (IRB) before the start of recruitment; all participants signed an informed consent. The data was stored anonymised; participation was voluntary, with the right to withdraw at any stage without consequences. The procedures complied with current standards of personal data protection and academic ethics, as well as recommendations for planning and evaluating comprehensive interventions.

## Results and Discussion

The study aimed to study the impact of dance programmes on the physical fitness, mental health, and academic performance of first-year university students. The study involved students who passed a psychometric exam upon admission, which allowed us to obtain comparable baseline data. The participants were divided into a control group (traditional physical education) and an experimental group (a 45-week dance programme). Before and after the intervention, physical fitness (BMI), mental health (stress, anxiety, depression, fatigue), and academic performance (exam scores, GPA) were assessed.

Table 2

Selected participant's indicators

| Group | N | Female, n (%) | BMI, M±SD | Stress, M±SD | Depression, M±SD | Fatigue, M±SD | Exam sem.1, M±SD | GPA, M±SD |
|---|---|---|---|---|---|---|---|---|
| **Control** | 118 | 47 (39.8%) | 22.26 ± 2.31 | 18.05 ± 3.74 | 11.61 ± 5.07 | 4.10 ± 1.41 | 65.23 ± 9.95 | 2.62 ± 0.56 |
| **Experimental** | 118 | 47 (39.8%) | 22.76 ± 2.51 | 17.97 ± 4.04 | 12.02 ± 5.16 | 4.26 ± 1.41 | 65.26 ± 9.78 | 2.89 ± 0.60 |

Note. The values are presented as M ± SD; for gender, n (%). Intergroup comparisons: $\chi 2$ – for gender; t-test – for continuous indicators.

Initially, the groups did not differ in gender ($\chi 2$, $p = 1.00$), *BMI* ($p = 0.109$), baseline stress values ($p = 0.886$), depression ($p = 0.533$), and fatigue ($p = 0.368$), as well as in grades for the 1st semester ($p = 0.982$) (see Table 1). At the same time, the baseline GPA was significantly higher in the experimental group (2.89 ± 0.60) compared with the control group (2.62 ± 0.56), $p < 0.001$. Therefore, the "semester 2 and semester 1" variation was used in the analysis of academic outcomes.

Correlation analysis showed significant correlations between psychometric indicators and academic outcomes. Higher levels of stress and fatigue were negatively correlated with exam results and GPA, while decreased anxiety and depression were associated with improved academic results (see Fig. 1).

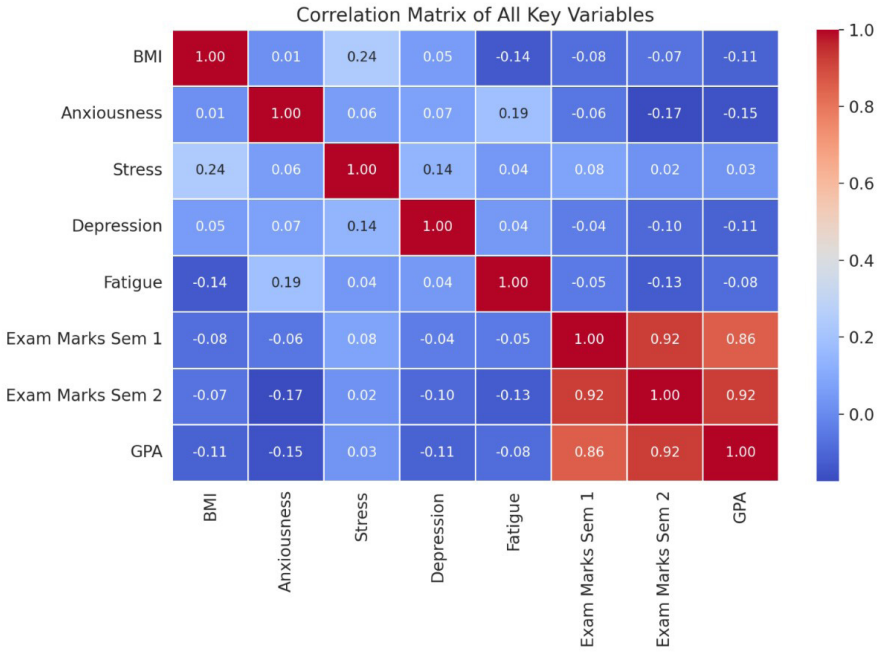


Fig. 1. Correlation matrix of all key variables

*Source: developed by authors*

In Figure 1, the correlation matrix of all key variables offers an in-depth examination of relationships between physical fitness, mental health indicators, and academic performance in the study. This section provides a detailed interpretation of these correlations and their potential implications.

Relationship between mental health and academic performance: stress, depression, and fatigue exhibit a strong negative correlation with academic performance (GPA and Exam Marks). Higher stress levels correlate with lower academic achievement, suggesting that stress impacts focus, memory retention, and cognitive efficiency. Depression negatively affects motivation, engagement in learning, and test performance. Fatigue is linked to reduced concentration, lower productivity, and increased likelihood of academic burnout. These findings highlight the need for effective stress management programmes and mental health interventions to improve student outcomes.

The influence of BMI on fatigue and academic performance BMI does not show a significant correlation with academic performance but has some relation with fatigue. This indicates that while general fitness may not directly impact grades, it does affect energy levels, endurance, and overall well-being, which in turn influences academic engagement. Maintaining a balanced BMI through proper nutrition and physical activity could help reduce fatigue and improve mental alertness.

Implications for student well-being and institutional policies given the strong links between mental health variables and academic success, universities should consider: implementing structured mental health programmes to reduce stress and depression; encouraging physical activity to manage fatigue and promote general well-being; integrating relaxation techniques and mindfulness training into academic schedules; and providing counselling and peer support networks to address anxiety and stress early.

The correlation matrix clearly illustrates that mental health factors significantly impact academic success, with stress, depression, and fatigue negatively affecting students' grades and cognitive functions. While BMI does not directly correlate with academic performance, its connection to fatigue suggests that physical health plays a role in sustaining long-term academic engagement. Understanding these relationships allows educational institutions to design targeted interventions that enhance students' mental resilience, academic outcomes, and overall well-being.

The study's results show that a 45-week dancing intervention substantially impacted physical fitness actions and mental health pointers in first-year university students. After partaking in the dance programme, the persons enhanced stamina to follow whole group during the practice but this intervention did not affect BMI as it shown in Figure 2. The control group followed traditional physical education, leading to more consistent fitness results, while the experimental group focused on dance, which improved flexibility and mobility rather than BMI changes.

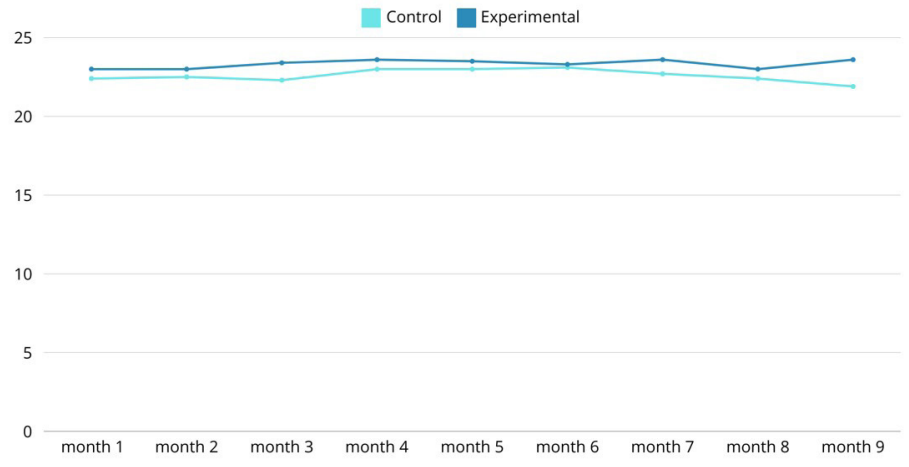


Fig. 2. Average BMI of the students on monthly basis

*Source: developed by authors*

The total psychometric exam outcome in the research amplified meaningfully following the dancing intervention, presenting that the participants' psychological properties, motivation, and stress resistance enhanced. The group, which has dance classes, demonstrated instant decline of stress level from third month and maintained that results till the end of project, while control group spent twice more time to show that trend. However, the control group has relatively high stress level. Dance-based interventions promote mindfulness, social interaction, and emotional expression, leading to faster stress relief compared to traditional exercises. This can be explained by the unique Indian culture of the participants, where music and dance play a central role. The results obtained from this project confirm the authors' hypothesis, which had previously been assumed but not substantiated with data.

The dynamics of psychometric indicators are presented in Table 2. Overall, the experimental group showed a more pronounced reduction in stress, depression, and anxiety than the control group.

Table 3

Average levels on psychometric scales (M±SD)

| Group | n | Stress, M±SD | Depression, M±SD | Anxiety, M±SD | Fatigue, M±SD |
|---|---|---|---|---|---|
| Control | 118 | 18.44 ± 5.41 | 12.32 ± 4.72 | 15.03 ± 2.80 | 4.19 ± 1.44 |
| Experimental | 118 | 18.46 ± 4.66 | 12.87 ± 4.73 | 14.98 ± 3.03 | 4.19 ± 1.56 |

According to monthly data, the experimental group showed a steady decrease in stress by the 3rd month, with the effect remaining until the end of the 45-week period; anxiety and depression decreased more smoothly, reaching a minimum by the 7th–9th month; fatigue decreased moderately and steadily. In the control group, the changes on the four scales were small and more variable, while the stress level remained higher for most of the months than in the experimental group (see Fig. 3).

The combined before–and–after assessment confirms these observations: the average changes (Δ, last week–week 1) in the experimental group were stress -1.85 ± 0.20; depression -2.69 ± 0.16; anxiety -2.70 ± 0.00; fatigue -0.86 ± 0.18, while no significant changes were noted in the control group (Table 2).

The combined before–and–after assessment confirms these observations: in the experimental group, the average changes were stress -1.85± 0.20; depression -2.69±0.16; anxiety -2.70±0.00; fatigue -0.86±0.18, while in the control group there were no significant changes (see Fig. 3).

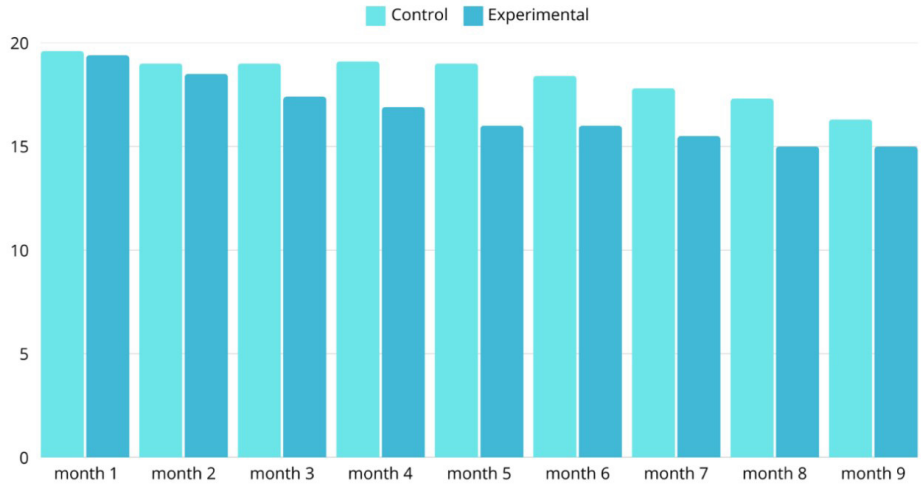


Fig. 3. Stress level indicators (monthly)

*Source: developed by authors*

Our results highlight the potential of dancing as a valuable tool for enhancing the well-being of university students and improving their academic performance during a crucial transitional stage, as concluded by P. Yang [24], L. Zhang [25], L. Zhou [26], C. Zimmer, M. H. McDonough, J. Hewson et al. [27]. Given the difficulties faced by first-year university students, the beneficial effects of dancing on both physical fitness and mental health are particularly noticeable. Our results share several similarities with the findings presented by J. Wang, D. Jia, and Y. Fan [28]; Y. Wang and G. Zheng [29]; L. Smith, R. Disler, and K. Watson [30], which indicate that regular physical activity, such as dancing, can enhance physical health, alleviate stress, and improve mood. The social aspect of dance promotes a sense of community and support among students, eliminating frequent feelings of social isolation and loneliness during the transition to university.

The current study looked at how a 45-week organised dancing intervention affected first-year university students' physical fitness index, mental health and academic performance. The findings show substantial and favourable benefits in all dimensions, highlighting the potential of dance as a comprehensive intervention to improve university student's well-being and academic achievement. In first semester both groups had similar performance in terms of marks in class and exam. In second semester the experimental group scored 8% higher on average compared to the control group as demonstrated in Figure 4. This can be explained by dance stimulations of cognitive function, improvement of memory and focus, which contributes to better academic performance over time.

***Changing Exam Scores***

In the second semester, the students of the experimental group showed a more pronounced improvement in their exam grades compared to the control group. The average change was ΔM = 6.15±3.65 ($n$ = 118) in the experimental group versus ΔM = 0.80±3.21 ($n$ = 118) in the control group. The results of the t-test confirm a statistically significant difference between the groups: t (230) = -11.97, $p$ < 0.001, 95% CI (-6.23; -4.47). These data are consistent with the visualisation in Figure 4, which shows the distribution of exam scores in the second semester.

Along with the increase in exam results, a steady positive trend in the average score (GPA) was recorded in the experimental group. The data obtained indicate that participation in the dance programme has a complex impact on academic performance, going beyond single exam achievements. Regular choreography classes contributed to the formation of a higher level of concentration, improved memory processes and cognitive efficiency, as well as increased internal learning motivation. Together, these led to more stable and long-term academic results for the students in the experimental group.

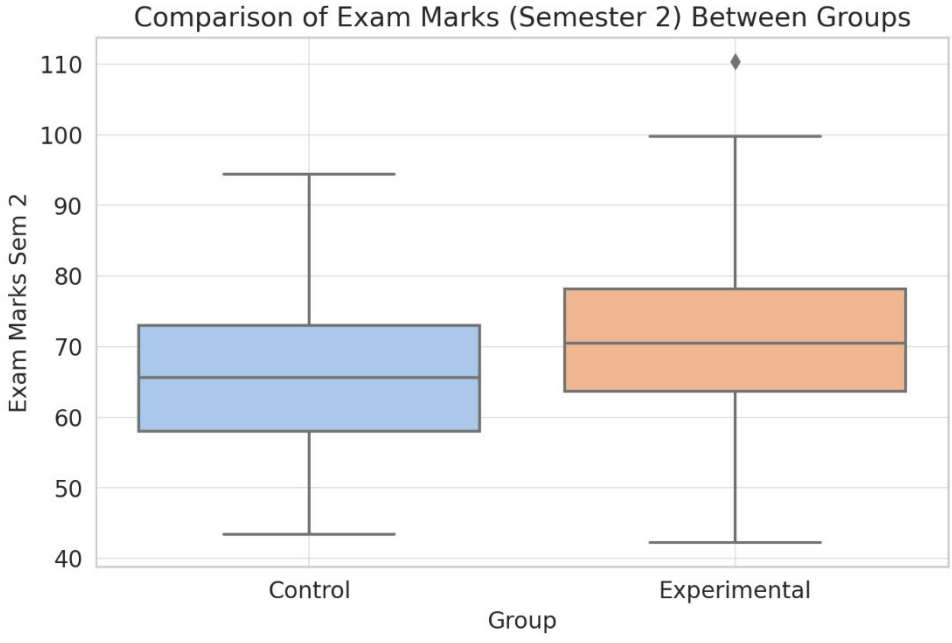


Fig. 4. Comparison of exam marks

Source: developed by authors

The data obtained indicate that participation in the dance programme was accompanied by an improvement in cognitive functions, which contributed to an increase in academic performance. Given the higher initial GPA in the experimental group, the focus was on analysing dynamics (Sem2–Sem1) rather than absolute values.

The change in exam scores from semester 1 to semester 2 was statistically significantly higher in the experimental group compared with the control (t-test for Δ, $p$ =…; $d$ =…), which is consistent with Figure 4. Taking into account the higher initial GPA in the experimental group, the main conclusion was based on the dynamics relative to the baseline level.

These results show the value of dance as a transitional period for university students. According to A. Fong Yan, L. L. Nicholson, R. E. Ward et al. [21], dancing can help students become healthier and more resilient by improving their physical fitness and emotional well-being. Similarly, Z. Jian [31] notes that incorporating dancing and physical activity into university courses and support programmes can help students enhance their mental health and academic performance.

However, significant limitations of the study must be considered, such as the lack of a control group and the dependence on self-report measurements for key mental health indices. Future studies involving control groups and objective assessments may give more firm data on the particular impacts of dancing on physical and mental well-being.

However, significant limitations of the study must be acknowledged. The study relied on self-report measures for several mental health indicators, which might be vulnerable to biases or social desirability effects. Using objective assessments and continuous follow-up, researchers might get a more rigorous and complete understanding of the long-term impacts of dance on university students. There are some difficulties to continue following years because physical education classes are not included in curriculum.

## Conclusion

The conducted research has confirmed the effectiveness of a 45-week dance programme as a means of improving the physical and mental state of first-year university students. Unlike the initial data, where the groups were comparable in most key parameters (gender, BMI, and psychometric scales), at the end of the experiment, it was in the experimental group that significant improvements in stress, depression, anxiety, and fatigue were recorded, as well as an increase in academic performance. At the same time, there were no differences in the dynamics of BMI, which is consistent with the results of the analysis of somatic indicators.

The scientific novelty of the work lies in the fact that, for the first time in a long university cycle (45 weeks), the role of dance classes was comprehensively assessed not only as a physical activity, but also as a psychophysical and social tool for student adaptation. The study identifies dance as a special form of physical activity that has a combined effect: strengthening mental health and increasing academic

performance. Such an emphasis on the "mental health-academic achievement" link through dance practice has not previously been considered in detail in domestic and international studies.

The practical significance of the results lies in the fact that they provide universities with an evidence-based basis for integrating dance programmes into the educational process and the system of psychological and pedagogical support for students. The introduction of dancing can be used as an affordable and effective tool to reduce stress, prevent burnout, increase cognitive activity, and academic motivation of first-year students. In practice, this opens up opportunities for the creation of specialised electives, adaptation courses, and extracurricular activities aimed at increasing students' resilience and academic success.

Conclusions on research objectives:

1. An analysis of scientific publications has confirmed that dance programmes have a positive effect on the physical fitness, mental health, and academic achievement of students. Still, the impact of choreography on first-year students has not yet been sufficiently studied.

2. The experiment showed that participation in the dance programme was accompanied by a decrease in stress, anxiety, and depression, which indicates its positive psycho-emotional effect.

3. The observation revealed an improvement in the functional parameters of physical fitness – endurance and flexibility, while maintaining stable body mass index values, which indicates the predominant effect of choreography on physical performance, rather than on anthropometric parameters.

4. The dynamics of exam scores and GPA in the second semester turned out to be significantly higher among the students of the experimental group compared with the control group, which is confirmed by statistically significant differences ($p < 0.001$). It indicates the positive effect of dancing on cognitive functions and learning motivation.

5. Based on the study's results, integrating dance programmes into the educational process as part of physical education is recommended. This approach simultaneously strengthens physical fitness, increases psycho-emotional well-being, and contributes to the academic success of first-year students.

## References

1. Sanderson P. Age and gender issues in adolescent attitudes to dance. *European Physical Education Review.* 2001;7(2):117–136. doi:10.1177/1356336X010072002
2. Adshead J., Hodgens P., Briginshaw V., Huxley M. *Dance Analysis: Theory and Practice.* Athens: Pasxalidis Publications; 2007. 212 p.
3. Khromina S.I., Malyarchuk N.N. Ideas of Vygotsky L. S. as a methodological basis for inclusion of physical educational environment. *Inkljuzija v obrazovanii = Inclusion in Education*. 2017;1:7–12. (In Russ.) Accessed December 21, 2024. https://www.tisbi.ru/files/prod/home/nauka/gurnal-inklyuziya-v-obrazovanii/eaed5c91fb2203c3cdd97feb4b5cdcf4.pdf
4. Lykesas G., Chatzopoulos D., Neratzoula V., Nikolaki E., Douka S., Bakirtzoglou P. Reviewing available online publications on the effect of dance on the physical and mental health of children and

adolescents. *Central European Journal of Sport Sciences and Medicine*. 2022;39:17–26. doi:10.18276/cej.2022.3-02

5. Tao D., Gao Y., Cole A., Baker J.S., Gu Y., Supriya R., et al. The physiological and psychological benefits of dance and its effects on children and adolescents: a systematic review. *Frontiers in Physiology*. 2022;13:925958. doi:10.3389/fphys.2022.925958
6. Gao X., Cao S. Teaching reform and innovation of sports dance in colleges and universities. *Frontiers in Sport Research.* 2021;3(5):1–6.
7. Koch S.C., Riege R.F., Tisborn K., Biondo J., Martin L., Beelmann A. Effects of dance movement therapy and dance on health-related psychological outcomes: a meta-analysis update. *Frontiers in Psychology*. 2019;10:1806. doi:10.3389/fpsyg.2019.01806
8. Marich J., Howell T. Dancing mindfulness: a phenomenological investigation of the emerging practice. *Explore.* 2015;11(5):346–356. doi:10.1016/j.explore.2015.06.008
9. Dos Santos G.C., do Nascimento Queiroz J., Reischak-Oliveira A., Rodrigues-Krause J. Effects of dancing on physical activity levels of children and adolescents: a systematic review. *Complementary Therapies in Medicine*. 2019;56:102586. doi:10.1016/j.ctim.2020.102586
10. Sil P. Effect of aerobic dance with music on selected health-related fitness parameters among adolescent school girls. *International Journal of Yoga, Physiotherapy and Physical Education*. 2018;3(1):1–5.
11. May T., Chan E.S., Lindor E., McGinley J., Skouteris H., Austin D., et al. Physical, cognitive, psychological and social effects of dance in children with disabilities: systematic review and meta-analysis. *Disability and Rehabilitation*. 2021;43(1):13–26. doi:10.1080/09638288.2019.1615137
12. Gilbert A.G. *Creative Dance for all Ages*. 2nd ed. Champaign, IL: Human Kinetics; 2015. 376 p.
13. Carballo-Fazanes A., Rico-Díaz J., Barcala-Furelos R., Rey E., Rodríguez-Fernández J. E., Varela-Casal C., et al. Physical activity habits and determinants, sedentary behaviour and lifestyle in university students. *International Journal of Environmental Research and Public Health*. 2020;17(9):3272. doi:10.3390/ijerph17093272
14. Popa D.A.T. Communication through dance–therapeutic method in working with young people. *Acta Universitatis Danubius. Communicatio*. 2021;15(2):15–30.
15. Morejón J.L. Dance improvisation research: embodied self-esteem and self-confidence through glass art. *Research in Dance Education*. 2021;22(2):174–189. doi:10.1080/14647893.2020.1800732
16. West B.T., Welch K.B., Galecki A.T. *Linear Mixed Models: A Practical Guide Using Statistical Software.* 3rd ed. Chapman and Hall/CRC; 2022. 490 p. doi:10.1201/9781003181064
17. Douse L., Farrer R., Aujla I. The impact of an intergenerational dance project on older adults' social and emotional well-being. *Frontiers in Psychology.* 2020;11:561126. doi:10.3389/fpsyg.2020.561126
18. Arman N., Turkmen E. Effect of dance therapy course practice on academic motivation, anxiety, dance-related self-efficiency, stress, and autonomous learning in physiotherapy students. *Archives of Health Science and Research.* 2021;8(2):124–130. doi:10.5152/archealthscires.2021.20120
19. Kong S. Analysis on the positive effect of dance on alleviating patience with depression. *Psychiatria Danubina.* 2022;34(Suppl.2):726–731. Accessed December 21, 2024. https://hrcak.srce.hr/file/409171
20. Skivington K., Matthews L., Simpson S.A., Craig P., Baird J., Blazeby J.M., et al. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJ.* 2021;374:n2061. doi:10.1136/bmj.n2061
21. Fong Yan A., Nicholson L.L., Ward R.E., Hiller C.E., Dovey K., Parker H.M., et al. The effectiveness of dance interventions on psychological and cognitive health outcomes compared with other forms of physical activity: a systematic review with meta-analysis. *Sports Medicine.* 2024;54:1179–1205. doi:10.1007/s40279-023-01990-2

22. Cao C.H., Liao X.L., Jiang X.Y., Li X.-D., Chen I.-H., Lin C.-Y. Psychometric evaluation of the depression, anxiety, and stress scale-21 (DASS-21) among Chinese primary and middle school teachers. *BMC Psychology*. 2023;11:209. doi:10.1186/s40359-023-01242-y
23. Rugh R., Humphries A., Tasnim N., Basso J.C. Healing minds, moving bodies: measuring the mental health effects of online dance during the COVID-19 pandemic. *Research in Dance Education*. 2022;25(2):137–157. doi:10.1080/14647893.2022.2078297
24. Yang P. Practical analysis of sports dance teaching in colleges and universities. In: *2019 4th International Conference on Social Sciences and Economic Development (ICSSED 2019)*. Atlantis Press; 2019:201–204. doi:10.2991/icsse-19.2019.55
25. Zhang L. The problems and solutions of dance education in universities. *Open Journal of Social Sciences*. 2019;7(05):240–249. doi:10.4236/jss.2019.75019
26. Zhou L. Innovative exploration of dance teaching with students as the main body in dance teaching in colleges and universities. In: *2018 4th International Conference on Education Technology, Management and Humanities Science (ETMHS 2018)*. Atlantis Press; 2018:43–46. doi:10.2991/etmhs-18.2018.11
27. Zimmer C., McDonough M.H., Hewson J., Toohey A.M., Din C., Crocker P.R., et al. Social support among older adults in group physical activity programs. *Journal of Applied Sport Psychology*. 2022;35(3):1–22.
28. Wang J., Jia D., Fan Y. Analysis of the integration of multimedia technology and dance teaching in colleges and universities. In: *International Conference on Innovative Computing*. Singapore: Springer Nature Singapore; 2023:657–665. doi:10.1007/978-3-030-73429-3_59
29. Wang Y., Zheng G. Application of artificial intelligence in college dance teaching and its performance analysis. *International Journal of Emerging Technologies in Learning*. 2020;15(16):178–190. doi:10.3991/ijet.v15i16.15495
30. Smith L., Disler R., Watson K. Physical activity and dietary habits of first-year nursing students: an Australian dual-method study. *Collegian*. 2020;27(5):535–541. doi:10.1016/j.colegn.2020.06.007
31. Jian Z. Practice the training concept of applied talents, and discuss the optimization of dance teaching in colleges and universities. *Journal of Frontiers in Art Research*. 2021;1(2):77–80.

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