

## PHYSICAL AND MENTAL HEALTH IN A SAMPLE OF ROMANIAN STUDENTS

**Cornelia MAIREAN<sup>1</sup>, Mirabela-Olivia PUNEI<sup>2</sup>, Daniela ȘOITU<sup>3</sup>,  
Ruediger TRIMPOP<sup>4</sup>, Lena SCHMITZ<sup>5</sup>**

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### **Abstract**

The present study aims to investigate the psychometric properties of a scale designed to measure different dimensions of healthy campus among Romanian students. The scale was translated from German language, using the backward translation design. In its original version, the development of the questionnaires for students was carried out with regard to the following dimensions considered relevant for a healthy campus: work/ study conditions (organization, tasks, work/ study environment, social relations, health and safety culture), health (physical and psychological health status, health attitudes, health knowledge, health behavior, nutrition, movement), offers of the university (familiarity, availability, usage, satisfaction, requests), other personal factors (mobility, satisfaction, coping strategies, commitment, self-efficacy, work-life-balance), changes during the COVID-19 pandemic. After a judgmental review of the adapted test and the revision of the adaptation, we selected a sample of 470 students, that filled in the scale including items that cover the above mentioned dimensions and demographic information. It took about 30 minutes to complete the questionnaire. The participants signed an informed consent and the anonymity and confidentiality of the answers were assured. An exploratory factorial analysis and analysis of reliability were conducted based on the collected data. Further, gender differences and correlations between factors were explored. The results sustain the structure of the scale with six factors. Practical implications of the results are discussed.

**Keywords:** mental health, physical health, campus, students, psychometric properties.

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<sup>1</sup> Assoc. prof. dr., Faculty of Psychology and Educational Sciences, Alexandru Ioan Cuza University of Iași, T. Cozma str., no. 3, Iași; cornelia.mairean@uaic.ro

<sup>2</sup> Student, Faculty of Psychology and Educational Sciences, Alexandru Ioan Cuza University of Iași, T. Cozma str no. 3, Iași; olivia.punei@gmail.com

<sup>3</sup> Prof. dr. Department of Sociology and Social Work, Faculty of Philosophy and Social-Political Sciences, Alexandru Ioan Cuza University of Iași, Carol I bdv. No. 11, 700506; daniela.soitu@uaic.ro

<sup>4</sup> Prof. dr. Lehrstuhl Arbeits-,Betriebs-Organisationspsychologie, Friedrich-Schiller Universität Jena, Humboldtstr. 27, 07743 Jena, Germany; ruediger.trimpop@uni-jena.de

<sup>5</sup> Master student, Friedrich-Schiller Universität Jena, Humboldtstr. 27, 07743 Jena, Germany; lena.schmitz@uni-jena.de

## Resumé

La présente étude vise à étudier les propriétés psychométriques d'une échelle conçue pour mesurer différentes dimensions d'un campus sain chez les étudiants roumains. L'échelle a été traduite de la langue allemande, en utilisant la conception de traduction inversée. Dans sa version originale, l'élaboration des questionnaires destinés aux étudiants s'est faite au regard des dimensions suivantes jugées pertinentes pour un campus sain : les conditions de travail/études (organisation, tâches, environnement de travail/études, relations sociales, culture santé-sécurité), la santé (état de santé physique et psychologique, attitudes en matière de santé, connaissances en matière de santé, comportement en matière de santé, nutrition, mouvement), les offres de l'université (familiarité, disponibilité, utilisation, satisfaction, demandes), d'autres facteurs personnels (mobilité, satisfaction, stratégies d'adaptation, engagement, auto-efficacité, équilibre travail-vie personnelle), changements pendant la pandémie de COVID-19. Après un examen critique du test adapté et la révision de l'adaptation, nous avons sélectionné un échantillon de 470 étudiants, qui ont rempli l'échelle comprenant des éléments couvrant les dimensions mentionnées ci-dessus et des informations démographiques. Il a fallu environ 30 minutes pour remplir le questionnaire. Les participants ont signé un consentement éclairé et l'anonymat et la confidentialité des réponses ont été assurés. Une analyse factorielle exploratoire et une analyse de fiabilité ont été réalisées sur la base des données collectées. De plus, les différences entre les sexes et les corrélations entre les facteurs ont été explorées. Les résultats soutiennent la structure de l'échelle à six facteurs. Les implications pratiques des résultats sont discutées.

**Mots clés:** santé mentale, santé physique, campus, étudiants, propriétés psychométriques.

## Rezumat

Prezentul studiu își propune să investigheze proprietățile psihometrice ale unei scale menite să măsoare diferite dimensiuni ale campusului sănătos în rândul studenților români. Scara a fost tradusă din limba germană, folosind designul din traducere. În versiunea sa originală, elaborarea chestionarelor pentru studenți s-a realizat cu privire la următoarele dimensiuni considerate relevante pentru un campus sănătos: condiții de muncă/studiu (organizație, sarcini, mediu de lucru/studiu, relații sociale, cultură de sănătate și securitate), sănătate (starea de sănătate fizică și psihologică, atitudini de sănătate, cunoștințe de sănătate, comportament de sănătate, nutriție, mișcare), oferte ale universității (familiaritate, disponibilitate, utilizare, satisfacție, solicitări), alți factori personali (mobilitate, satisfacție, strategii de coping, angajament, autoeficacitate, echilibru muncă-viață-viață), schimbări în timpul pandemiei de COVID-19. După o revizuire a testului adaptat și revederea adaptării, am selectat un eșantion de 470 de studenți care au completat scala incluzând itemi care acoperă dimensiunile și informațiile demografice menționate mai sus. A durat aproximativ 30 de minute pentru a completa chestionarul. Participanții au semnat un consimțământ informat și au fost asigurate anonimatul și confidențialitatea răspunsurilor. O analiză factorială exploratorie și o analiză a fiabilității au fost efectuate pe baza datelor colectate. În plus, au fost explorate diferențele de gen și corelațiile dintre factori. Rezultatele susțin structura scalei cu șase factori. Sunt discutate implicațiile practice ale rezultatelor.

**Cuvinte cheie:** sănătate mintală, sănătate fizică, campus, studenți, proprietăți psihometrice.

## 1. Introduction

Young adults, including students, represent a vulnerable category for developing mental and physical health problems (Denovan *et al.*, 2017). Some factors related to this increased risk are academic pressure, concerns about future career, financial worries (Yikealo *et al.*, 2018). The restrictions imposed by the COVID-19 pandemic during the last years also contributed to the development of mental health symptomatology (e.g., anxiety) in students' samples, all over the world (e.g., Plakhotnik *et al.*, 2021; Silișteanu *et al.*, 2022; Wang *et al.*, 2020). While academic stress is associated with physical and mental symptomatology (Kurebayashi *et al.*, 2012; Kohls *et al.*, 2020), students well-being is related to higher engagement in learning activities, positive relations, sense of belonging with the university (Cox & Brewster, 2020). Increasing students' resilience during stressful experiences could contribute to their life satisfaction and successful adaptation to all academic activities and challenges (Cazan & Truță, 2015).

University has an important influence on students' well-being through the policies they adopt, values promoted, the opportunity to establish social relations with peers, teaching quality, the sense of belonging, the facilities offered to their students, support in difficult times (e.g., Capone *et al.*, 2020; Flinchbaugh *et al.*, 2012). Other authors sustain that both academic (e.g., positive teacher culture, teachers' support, collaborative learning) and non-academic (e.g., social relationships, flexibility) factors are related to student well-being (Giusta *et al.*, 2017). Physical activity and sport were also found to have an important role in students' life (Kovacs, 2018). Concerning this factor, the results of a study conducted with Romanian students showed that students perceived physical education time and the required equipment as insufficient (Sandu *et al.*, 2018). Other studies conducted with Romanian students before the pandemic showed a positive relation between homework workload and anxiety symptomatology (Aniței & Chraif, 2013). Overall, male students displayed high levels of well-being compared to female (Pânișoară *et al.*, 2018).

The Healthy Organisation, Person, Environment System Model (HOPES) (Trimpop, 2014) is a theoretical framework that can contribute to our understanding about health and well-being among students. It is based on the idea that our psychological and physical health are dependent on the work environment, which is based on interpersonal relationships and shared responsibilities among members. The person, who is endowed with values, behavioral patterns, or coping strategies, supports both the organization and the work environment. Ultimately, all of these variables can act as a stressor or as a resource, with feedback looping back to the organisation. As a result, there is an ongoing cycle in which these factors interact, making the person feel more stable or unstable in terms of her health. The Healthy Campus Jena Model (Trimpop, 2021) aims to integrate into a single structure all component parts of the University, that have an impact on the well-being of students, teachers, and the entire university staff.

The Health Belief Model (HBM) (Hochbaum, 1958) is one of the most widely used theoretical foundations in health behavior studies, serving as a conceptual basis for health behavior intervention strategies as well as explaining the transition and maintenance of health-related behaviors. Designed to identify the reasons why individuals don't engage in certain health-related behaviors, HBM is based on the idea that whether we will engage in a proposed behavior is determined by our confidence in the treatment of a disease, combined with our perception of its efficiency. The theoretical constructs developed over time are: perceived susceptibility to and severity of a disease, benefits, barriers, modifying variables, cues for action and, ultimately, self-efficacy. The Transtheoretical Model of Change (TTM), also known as Stages of Change Model (Prochaska & DiClements, 1983), represent another psychological guideline that help us to understand the adoption and maintenance of deliberate health behaviors (Prochaska & DiClements, 1983). The transtheoretical model divides a person's transformation process into five stages (i.e., precontemplation, contemplation, preparation, action, and maintenance), which are less likely to be linear and more likely to be cyclical due to the fact that a changing process does not necessarily end when an individual reaches the ultimate stage of maintenance, as he can relapse into a previous stage at any time.

Using these theoretical models presented above (e.g. Trimpop, 2014, 2021), Schmitz *et al.* (2022) found that specific areas of risk for mental health among German students are represented by fatigue/exhaustion and difficulty of concentrating. Multiple workloads due to competing tasks also represent a danger. In terms of study organization, there is a need for optimization in terms of work interruptions, workload and working hours, time pressure, a high demand for attention, and a high time requirement for self-study. The examination load should be emphasized as a danger area, which is characterized by a high density and heterogeneity of content. Further, the majority of students feels impaired by long working hours at the computer screen and the working posture. The consequences of stress are particularly evident in the form of psychological complaints, especially with regard to severe fatigue/exhaustion and difficulty of concentration. Physical complaints are comparatively less pronounced. Regarding the pandemic and related online teaching, students report an increase in stress/overload, difficulty of concentration, depressed mood, and inner turmoil. Among the physical complaints, an increase can also be observed in headaches, pain in the limbs, shoulders, back or neck and an impaired general condition. On the basis of their initial results, a need for optimization can be identified for a large part of the stress factors.

Identifying strategies for promoting physical activity for health and well-being purposes among youth seems to have become highly relevant for public mental health (Fletcher *et al.*, 2018; Thøgersen-Ntoumani *et al.*, 2022). An understanding of community organization can allow us to identify and mobilize key individuals and groups to build or sustain a wellness program. In order to achieve these goals, this study aims to identify the factorial structure of a scale designed to measure different dimensions of healthy campus, as well as the

prevalence of physical and mental health difficulties in a sample of Romanian students.

## 2. Method

### 2.1. Participants and procedure

A sample of 470 undergraduate students from a university from the North Eastern part of Romania was involved in this study. In exchange for their participation, the students received course credits. From the total sample, 88.9% are female. The majority of the participants are enrolled in a bachelor program ( $n = 423$ , 90%), while the others are enrolled in a master program. Most of the participants are in the second year of study (68.5%). The large part of the sample reported being involved in a romantic relation (47.4%).

Potential participants received brief information about the study and the students who agreed to participate in the study received a link to the questionnaires. The participants completed the online survey in June 2022 and the students' participation was voluntary and anonymous. No exclusion criteria based on demographic variables was used.

### 2.2. Instrument

**Healthy campus scale.** The development of the questionnaires was carried out with regard to the following goals: holistic recording of stress factors and resource structures including the stress consequences, all relevant influencing factors, and the changes under the COVID-19 pandemic, evaluation of the existing use of measures provided by the university and development of need-based measures, long-term establishment of the risk assessment. All of this happened based on the principles of information, participation, motivation, and integration. The item selection from theoretical and practical sources took place prioritizing recommendations from previous project reports and established scales, and was supplemented with specially constructed items when needed. Thus, the questionnaire was continuously optimized by an interdisciplinary team based on item selection and construction.

The conceptual dimensions covered by the items are: work/study conditions: organization, tasks, work/study environment, social relations, health & safety culture; health: physical and psychological health status, health attitudes, health knowledge, health behavior, nutrition & movement; offers of the university: familiarity, availability, usage, satisfaction, requests; person: mobility, satisfaction, coping strategies, commitment, self-efficacy, work-life-balance; changes during the COVID-19-Pandemic.

Based on the German questionnaires, a Romanian version was prepared to be applied in the university as a first step of a need assessment and overall health topics of students within a Healthy Campus project. Based on guidelines for scales adaptation (Hambleton & Lee, 2013; Hambleton & Zenisky, 2011; Hogan, 2019), we followed these steps:

*Step 1.* We analysed, evaluated and ensured that the *content of the scale is equivalent* in the two languages (i.e., German and Romanian languages) and cultural groups. We concluded that the construct definition of healthy campus and its dimensions used in the original version of the scale are also applicable in Romanian cultural group.

*Step 2.* Given the fact that the construct is similar in the two cultures, we decided in this step to adapt the original version, not to develop a new test. Beside this equivalence, the decision to adapt the scale was also based on the already documented psychometric properties (i.e., reliability, validity) of the source language version of the test.

*Step 3.* We selected a *well-qualified translator* (Romanian native), that knows the two languages and also the two cultures. The translator provided the Romanian version of the scale.

*Step 4. Revising the test directions, redesigning the answer sheets.* Item format and appearance were considered in this step, by analysing the following issues: the length of the item stem in the two versions, the utilisations of different forms of word or phrase emphasis (e.g., bold, italics, underlines). For each issues, we ensured that the two versions of the scales are comparable.

*Step 5.* We conducted a judgmental review of the adapted test and we revised the adaptation. In this step we used the backward translation design. Specifically, we compared the original sources language test and the translated version and the problems identified in this step were fixed in the target language version of the test. Based on a careful evaluation in our team, together with the team from Jena University, we established a Romanian version of the scale comparable with the original scale. Grammar and phrasing were also analyzed in this step, by considering the following issues: modification of the item's structure (e.g., word order changes that might make an item more or less complex in the target language version); grammatical clues that might make an item easier or harder in the target language version; gender or other references that might make an item be cued in the target language version; words in the item that change from having one meaning to having more than one common meaning.

*Step 6.* We conducted a *small try-out* of the target language version of the test. This step was used to identify possible other problems in the target language version of the test, prior to investing time and expense in carrying out more reliability and validity studies. We aimed to identify the clarity of directions, the clarity of each item, and the suitability of the test format.

*Step 7. Design and carry out a substantial study to investigate the psychometric properties of the scale (i.e., reliability and validity).*

In the Romanian language, we kept the same theoretical structure of the scale as in the original version. Therefore, the items cover the following issues: environmental conditions, exams, daily academic activities, workload, concerns and worries about evaluation and accomplishing the tasks, relations with colleagues and teachers before and during the pandemic, technical equipment, internet connection and data bases, health services (e.g., psychological counseling,

medical services, sport), physical and psychological health, well-being, mobility (e.g., to university, between university buildings, within university buildings), demographic information (sex, marital status, financial status, migration background, living conditions, etc.

### 3. Results. Exploratory factor analysis

We submitted a set of 52 items to an exploratory factor analysis, using primary axis (PA) extraction and Oblimum Rotation. Factor loadings higher than .40 were used as item selection criterion. Factors with an Eigen-value of more than 1 were extracted. Six factors resulted from the analysis, which explained 56.81% of the total variance. The Kaiser–Meyer– Olkin (KMO) = 0.852 and  $p < .001$  for Bartlett’s test of sphericity indicate a good fit of the factors. We analyzed the structure matrix, in order to select the items for their factorial assignment. The loadings of the 39 remaining items on these factors are presented in Table 1.

The first factor explains 16.42% of the total variance and consists of 10 items measuring *motivation for physical activity*. The second factor includes 11 items and explains 15.68% of the variance. We labeled this factor as *general health*, since the items covers issues related to both physical and mental health. The third factor explains 7.87% of the variance and includes six items, representing the degree of *content with health offer* promoted by the university. The fourth factor includes four items that explain 6.68% of variance. We called this factor *substance use*. The fifth factor includes 5 items that explain 5.86%. These items are related to *stress generated by using resources* offered by the university (e.g., technology, scientific databases). The last factor explains 4.28% of the variance and consists of three items measuring *social support* from university. For each factor, higher scores represent higher levels of what the factor measure.

Table 1. Exploratory factor analysis of the Healthy Campus Scale

	Factor loading						M	SD
	1	2	3	4	5	6		
<b>Physical activity</b>								
1. improve fitness	.768						2.39	1.46
2. decrease stress	.750						2.14	1.47
3. prevent diseases	.743						2.39	1.48
4. make friends	.730						1.57	1.39
5. meet new people	.725						1.53	1.39
6. body training	.723						2.38	1.48
7. looking good	.712						2.58	1.47
8. reduce acute symptoms	.710						2.00	1.51
9. sport for fun	.685						1.88	1.40
10. enjoy exercises	.663						1.72	1.37
<b>General health</b>								
1. general discomfort		.722					1.79	1.48
2. anxiety symptoms		.714					1.97	1.49
3. concentration difficulty		.681					1.62	1.38
4. psychomotor agitation		.680					1.85	1.44
5. lack of motivation		.676					1.75	1.42

	Factor loading						M	SD
	1	2	3	4	5	6		
6. fatigue		.648					1.31	1.29
7. stress (overload)		.644					1.31	1.26
8. intestinal symptoms		.614					2.30	1.41
9. sleeping problems		.603					2.03	1.50
10. body pain		.570					1.93	1.53
11. irregular heartbeat		.539					2.53	1.45
<b>Content with health offer</b>								
1. general social counselling			.741				4.60	0.89
2. International office			.656				4.67	0.84
3. health counselling service			.643				1.07	1.93
4. counseling centers			.640				0.95	1.67
5. psychological counseling			.621				0.94	1.65
6. university learning centers			.492				1.69	2.27
<b>Substance use</b>								
1. substance 1				.857			1.12	0.58
2. substance 2				.817			1.01	0.344
3. substance 3				.809			1.01	0.35
4. substance 4				.670			1.04	0.38
<b>Stress</b>								
1. access to databases					.716		2.50	1.43
2. computer access					.632		1.97	1.33
3. access to scientific literature					.603		2.72	1.47
4. software equipment					.512		1.99	1.24
5. internet access					.510		2.29	1.43
<b>Social support</b>								
1. teacher support in difficult period						.697	3.91	1.09
2. general teacher support						.662	3.85	1.07
3. general involvement						.626	3.83	1.12

Concerning motivation for physical activity, the most important issue is the desire to look good, followed by the intention to improve fitness and to prevent disease. On the other extreme, the less important factors are the possibility to make friends and to meet new people. In the area of general health, the symptoms with a high prevalence of occurrence are irregular heartbeat, intestinal symptoms, and sleeping problems, followed by anxiety symptoms. Further, the higher degree of content for university offer was related to the services provided by the international office.

Overall, the substance use is very low for each substance. The items that measure students' stress at a higher degree include concerns about access to scientific literature and about access to scientific databases. The dimension about social support includes items with highest means from the entire set of analyzed items, on the first position being the item about perceived social support from academic staff during difficult times.

#### *Reliability analyses and inter-correlations between factors*

Reliability estimates are presented in Table 2. The  $\alpha$ -values obtained in the present sample ranged from 0.77 to 0.94, indicating good to excellent internal consistency. Skewness [-.86, 1.45] and kurtosis [-.90, 1.19] estimates for the five



factors, excepting substance use, allowed the use of parametrical correlational analyses.

Table 2. Descriptive statistics for the study variables

Factor	Skewness	Kurtosis	Mean	SD	Min	Max	Alpha
1. Physical activity	-.34	-.90	2.00	1.16	0	4	.94
2. General health	.17	-.76	1.86	1.06	0	5	.92
3. Content with health offer	1.45	1.19	2.33	0.96	1.33	5.33	.78
4. Substance use	3.25	24.73	1.05	0.36	0	4	.84
5. Stress	0.21	-0.56	2.30	1.10	0	5	.85
6. Social support	-.86	1.14	3.86	.91	0	5	.77

Note.  $N = 470$

Great motivation for physical activity is positively related to content with the health offer of university and with social support received from university. Further, general health is negatively related with stress. Social support is positively related with content with the health offer and also negatively related with stress. These results are presented in Table 3.

Table 3. Correlation matrix among study variables

Variable	1	2	3	4
1. Physical activity				
2. General health	-.03			
3. Content with health offer	.18***	-.02		
4. Stress	.07	-.27***	.05	
5. Social support	.16**	.09*	.09*	-.09*

Note.  $N = 470$ ;

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

#### Gender differences

Gender differences revealed that men reported significantly higher scores for general health ( $M = 2.47$ ,  $SD = 1.12$ ),  $t(468) = 4.48$ ,  $p < .001$ , and lower scores for stress ( $M = 1.97$ ,  $SD = 1.16$ ),  $t(468) = -2.31$ ,  $p = .021$ , compared to women ( $M = 1.78$ ,  $SD = 1.03$ ;  $M = 2.30$ ,  $SD = 1.08$ , respectively). The differences between men and women concerning motivation for physical activity, content with the university' offer, and social support from university are non-significant.

## 4. Discussions

The aim of the present study is to evaluate the psychometric properties of a scale designed to measure students' perceptions about different dimensions of a healthy campus. The scale was translated from German language and we applied the adapted version in a sample of Romanian students at the end of the second semester of the academic year. The frequencies of physical and mental health difficulties, as well as the correlations between factors and gender differences were also explored.

The results sustain the structure with six factors, that measure the following dimensions of healthy campus: motivation for physical activity, general health, content with health offer, stress, substance use, and social support received from academic staff. All the factors present good reliability coefficients. Similar to some previous results conducted in a sample of Romania students (e.g., Pânișoară *et al.*, 2018), in our sample men presented high general health and low stress compared to women. Concerning the associations between variables, social support dimensions presented significant relations with all the other dimensions: positive relations with motivation for physical activity, general health, and content with university offer, and negative relations with stress. These results suggest that a supportive environment in campus could be related with different dimensions of students' health and well-being.

When comparing our results with those obtained on the German sample (Schmitz *et al.*, 2022), we can identify a different pattern of results concerning the prevalence of physical and psychological health difficulties. While Schmitz *et al.* (2022) found that psychological complaints are more frequent and physical complaints are comparatively less pronounced, in our sample physical symptoms are more pronounced.

Further analyses are required in order to inform different stakeholders for preparing the implementation of target group-specific interventions for the students. In addition, the survey results need to be processed and prepared in a way that students have access to an overview of the empirically shown data of health and safety of the university students, reflecting their own studying conditions and health matters. On the long term, based on the collected data and the results from each EC2U alliance university, interventions for a Healthy Campus within all EC2U alliance universities will be suggested, implemented, and evaluated. The official agents of all participating universities will exchange their methods and experiences in order to increase the effectiveness and to learn about the universal and particular good practices.

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