



Physical Activity and Selected Psychological Constructs of Intercultural Students in the Field of Physical Education During the Covid-19 Pandemic

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

The purpose of the study was to compare anxiety, depression, self-efficacy and mood between students at the Faculty of Physical Education in Poland and Algeria during the Third Wave of the COVID-19 Pandemic, as well as to compare the intensity and quantity physical activity. It was also important to examine relationships between self-efficacy and other psychological variables, and self-efficacy and physical activity in the two groups. The following questionnaires were used to assess psychological constructs, self-efficacy and physical activity level: Mood State Profile (POMS), depression (Beck Depression Inventory), anxiety states (STAI), self-efficacy (GSES), a physical activity questionnaire. The research results show that there were statistically significant differences between Polish and Algerian students in anxiety and mood state. There were also statistically significant differences between the groups in the intensity and quantity physical activity. Based on the results of students' self-efficacy in relation to states of mood, it turned out that anger and vigour are a significant predictor of a sense of self-efficacy of Algerian student, but among Polish students only vigour is a significant predictor of a sense of self-efficacy. The comparative study showed statistically significant differences in each of the mood scales. In data on physical activity during the pandemic, all variables showed statistical significance, but physical activity did not turn out to be a significant predictor of psychological variables in the study. It can be assumed that undertaking increased physical activity is a kind of preventive measure in reducing mood disorders and relieving depressive episodes.

Key words: depression, mood, self-efficacy, anxiety, students, Poland, Algeria

Introduction

Widespread transmission of COVID-19 (Corona Virus Disease 2019) recognized by the World Health Organization (WHO) as a pandemic (Li et al., 2020), has led to a large number of studies to assess the effects of COVID-19 on the mental health of the population. Data collected among the Chinese and Iranian populations (Zandifar & Badrfam, 2020; Moghanibashi-Mansourieh,

2020) confirm the belief that the pandemic significantly affects our mental state, and thus - our daily functioning and quality of life.

Successive waves of the pandemic are being noted and recorded, and the changes that have taken place throughout the world since the start of the pandemic due to the threat of disease has led to attempts to deal politically and economically with the existing circumstances. During the so-called "third wave", European governments took

turns increasing and loosening the restrictions. The Polish government extended the nationwide Covid-19 restrictions until April 25. Until May 3, restrictions were in force in hotels and other facilities offering accommodation (Czermański, 2021). Algeria, with the rest of the world, was not spared from the Covid-19 pandemic, where the first infection with the Covid-19 was on February 24, 2020 (Lounis, 2020). During the first, second, and then third wave, the Algerian government implemented a strategy to control the pandemic, such as: recruiting medical staff, equipping hospitals, imposing the wearing of masks, suspending cultural and sports activities, as well as studies to protect pupils and students (Hemmeda et al., 2022; Merine & Maidi, 2021). When the students' attendance was suspended, they forced into remote learning. Online training has become an imperative for higher education institutions, imposed by the nature of living conditions. It is an education system that integrates technology and creates flexibility to achieve educational security and improve university outcomes (Lassoued et al., 2020). Like most university students, physical education students in Algeria had an average level of e-learning during pandemic Covid-19 (Kenioua & Krine, 2021). Because they are not provided with the necessary materials to better implement distance education and the lack of social and economic support (Chelghoum & Chelghoum, 2020). Also, the online training lessons devoted to physical activity of all kinds, whether for physical education students or all sectors of society, were not enough (Abdelatif et al., 2021). After the gradual return to the proximate (face-to-face) learning, the university put in place strict health instructions and protocols, such as reducing the number of students in groups, approving the study in rotation, and providing a room for each student in university residence (Kerras & Salhi, 2021).

Due to the Covid-19 pandemic, from 2020 people all over the world have changed their sports habits due to limited access to sports equipment, sports centers and sports groups. In many places, it was forbidden to organize training camps or sports competitions (McGuine et al., 2021). The problem of restrictions also affected sports universities and students applying for the titles of physical education teachers or trainers of various disciplines. From January 2021, sports, entertainment and recreation activities involving the organization of sports competition, sports activities and sporting events could be allowed under certain conditions: only for professional sports without the participation of the public.

In previous studies on adults, a correlation was found that greater cardiovascular capacity and physical activity were associated with a lower incidence of symptoms of depression and clinical anxiety (Baumeister et al., 2017). Moreover, Gallegos-Carillo et al. (2012) found that those with a higher level of activity had a lower risk of develop-

ping symptoms of depression compared to those with an inactive or moderate PA (physical activity) pattern. It was observed that during the pandemic, movement limitations generated certain changes in human behavior related to physical activity (Tison et al., 2020, Reigal et al. 2021).

Currently, experts confirm that playing sports and being physically active with friends has both physical and mental health benefits for children and adolescents (Eime et al., 2013). Mentally, adolescents can benefit from increased socialization with friends and coaches as well as a return to a more orderly routine. These psychological and physical benefits can help support their development. One of the solutions in difficult conditions is distance learning and online programs in sports classes and at sports universities, which, however, are burdened with great difficulty in the implementation of practical classes (Webster et al., 2021). Not all young people are self-disciplined in engaging in physical activity during a pandemic. Lower results of depression, anxiety and stress turned out to be significantly correlated with regular physical exercise, maintaining physical habits during the COVID-19 pandemic, and exercising more than 1 to 2 times a week (> 1 hour) (Deng et al., 2020). Studies carried out in the early stages of the pandemic showed that adults were definitely not getting enough physical activity. At the same time, the subjects who devoted more time to physical activity showed a significantly higher positive emotional affect than the other participants (Qin et al., 2020). Physical activity is positively related to health perception and mood. Similarly, reports indicate that moderate exercise predicts better health perceptions and positive mood states than vigorous physical activity. In particular, moderate physical activity is the only variable (in the present study) that predicts anxiety (Reigal, 2021).

In the analyses of articles in medical databases, changes in the levels of PA caused by the COVID-19 pandemic were observed. It was important to show a link between mental health problems and decreased participation in PA, as it turned out that the relationship was inverse during the COVID-19 pandemic (Jacob et al., 2020). Most of the evidence points to a decline in PA levels in society due to distancing. The authors speculate that PA may help reduce the mental health burden associated with the COVID-19 outbreak (Caputo & Reichert, 2020).

The levels of stress, anxiety, and depression that people currently live with are high. In the literature on the subject, however, we can find few reports on the individual protective factors of this construct (Taylor et al., 2020; Hyland et al., 2020; Lin et al., 2020). So far, it has been shown that depression in children and adolescents is related to self-efficacy (Radziwiłowicz, 2010), self-competence, self-esteem, and stress coping styles consisting in focusing on pleasant activities.

A particularly important resource in the changing conditions of a pandemic seems to be the sense of personal competence, which is synonymous with the concept of „self-efficacy” (Bandura, 1997). Self-efficacy is understood as the strength of individual beliefs about having the ability to cope with difficult situations (Juczyński, 1999). More recent studies have found that a strong sense of self-efficacy in coping with difficulties reduces susceptibility to stress, anxiety and depression, and indirectly positively affects mental health (Marchant et al., 2021; Wang et al., 2020). For example, more than half of participants reported decreased physical activity during an initial COVID-19 outbreak in Australia, but those having a high sense of self-efficacy were more likely to see positive changes (increases) in physical activity (Marchant et al., 2021). In light of the empirical verifications to date, an important factor protecting against the occurrence of anxiety and depression in adolescents are strong beliefs about their own effectiveness in terms of social and emotional functioning and academic achievement (Bandura, 1997). SE is an effective predictor of performance (Bandura, 1991) and has either a direct or indirect influence on teachers’ behavior (Woods & Rhoades, 2013).

Recent meta-analyses show that self-efficacy does, however, greatly influence health behavior through intention and maintaining self-efficacy (Zhang et al., 2019; Wolf, 2021). Especially self-efficacy in building intention and planning activities has a greater impact on behavior related to physical activity compared to other health behaviors (Zhang et al., 2019). Indeed, Covid-19-specific interventions should focus even more on the experience of self-efficacy in building PA intent and executing PA as routine PA activities are interrupted by anti-contagion policies.

The requirement of changes during a pandemic are presumed to be important in the lives of students focused on physical education and sport. Therefore, in this study, psychological variables were used, with particular emphasis on those that undergo faster changes, such as affective states, a sense of anxiety and the state of depression. It is assumed that the changes in these indicators may be partially caused by the situation of the next wave of the pandemic. The aim of the study was to compare anxiety, depression, self-efficacy and mood between students at the Faculty of Physical Education in Poland and Algeria during the Third Wave of the COVID- 19 Pandemic, as well as to compare the intensity and quantity physical activity. It was also important to examine the relationships between self-efficacy and other psychological variables, and self-efficacy and physical activity in the two groups.

In figure 1 the theoretical model of pathways for a study that suggests the direction of each variable is presented.

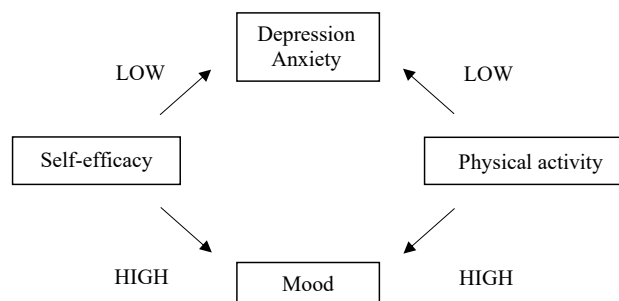


Figure 1. Can self-efficacy help students (amateur athletes) of different cultures survive the pandemic?

Methods

Participants and procedures

The study group consisted of 191 adult men from the Faculty of Physical Education. 96 students aged 17-30 ($M = 20.79$, $SD = 2.24$) came from Poland and studied at the Academy of Physical Education in Warsaw, and 95 of the subjects aged between 22 and 42 years old ($M = 27.18$, $SD = 5.32$) were trained at the University of Kasdi Merbah Ouargla in Algeria. The subjects were current/ potential Physical Education teachers or qualified trainers of various sports disciplines. The selected study sample is from low-income groups.

Students of both universities declared that they undertook physical activity during the study with different intensities, but predominantly of moderate intensity. Men participated in various types of physical exercises with a frequency ranging from 1 to 15 times a week. The training session lasted from 30 minutes up to 7 hours depending on the type of activity and the intensity of the effort.

The selection for the group was intentional. The criterion for the inclusion: being a student of one of these two universities while the study is being conducted and of male gender.

All subjects gave their consent to participate in the study and were of legal age. The survey was voluntary and anonymous. It was carried out in accordance with the standards of the Senate Ethics Committee of Scientific Research at the University of Physical Education in Warsaw SKE 01-49/2021 and the standards specified in the Declaration of Helsinki. Students received feedback on their individual performance at the request of the researcher. All subjects gave their consent to participate in the study and were of legal age. Researches received written informed consent from participants of study.

Research procedure

The online survey on the survivo platform was used in the study. The study lasted two weeks and took place during the third wave of the coronavirus pandemic in May 2021. The research was carried out by lecturers during classes

at universities. Due to the restrictions introduced, students of both universities were obliged to participate in online classes, and sports classes were focused more on theoretical learning than practical learning (Rector's Ordinance AWF Warsaw No. 47/2020/2021 from 9th February 2021).

Research measurement

The study used the standard psychological questionnaires used by psychologists investigating: Profile of Mood State (POMS), depression (Beck Depression Inventory), anxiety states (STAI), self-efficacy (GSES).

In addition, the authors created a survey specifying the level of physical activity of the subjects relating to changes in activity during the third wave of COVID-19. The semi-closed physical activity survey asked the following questions: 1. *How many times a week do you practice physical activity? (Frequency)* 2. *How intense is the physical activity (exercise) practiced (Intensity)?* 3. *How long is the physical activity (exercise) that you practice (Duration)?* 4. *For you, has the physical activity practiced during the Covid period changed (Change)?*

The Mood Profile Questionnaire by McNair, Lorr and Droppleman in 1971 was used to measure mood, with six scales: fatigue, confusion, depression, anger, vigour, tension. In addition to the indices of these affective states, the summary index of negative mood can be calculated. It consists of 65 items. The respondent assesses how they felt about the condition described by the adjective. The questionnaire has no standards (norms) for the Polish and Algerian population countries. It is widely used in sport to measure an athlete's transient, distinct mood states over a period of time. The psychometric results of the tool are satisfactory for research demonstrating Cronbach's alpha to be within the range of 0.74-0.91 (McNair, 1971). Although the tool is quite old, it is still used for research even in pandemic circumstances (Szczypińska et al., 2020).

The Beck Depression Inventory by Beck, Steer and Brown (1996) is a self-description tool, consisting of 21 items. BDI-II is a tool for measuring the severity of depression and has demonstrated internal consistency, stability, and accuracy: Very high internal consistency – the Cronbach's alpha coefficient for the entire normalization sample was 0.91, and 0.93 for patients with depression. High stability of the results obtained in the study – the differences between the first and second Beck Depression Inventory performances were statistically insignificant, and the relationship between the test and retest results, estimated using the Pearson correlation method, was 0.86. The results obtained in Beck Depression Inventory differentiate psychiatric patients diagnosed with depression from mentally ill patients without a diagnosis of depressive disorders, people with brain damage, or those with Huntington's disease. BDI-II is a sensitive tool for detecting changes in the level of mood, resulting from the applied therapy or the deve-

lopment of the disease. The Beck questionnaire should be used as a screening measure – it is used to initially assess the severity of the symptoms under study. On the basis of the obtained results, the diagnosis of depression should not be made and it should definitely be diagnosed whether the disease is present (Wang & Gorenstein, 2013).

The State and Trait Anxiety Inventory (STAI) is a tool designed to test the level of anxiety. The tool consists of two questionnaires, one of which concerns transitional (situational) anxiety, and the other is understood as a relatively constant personality trait of the individual. The tool contains 40 questions that the respondent can answer using the Likert scale and all items are rated on a 4-point scale (Spielberger et al., 1983). The psychometric indicators show a fluctuation in the internal consistency coefficients (0.86 to 0.95), and the test-retest reliability coefficients from 0.65 to 0.75 (Spielberger et al., 1983).

General Self-Efficacy – (GSES) measures the strength of an individual's general belief in their own effectiveness at coping with difficult situations and obstacles in terms of coping and adaptability in both daily activities and in isolated stressful events (Schwarzer & Jerusalem, 1995). The psychometric assumptions of the test are satisfactory for scientific research - Cronbach's alphas ranging from 0.76 to 0.90 (Schwarzer & Jerusalem, 1995).

Statistical analysis

In order to compare the studied groups and check the normality of the distributions of the variables, the Kolmogorov-Smirnov test was used, taking into account the Lilliefors Significance Correction. Since the variables did not meet the requirements of the normal distribution for analysis, the nonparametric u Mann-Whitney Test and a Pearson test was performed to determine the correlation significance of the selected constructs.

Additionally, Multiple Regressions method was used, which made it possible to verify the theoretical assumptions presented in the model (see Figure 1).

SPSS in psychology: version 22 was used to carry out the analyses. Thanks to the use of selected analyses, it was possible to estimate the future value of one dependent variable based on knowledge of the values of other variables – independent variables (Field, 2009). Knowing the effect of the independent variables on the dependent variable, the regression equation is designed to predict the values of the dependent variable (Pallant, 2020).

Multiple Regression is a method that searches for the independent variables that have the most powerful influence on the dependent variable (George & Mallery, 2019); the existence of a correlation between two or more variables does not mean that there needs to be a causal effect. Causality and prediction can only be obtained by using Multiple Regression in the case of the presence of more than one independent variable (multiple independent variables).

Results

The comparison of data in the Algerian and Polish groups made it possible to conduct a comparison between the level of self-efficacy, the level of depression and individual mood scales of students (see Table 1). Each group had its own

norms in the questionnaire. In the case of the analysis of the mood comparison groups, in which standardized sten scales are not presented, percentages were used estimate the mean results, assuming that $\geq 30\%$ of the maximum theoretical value is low, 31-70% of the max values are average, and over 70% of the maximum values were considered too high.

Table 1. Comparison of psychological variables between Polish and Algerian Physical Education students

Variables	Group	M	SD	U	Z	p
Anxiety (STAI)	PS	39.86	8.49	1778.5	-7.289	0.000*
	AS	48.37	4.98			
Beck Depression	PS	9.39	7.64	4424.5	-0.355	0.722
	AS	9.30	8.27			
Self-efficacy	PS	29.14	5.16	4538.5	-0.057	0.955
	AS	28.78	4.82			
Anger	PS	13.03	7.75	3664	-2.348	0.019*
	AS	10.88	8.61			
Confusion	PS	11.10	4.6	3243.5	-3.456	0.001*
	AS	9.04	3.560			
Depression	PS	16.83	10.82	2737.5	-4.776	0.000*
	AS	10.01	10.01			
Fatigue	PS	8.82	5.26	2956.5	-4.208	0.000*
	AS	5.92	5.17			
Tension	PS	12.27	6.14	3286.5	-3.339	0.001*
	AS	9.47	6.18			
Vigour	PS	18.39	5.08	3580.5	2.569	0.010*
	AS	20.49	5.02			

Note: AS- Algerian students, PS- Polish students, M- mean, SD-standard deviation, U- U value, Z- Z score, P- P value, * - statistically significant ($p < 0.05$)

The research results show that Polish students had significantly lower scores on the anxiety trait scale ($Z = -7.289$; $p < 0.001$). The average score of 39 gives Polish students 5 sten, which means the average severity of the variable. The mean group score of 48 for Algerian students is 7 sten, which is still the mean score. The data presented show that all students in the study had a moderate level of anxiety.

Taking into account Beck's depression scales and comparing the surveyed students to the norms, it is observable that neither Polish ($9.39 < 11$) nor Algerian ($9.30 < 11$) students are depressed. The results, however, do indicate a depressed mood in both groups, probably caused by current life events.

Regarding the self-efficacy scale, comparing Polish and Algerian students to the norms, their results are on the 6th level, i.e. moderate. Students have an average strength general belief in the effectiveness of coping with difficult situations and obstacles.

There is a statistically significant difference in each of the mood scales ($Z = -2.348$; $p = 0.019$). Nevertheless, the presented results show only low or average results. It turned out that in the case of anger, both the Algerian (23%) and Polish (27%) groups obtained relatively low results. The examined students did not experience intense anger. Confusion, demonstrating ($Z = -3.456$; $p = 0.001$) in both groups is at a moderate level; for Polish students it was 40%, and for Algerian students 32% of the maximum values. Algerian students obtained a surprisingly low level of depression (17%), and Polish students almost average (28%). The difference between the groups is statistically significant ($Z = -4.776$; $p < 0.001$). In the scale of fatigue ($Z = -4.208$; $p < 0.001$), the difference in mood also relates to the better well-being of Algerian students (21%) than Polish students (28%). The students did not have a high sense of burden. Similar results are recorded

in the tension ($Z = -3.339$; $p = 0.001$), whereas the Polish group shows moderate results (34%), and the Algerian group – significantly lower (26%). Vigour, significantly differentiating as a positive state ($Z = 2.569$; $p = 0.010$), was

shown to be close to high (64%) for Algerians, and for Poles, it was an average result (57.5%). However, it turned out to be the closest to the maximum values obtained by the subjects.

Table 2. Comparison between intensity and quantity Physical Education Polish and Algerian students

Variables	Group	N	M	SD	U	Z	p
Q.1.P.E.I Frequency	PS	96	5.47	2.209	2257	-6.092	0.000*
	AS	95	3.60	1.835			
Q.2.P.E.I Intensity	PS	96	1.74	0.631	3292.5	-3.394	0.001*
	AS	95	1.46	0.474			
Q.3.P.E.I Duration	PS	96	2.55	0.499	2175	-7.622	0.000*
	AS	95	2.00	0.326			
Q.4.P.E.I Change	PS	96	1.69	0.741	3713	-2.467	0.014*
	AS	95	1.89	0.535			

Note: AS- Algerian students, PS- Polish students, M- mean, SD-standard deviation, U- U value, Z- Z score, P- P value, * - statistically significant ($p < 0.05$)

In the questionnaire questions concerning physical activity during the pandemic, all the variables showed statistical significance. Polish students turned out to exercise more often during the week (question 1), more intensively (question 2) and longer (question 3) compared to the Algerian

group. In spite of this, Algerian students showed that their physical activity significantly improved during the pandemic (question 4) in relation to the Polish group of men.

The figures below represent the theoretical model of pathways for the direction of each variable.

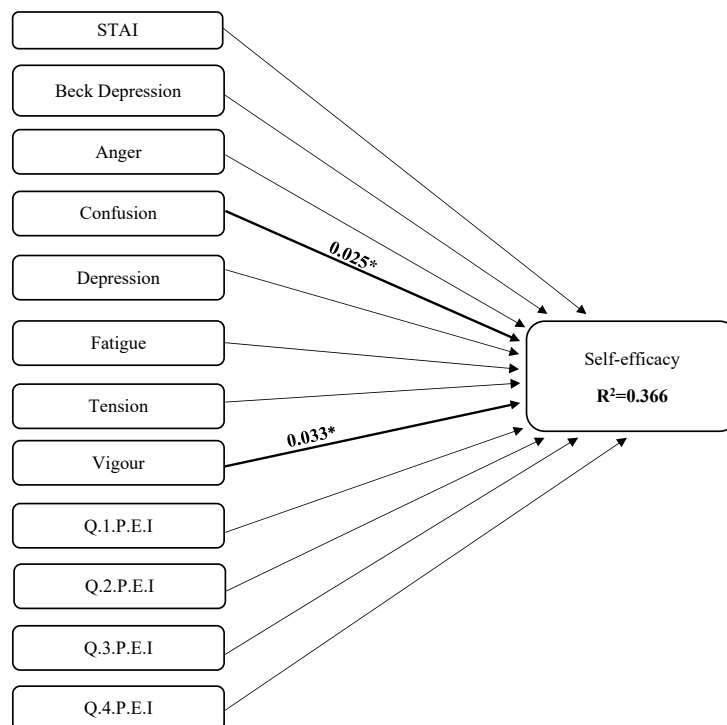


Figure 2. Results of multiple regressions of self-efficacy in relation to the mood and physical activity of Polish students- pathway model

The model presents all relationships between self-efficacy, mood states, Beck's depression, anxiety and physical activity in the group of Polish students. Based on the results, almost 37% ($R^2 = 0.366$) of vigour $F(1, 12) = 3,523$; $p=0,033$ and confusion $F(1, 12) = 3,523$; $p=0,025$ are predicted, assuming knowledge about the level of self-efficacy. A higher level of vigour is to be expected in students who show a high level of self-efficacy. The negative impact of the sense of self-efficacy on confusion supports the interpretation that when obtaining higher values of the tested independent variable, confusion is lower. The other

variables (including those associated with physical activity) did not show statistical significance.

In figure 3. Only the important directions of the variables in the group of Algerian students are presented in a similar way.

All relationships between self-efficacy and other psychological variables analyzed in the study are presented. It turned out that vigour $F(1, 12) = 2,464$; $p=0,003$ can be predicted in 26% ($R^2 = 0.265$) with the knowledge of the intensity of the sense of self-efficacy. All tested constructs, apart from vigour, did not show any significant relationship.

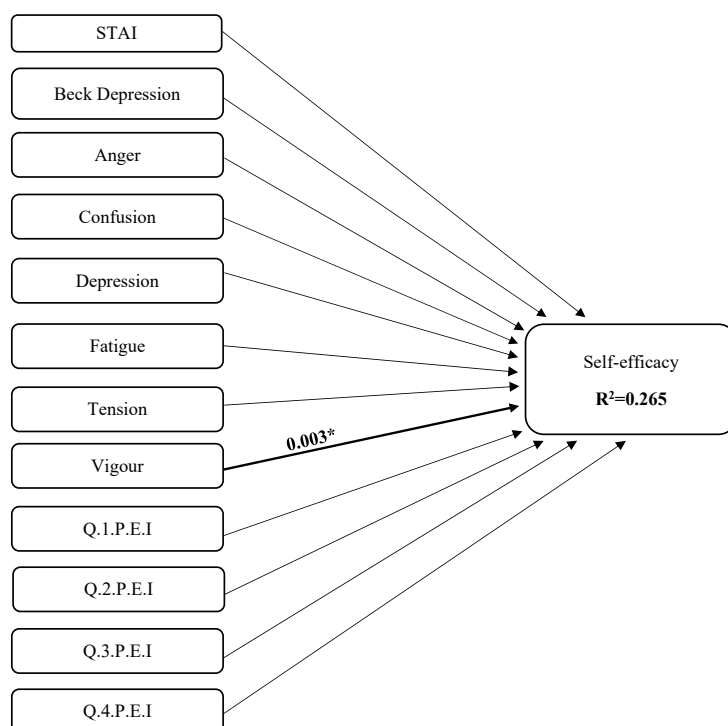


Figure 3. Results of Multiple Regressions of self-efficacy in relation to the mood and physical activity of Algerian students- pathway model

Discussion

The aim of the study was to assess selected psychological variables in the studied groups exposed to the third wave of the COVID-19 pandemic. Students from the Faculty of Physical Education from Algeria and Poland demonstrated an average level of anxiety as a state. The sten results in the Polish (5 sten) and Algerian (7 sten) groups indicate the average intensity of anxiety. Perhaps the last wave of the pandemic did not create a feeling of danger in student groups whose fitness level was above-average. One can also consider some kind of adaptation to the pandemic situation. Additionally, the lower level of anxiety in Polish students can be explained by the higher level of aggression (anger) (Sayers, 2013). Aggression goes hand in hand with anxiety,

and it is also an antidote to anxiety. In aggression, a man comes out of the fearful position of being hounded and the maximum contraction of his own space-time, hitting the surrounding world with rage and despair. (Ostrowska, 2014).

Moreover, the subjects showed greater anxiety due to the threat to their own and their relatives' health, bad economic situation and uncertainty of the future (Samełko et al., 2021). During the pandemic, legal regulations and university regulations dictated the likelihood of participating in theoretical learning instead of practical learning. Probably, these changes affected students differently depending on their gender, social status, or the type of sport they practiced (McGuine et al., 2021).

According to WHO (2019), by 2023, depression will be one of the deadliest diseases in the world (Destroy de-

pression). In the analysis of the intensity of depression, the students showed no symptoms of the disease, obtaining similar mean results in the groups. Polish students were characterized by a reduced well-being.

Differences between students may be due to their place of residence and culture that the authors have not studied. The desert region in which the MPEAS live is characterized by religious commitment and the observance of prayers, which helps in adjusting the mood. To relieve stress, anxiety, and depression during the COVID-19 pandemic, many groups in the community are engaged in spiritual and religious activities (Wang et al., 2020). Spirituality and religious practices are one of the necessary factors that protect the psychological and mental aspects of individuals during crises (Coppola et al., 2021; Del Castillo, 2021). Lucchetti et al. (2020) indicated that the use of religious and spiritual beliefs during the COVID-19 pandemic provided positive results and reduced some psychological problems such as anxiety and sadness. On the other hand, some results of the studies showed that many members of society took inappropriate actions or had negative thoughts during the COVID-19 pandemic, such as thinking about suicide or committing suicide directly (Dubé et al., 2021).

The authors focused in particular on the sense of self-efficacy, considering this construct important in the context of the subjects' affective changes. The relative constancy of self-efficacy makes this psychological factor strengthen the resistance to difficult, unexpected or very demanding unusual situations. It turned out, in line with theoretical assumptions, that this variable was a significant predictor of mood during a pandemic (states of vigor and confusion), but in the Algerian group the relation between the impact of higher self-efficacy and higher vigor was significant. In the Polish group, self-efficacy had a positive effect on vigor, but (also significantly) negatively on confusion. It should be remembered that self-efficacy is the strength of an individual's personal beliefs related to the sense of having sufficient skills to deal with difficult situations (Juczyński, 1999). We can assume that a higher value of this construct leads to more optimal functioning in a difficult situation, which is also associated with maintaining a positive mood (Pearlman, et al., 2020).

The students subject to this study presented the sixth-average sten in self-efficacy. However, those who exhibited more of this resource coped better at maintaining a good mood in the third wave of the pandemic. Both Algerian and Polish young people with a greater sense of self-efficacy show a higher level of vigor - the only positive state that was high in the surveyed students in this study. The remaining mood variables, such as anger, tension, disorientation and weariness, did not show significant relationships with the sense of self-efficacy in both studied groups, though, interestingly, students from Algeria and Poland showed significant differences in each of the mood states studied.

During the third wave of the COVID -19 pandemic, Algerians have a more optimal level of mood.

In Algeria, it was found (Tiliouine & Belgoumidi, 2009) that religiosity contributes to the well-being of Muslim students because it increases the meaning of their lives. Religion is ubiquitous in Algerian society and therefore significantly influences subjective well-being (Tiliouine, 2009). Although Poland is one of the most homogeneous countries in the world, with 95.8% of the population self-declared Catholics, spirituality hardly contributes to life satisfaction (Mandes & Rogaczewska, 2013).

The group of subjects is specific in terms of taking up physical activity. Students from the Faculty of Physical Education are people who perform intense physical exercises on a daily basis. Moreover, they tend to be professional players, athletes representing various sports disciplines or amateurs practicing sports recreationally. This study defined the self-efficacy and increased undertaking of physical activity by students as independent variables. Due to the reports to date suggesting no relationship between self-efficacy and the level of physical activity in the pandemic, this relationship has not been analyzed (Terran-Escobar et al., 2021). Based on our analyses, it is notable that Polish students show significantly more frequent and more intense contact with physical activity compared to the Algerian group, but the results show evidence that physical activity does not have a direct impact on the psychological variables studied by the authors, such as depression, anxiety, or individual mood states. In turn, the Algerians recognize the period of the third wave of the pandemic as significant in increasing physical activity and sport. The results of the own research correspond with the results of the research (Bednarek et al., 2014) where the level of physical activity of Polish and Turkish students was compared. Total physical activity per week, expressed in MET minutes / week (metabolic equivalent), was much higher for Polish students than for Turkish students. Moderate physical activity was higher among Turkish students, while vigorous physical activity was higher among Polish students. Previous research shows that during the first wave, 42.3% of those surveyed (students of Physical Education from Warsaw) engaged in more frequent training and devoted more time (than before) to physical activity.

Conclusions

It is worth noting that the presented results show a significant relationship between the presence of anxiety and depression symptoms. In addition, the relationship between anxiety, depression and exercise is worth considering. The prevalence of mental disorders is lower than expected in very active people, showing minimal symptoms of depression and no anxiety.

According to the conducted research, significant differences in the states of mood and anxiety between students from Algeria and Poland do not result from training loads (volume and intensity). They also do not affect the level of depression experienced by students. One can only guess that the mere undertaking of increased physical activity is a kind of preventive measure in reducing mood disorders and experiencing depressive episodes.

Vigor, as one of the mood states important in relation to self-efficacy, is the only mood component that is responsible for positive feelings and vitality (as opposed to depression). Future research should to a greater extent concern not only negative states containing pathological factors, but also be associated with the measurement of the severity of positive phenomena, thus enabling the coverage of a larger spectrum of mechanisms triggered in previously unknown / unexplored situations, i.e. a pandemic. Both studied groups of students revealed a relationship between their own effectiveness and vigor, which proves that people who have greater faith in their own skills and competences are better adapted. The conducted research demonstrates the value of the role of beliefs about oneself and highlights the importance of their contributions to the outcomes of those working with beliefs.

Limitations

The study did not measure professed values related to cultural aspects, which are important from the point of view of threats and coping with difficult situations (such as faith, religion), and in which the authors postulate differences in the studied groups. In addition, climatic differences such as sunshine and air temperature may affect the differences in the examined states of mood, depression or anxiety. One should also distinguish between episodic symptoms of depression caused by overload, which take the form of anxiety and sadness. It can be assumed that in most cases these affective states, developed during a pandemic, are an expression of temporary adaptive solutions. The distinction requires categorizing symptoms of this type, which may constitute a manifestation of more serious mental problems requiring professional psychiatric and/or psychological help.

The above analyses focused on comparing groups of students who displayed different mood states in similar pandemic circumstances. The high level of physical activity of students of Physical Education from Warsaw seems to be an attempt to cope with an excessive mental burden. Perhaps the statistically higher activity of Polish students prevents the development of depression in this social group. On the basis of the observed results of mood, the lack of measurements of the studied constructs of the Algerian and Polish groups before the pandemic should be considered a drawback. On this basis, it would be easier to operate with the studied variables and find

relationships between psychological variables and the undertaken remedial strategies, such as the introduced changes in exercises.

Research dilemmas are often associated with the selection of appropriate factors, and then the determination of the directions of interactions between them. During the COVID-19 pandemic, both biological and social aspects, as well as patterns of behavior and response to difficult situations developed so far, are important. In the psychological area, the consequences of phenomena are analyzed by researchers after they occur, which in turn leads to incomplete conclusions about the collected data. The individual characteristics of individuals are also important, and they are ignored in cross-sectional studies, similarly in exceptional circumstances, i.e. the measurement of indicators relevant to the third pandemic wave.

In this study, no significant relationship between self-efficacy and physical activity was found directly. Perhaps this is the result of not subjecting the author's questionnaire to biometric analysis to physical activity. At the same time, the demonstrated training loads of students (often higher than before the pandemic) allow us to assume that remedial strategies or defense mechanisms are activated in the form of increased participation in sports training, thanks to which it is easier to reduce a high level of anxiety, tension or anger. The research also needs to be supplemented with a comparison of the results in other social groups, e.g. the group of high-performance athletes in the so-called „iceberg profile” with an increased state of vigor while lowering negative states (Khayyat et al., 2020).

In order to minimize the losses incurred as a direct or indirect result of the COVID-19 pandemic and to prepare for further mutations of the virus, it is worth focusing research interests on fairly well-studied and controllable constructs, such as working on the body, undertaking physical activity and promoting physical culture understood as developed patterns of behavior in the spirit of sport.

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