Secondary School Students’ Well-Being as an Effect of Outdoor Physical Activity versus Indoor Activity and Inactivity

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Abstract: (1) Background: Well-being is a broad concept within which, among other components, self-esteem and general mood can be distinguished. Their formation can take place on the basis of contact with physical activity and with the natural environment. (2) Methods: The aim of the study was to compare the self-esteem and general mood of schoolchildren at different levels of contact with physical activity and the natural environment, distinguishing between active outdoor, active indoor and inactive groups. The study involved 306 secondary school students aged 16–19 years. The study used a diagnostic survey method, choosing a questionnaire technique. Two research tools in the form of survey questionnaires were used: Rosenberg Self-Esteem Scale—SES and General Mood Scale—GMS. (3) Results: The results indicated physical activity as an important determinant of both well-being components studied. In the study group of adolescents, contact with the natural environment proved to be a non-significant determinant of well-being. (4) Conclusions: The hypothesis of a synergistic positive effect of physical activity and contact with nature on self-esteem and general mood, which was not confirmed in this study, should be verified among representatives of older age groups.

Keywords: outdoor physical activity; indoor physical activity; physical inactivity; self-esteem; general mood

1. Introduction

The ongoing COVID-19 pandemic poses new challenges for health care. In addition to the currently recommended preventive methods based on vaccination, wearing masks or keeping a social distance, it is essential to practise traditional methods of health care, which, since the Lalonde 1 report [1], invariably include a health-promoting lifestyle with an extremely important element—physical activity. In contrast, contact with the natural environment is a separate category of health determinants within this concept. Both of these factors shape the healthiness of modern man in a way proven by numerous reports, both in relation to objectively and subjectively measurable parameters [2–5].

The idea of the authors of the study presented was to focus on potentially relevant psychological variables linked to health-related well-being [6–8]. This aspect is undoubtedly of interest in relation to representatives of the younger generation, due to the fact that life attitudes, including health-promoting attitudes, are crucial for this period, which, translated into the consolidation of positive habits, result in their numerous manifestations in subsequent stages of life. The well-being determinants chosen for analysis are physical activity and contact with the natural environment.

The term “well-being”, understood as the positive experience of life, is a frequent research construct [2], albeit interpreted quite differently. For some it is happiness or serenity, while for others it is a long-term state of contentment. For some it is happiness or serenity, while for others it is a long-term state of contentment. It is sometimes understood as well-being, physical health or mental health. None of these views is wrong, but, on the
other hand, each is incomplete. For this reason, it remains a great scientific challenge to objectively define this broad concept.

Researchers recognise that self-esteem, defined as a sense of self-worth, is closely related to well-being and several other adaptive factors. Hence, the analysis of self-esteem in publications on well-being seems to be an eyesore [6]. General mood, on the other hand, is usually understood to be an important psychological variable, that influences a person’s perceptions and behaviour. In this case, manuscripts devoted to the good-state also contain references to general mood [5].

2. Nature and Well-Being—An Overview

Although an active lifestyle has always been considered the best way to achieve health as far back as antiquity [9], it has been scientifically found to be a necessary complement to other health habits [10], and, in the last 20 years, the concept of exercise as a medicine or preventive method has become fully accepted [11]. Some authors consider exercise as a kind of universal pill that, in addition to its benefits in the prevention and treatment of many diseases, has the advantage of having no adverse reactions and being a cheap alternative compared to drugs, surgery and hospitalisation [12]. Research on the protective effects of physical training and active lifestyles in the prevention of metabolic and cardiovascular disease is nothing new [13]. The effects of exercise on the brain, cognitive function and behaviour have also received considerable attention [14–16]. Since the classic study, in which it was first shown that animals subjected to voluntary exercise had increased neurogenesis [17], exercise has been seen as a potential enhancement of cognitive and behavioural functions in humans as well.

The issue of physical activity targeting the reduction of mental health risks has been extensively studied in the world literature [18–20]. A significant proportion of these studies involve people at a young age. It is the period of late childhood and adolescence, often characterised by harsh self-esteem in comparison to others, that can result in poor mental health and consequently attempts to punish oneself for imagined deficits in the form of self-harm and even suicide attempts. Regardless of pharmacotherapy and psychotherapy, the way to restore mental well-being can be through physical activity, both on one’s own initiative and also organised in a planned manner by schools and colleges [21]. An important determinant of young people’s mental ill-being may also be their unsatisfactory economic status. It is conjectured, however, that this is a primary and therefore indirect cause of mental health disorders. The feeling of poverty, on the other hand, causes those experiencing it to intuitively place themselves on the lower rungs of the stratification ladder, which is often a direct cause of threats to mental functioning. Here, too, a recognised remedy for such a problem may be structured sessions of higher-intensity physical activity [22].

The most current issue that can be seen as a health threat is the coronavirus pandemic, during which fear-inducing messages from public debate can interact synergistically with movement restriction orders. Indeed, this reduces the mobility reflex natural to adolescence, which is also not conducive to maintaining a satisfactory level of mental well-being [23,24]. This is confirmed by the most recent findings on the negative correlation between the level of physical activity and the occurrence of anxiety, depression and other mental disorders among representatives of the younger generation [25].

An equally frequently emphasised category in the world literature as a determinant of mental health is natural resources. There has been a gradual increase in interest in the relationship between natural outdoor spaces and people’s health and well-being. Some of this work involves the use of nature during selected health interventions, such as outdoor exercise programmes. These initiatives are guided by the view that nature has a unique therapeutic potential [26].

In particular, much attention has been paid to initiatives that refer to the qualities of the natural environment for mental health problems. These initiatives refer to the compelling evidence that people with unrestricted access to the natural environment are more likely to have better mental wellbeing [27].
In a study involving 20,000 respondents, researchers from the European Centre for Environment & Human Health at the University of Exeter found that people who spent two hours a week in green spaces were significantly more likely to report good mental health and wellbeing than those who did not. These two hours, whether they involved a single contact with nature or were the result of several episodes of several minutes, seem to be the minimum necessary in this case for real health benefits, regardless of associated factors such as ethnicity, economic status or the experience of illness or disability [28].

Another study involving 2000 respondents from the UK area shows that nature’s action can go deeper than just providing wellbeing, as it includes a reduction in aggression and crime and therefore more satisfactory social cohesion [29]. However, it must be acknowledged that the published results do not allow for clear conclusions. Indeed, there are conclusions that an abundance of vegetation is associated with a reduction in assaults, robberies and burglaries [30], counterbalanced by information on criminal tendencies in denser vegetation clusters, including murders, assaults and thefts [31]. Despite the interesting message, much of this research is correlational rather than causal. This means that it is difficult to prove that natural landscapes result in such behavioural effects. In the light of these inconclusive results, it is worthwhile pushing for the formulation of an urban nature conservation model and its inclusion in planning for effects in the area of human mental health [32].

However, research indisputably shows that time spent in nature—as long as people feel safe—is an antidote to mental health disruption, helping to lower blood pressure and stress hormone levels, boosting immune system function, while increasing self-esteem, improving mood, and ultimately reducing anxiety and feelings of social isolation [33]. However, it is becoming increasingly difficult to effectively communicate this information to a young person’s consciousness. Meanwhile, the results of study after study—combined with an intuitive understanding of the indispensability of nature and growing concerns about the rampant use of smartphones and other technological advances—are leading to a tipping point where health experts, researchers and government officials are proposing widespread lifestyle changes towards closer contact with nature [34].

Observations of population behaviour undertaken during the COVID-19 pandemic indicate a polarisation of physical activity preferences from total inactivity in conducive home settings to attempts to become active in indoor sports and recreation facilities, to outdoor forms of physical activity. The latter has, until recently, seen an administrative move towards the closure of urban parks and woodlands. However, suggesting further information on the health risks of lack of contact with nature [35,36], this health questionable strategy was eventually abandoned.

Given the numerous examples of positive psychological wellbeing, both through contact with nature and physical activity, the likelihood of their synergistic effect on the sphere of emotional experience of a person can be tentatively considered. Although the two factors mentioned above are not the only determinants of increased self-esteem and positive emotions, it was decided to highlight them in opposition to the increasing trend towards sedentary lifestyles these days.

Following the prolonged restrictions accompanying the COVID-19 pandemic period, the authors identified three categories of physical activity participants. The first was students interested in outdoor physical activities as the least risky from an epidemic risk perspective. The separation of this group was possible because the status of outdoor areas as safe places for activity was only briefly questioned by Polish administrative authorities. The second group consisted of students who were physically active indoors, exercising in private spaces, mainly in their own homes. In contrast, the third group included students declaring low levels of physical activity without any intensive or moderate variation.

The aim of the study was to compare the self-esteem and general mood of secondary school students remaining at different levels of contact with physical activity, distinguishing between active outdoor, active indoor and inactive groups.
It may also be of interest to answer the question of whether the two components of well-being, i.e., self-esteem and general mood, differ to a similar extent in each of the three research groups.

The aim presented in the study stems from the need to answer the question: is the potential interaction of physical activity and contact with nature a sufficient condition for improving the well-being of secondary school students? The focus of this aspect of integration on representatives of the younger generation is due to the relatively easy access to them through contact with educational institutions. Further down the line, one can attempt to confirm the synergistic effect of physical activity and nature on well-being among representatives of the older generation.

3. Materials and Methods

The selection of the research sample resulted from a bilateral agreement between the Gdansk University of Physical Education and Sport and one of the secondary schools located in close proximity. The close educational contact consisted, among other things, of lectures for schoolchildren and the promotion of study at this university among students. On the other hand, this cooperation was in accordance with an agreement made between the Pomeranian school superintendent and the ethics committee of the Gdansk University of Physical Education and Sport, represented by the rector. This agreement concerned the evaluation and stimulation of the quality of physical activity of school students in the Pomeranian Voivodeship (agreement number 17/03/05).

An additional ethical prerequisite for the research was the written consent of adult students (which in Polish law means turning 18 years of age). For younger pupils, official consent to participate in the research was given in writing by their parents. A significant part of the lessons took place online during the research, which made direct contact with the students difficult. However, after a certain period of time, by decision of the state administration, students returned to school, participating in traditional lessons. This enabled them to complete paper versions of the questionnaires, which were returned to the authors as soon as they were completed.

However, it is important to note a very important fact that the study referred not so much to students’ physical activity during PE lessons, but to their overall level of physical activity. This is an important caveat that accentuates the fact that only three hours of physical education per week are realised in the Polish educational system at secondary school level. According to the authors, this could be insufficient time to develop clearly differentiated levels of self-esteem and general mood in outdoor and indoor student groups. In other words, it was hypothesised that students’ participation in physical education classes had relatively little effect on their final levels of self-esteem and general mood. In addition, the online lessons did not allow for outdoor exercise. For this reason, the variable analysed in the study was not only the activity during the lessons, but all symptoms of physical activity undertaken voluntarily and often individually during the week. Only from this perspective was it possible to create a group of outdoor students.

A total of 306 secondary school students aged 16–19 years (17.82 ± 0.98) participated in the study. In the Polish education system, this is the period in life immediately preceding studies at university. The choice of this age group was prompted by public perception of environmental well-being risks specifically affecting this age group. BMI was an important determinant in the selection of the study group. In the case of children, it is calculated according to the same formula as in adults, but the result is interpreted using growth charts appropriate to the child’s gender, separately for boys and girls. According to Polish centile grids, the normal BMI for children aged 3–18 years is 14–17. All the children studied fell within this range. Therefore, they did not show evidence of being underweight, overweight or obese. The research was conducted in an urban school in Gdansk located in the Pomeranian Province in northern Poland.

The male group comprised 144 participants (17.91 ± 0.96) and the female group 162 participants (17.74 ± 1.00). For the purposes of the study, there were also groups of
92 individuals declaring themselves to be primarily engaged in outdoor physical activity (17.83 ± 0.97), 102 individuals declaring themselves to be primarily engaged in indoor physical activity (17.89 ± 0.99) and 112 individuals describing themselves as physically inactive (17.75 ± 0.99). A slightly more detailed characterisation is presented in Table 1.

Table 1. Number and age of students surveyed by gender and outdoor activity/indoor activity/inactivity.

| Group | Active Outdoor Students | Active Indoor Students | Inactive Students |
|-------|-------------------------|------------------------|------------------|
| Gender | Male Students | Female Students | Male Students | Female Students | Male Students | Female Students |
| N    | 44         | 48         | 47         | 55         | 53         | 59         |
| Age (X ± SD) | 17.75 ± 0.99 | 17.90 ± 0.95 | 18.13 ± 0.92 | 17.69 ± 1.02 | 17.85 ± 0.95 | 17.66 ± 1.03 |

A more detailed analysis also required a 44-person outdoor subgroup (17.75 ± 0.99), a 47-person indoor subgroup (18.13 ± 0.92) and a 53-person inactive subgroup (17.85 ± 0.95) in the male group. Similarly, in the female group, there was a 48-person outdoor subgroup (17.90 ± 0.95), a 55-person indoor subgroup (17.69 ± 1.02) and a 59-person inactive subgroup (17.66 ± 1.03).

The creation of the study groups was based on written declarations from the respondents. They were given a set of 3 grouping statements (plus a gender question) and both questionnaires on one card. Each student indicated their gender and one of the three statements from the following suggestions: I prefer exercising outdoors to indoors, I prefer exercising indoors to outdoors, I prefer a physically inactive lifestyle.

The study used a diagnostic survey method, choosing a questionnaire technique. Two research tools in the form of survey questionnaires were used. One was the Rosenberg Self-Esteem Scale (SES), developed in 1965 by Morris Rosenberg to measure the overall level of self-esteem as revealed by self-report, which is treated as a relatively permanent trait rather than a temporary state. This tool was made available to respondents in the form of its Polish adaptation [37]. It is formed by 10 different statements that refer to the respondent’s beliefs about the self. Respondents were asked to indicate the extent to which they identified with each statement by indicating only one of the four possible answers. A 4-point response scale was used (1—strongly agree, 2—agree, 3—disagree, 4—strongly disagree).

The SES correlates significantly with scales measuring emotional dispositions, task-orientation and social functioning, confirming the tool’s criterion-relevance. On the other hand, the reliability coefficient of the Polish version of the method (Cronbach’s alpha) in the various age groups studied ranges from 0.81 to 0.83. For the group of adolescents aged 14–18, it is 0.81. In general, the results of studies using the Polish adaptation of the SES confirm its high convergent validity.

The second research tool used was the General Mood Scale (GMS), developed by Polish authors [38]. It consists of 10 statements formulated to express a general positive or negative mood. All statements showed satisfactory psychometric indices on the construction sample. Scale completers indicated on a five-point estimation scale how much they agreed or disagreed with each statement. The overall score of the scale was the average of the scores on the individual estimation scales, and the score ranged from 1 to 5 (1—disagree, 2—rather disagree, 3—somewhat yes, somewhat no, 4—rather agree, 5—agree).

All scale items are characterised by very high discriminatory power, resulting in high rates of internal consistency across the scale. For the student group, these range from 0.76 to 0.87 for the individual scale statements. All factor analyses of the GMS revealed only one strong factor with an eigenvalue of more than 1.0, which, across the various samples, explained between 59 and 68 per cent of the variance in scale scores.

The choice of the two questionnaires was based on the fact that both referred to well-being in a broad sense. Furthermore, both were adapted to the Polish population. The GMS is an instrument created by the Polish authors, while the SES required a psychometric
adaptation of form and content, as it was originally dedicated to a different population than the Polish one.

The literature search carried out allowed the research hypotheses relating to the aim of the article to be put forward:

**Hypothesis 1 (H1).** Contact of physically active people with the natural environment results in higher levels of self-esteem and better mood compared to people engaged in indoor forms of physical activity.

**Hypothesis 2 (H2).** People engaged in physical activity based on the use of indoor facilities have higher levels of self-esteem and a better mood compared to people who are not physically active.

Against the backdrop of the hypotheses presented, there is an additional need to determine the role of gender in shaping self-esteem and mood levels in the three groups of students identified.

Statistical analyses were performed using a statistics software package (Statistica 13.1 software, TIBCO Software, Palo Alto, CA, USA). Shapiro–Wilk tests were used to assess the homogeneity of dispersion from normal distribution. To evaluate the differences between active and non-active people unpaired tests were used (U Mann–Whitney test). In a further step of the analysis, we separated the active people according to outdoor and indoor forms of activity. Hence, the Brown–Forsythe test was used to evaluate the homogeneity of variance. One-way analysis of variance was used to evaluate the changes between the groups. In case of a significant differences between groups, post hoc tests for unequal sample sizes were performed to identify significantly different results. The level of significance was set at $p < 0.05$.

4. Results

The sample size was predetermined by using a power calculation with the software G*power version 3.1.9.4 from the Faculty of Mathematics and Natural Sciences Heinrich Heine University Düsseldorf (Germany). A sample size analysis showed that the sample group should have 256 participants ($\alpha = 0.05$, $\beta = 0.95$, $f = 0.25$). To avoid a possible reduction in the number of participants, we increased each group by 30%.

A comparative analysis of the group of active and inactive people showed no significant differences in general mood ($Z = 0.36$, $p = 0.72$, Table 2. However, in active people, statistically significantly higher self-esteem (SES) was noted ($Z = 4.70$; $p < 0.001$).

Table 2. Comparison of active and inactive people.

|        | Active | |        | Inactive | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|        | $X \pm SD$ | Me (Q1–Q3) | V% | $X \pm SD$ | Me (Q1–Q3) | V% | $p$ |
| GMS    | 2.98 ± 0.19 | 3 (2.9–3.1) | 6.44 | 2.97 ± 0.20 | 3 (2.8–3.1) | 6.9 | 0.72 |
| SES    | 31.24 ± 4.94 | 31 (29–35) | 15.82 | 28.91 ± 4.24 | 29 (26–32) | 14.69 | <0.001 * |

Note: GMS—General Mood Scale; SES—Self-Esteem Scale; V—coefficient of variation; *—statistically significant differences between active and inactive people.

In the next step of the analysis, the forms of physical activity were distinguished (indoor and outdoor). A statistically significant difference between groups was discovered for SES ($H = 22.25$, $p < 0.001$, Figure 1B). Post hoc analysis indicated significant differences between inactive people and people who train indoors ($p < 0.0001$) and outdoors ($p = 0.0003$). No significant differences between form of activity was noticed ($p = 0.99$). There were no significant differences in general mood.
Further analyses, taking into account the sex of the respondents, did not show any statistically significant differences (Table 3).

**Table 3. Comparison of men and women.**

|       | Men | Women |
|-------|-----|-------|
|       | X± SD | Me (Q1–Q3) | V% | X± SD | Me (Q1–Q3) | V% | p |
| GMS   | 2.98 ± 0.19 | 3 (2.9–3.1) | 6.64 | 2.97 ± 0.19 | 3 (2.8–3.1) | 6.57 | 0.49 |
| SES   | 30.39 ± 4.38 | 30 (28–34) | 14.40 | 30.38 ± 5.20 | 30 (28–35) | 17.13 | 0.70 |

Note: GMS—General Mood Scale; SES—Self-Esteem Scale; V—coefficient of variation.

The same differences between groups in terms of gender were also noted in the analysis of groups of people exercising outdoor, indoor and those who were inactive (Figures 2 and 3).

**Figure 1.** General mood (A) and self-esteem (B) of the respondents—division into forms of physical activity undertaken (*p < 0.05).

**Figure 2.** General mood (A) and self-esteem (B) of men (*p < 0.05).

**Figure 3.** General mood (A) and self-esteem (B) of women (*p < 0.05).
5. Discussion

In the study group, physical activity reveals itself as a determinant that significantly improves SES but has no effect on GMS. The differentiation of physical activity into outdoor and indoor activity did not yield new insights. Representatives of both forms of activity, as well as inactive people, had statistically similar levels of GMS. However, in the case of SES, which was higher in active people, there were no statistically significant differences between outdoor active and indoor active people.

A comparison of GMS and SES showed no differences between the male and female groups. However, further differentiation of the male and female study groups into inactive, indoor and outdoor groups leads to the conclusion that, as with the entire study group, both genders have a higher SES in the physically active groups, regardless of whether it is outdoor activity or indoor activity.

Physical activity is therefore an important condition for improving SES in this group, in contrast to the place of implementation of this activity. Hypothesis 1 was therefore not confirmed. In contrast, hypothesis 2 was only positively verified for SES, which is higher in the indoor active group compared to inactive individuals.

The observations presented here do not support a synergistic effect of the positive effects of physical activity and the natural environment on GMS and SES. Despite the many reports cited of improvements in mental health components resulting from contact with physical activity and such improvements in contact with nature, there is some explanation for the lack of the expected synergy. With increasing examples of school education oriented towards the development of environmental awareness, the question of the role of the natural environment in the lives of today’s adolescents remains open. The perception of this value is generally a matter of time and therefore of a person’s spiritual maturation. It is therefore worth contrasting the results presented with the effects of contact with physical activity and nature in the elderly. The existence of a synergistic effect seems much more likely in their case.

The lack of differences in self-esteem and current mood between outdoor and indoor groups of physically active young people may be due to the fact that people planning activity-based health training are not in nature for nature’s sake, but more for the opportunities it provides as a health-forming space through physical activity. This effect may be caused on the one hand by the growing cult of the body embodied in physical activity [39], and on the other hand by the gradual weakening of modern man’s relationship with nature, which particularly affects children and adolescents [40]. This deficit is often the result of an intergenerational interaction in which parents who shun nature pass on this pattern of behaviour to the younger generation [41]. It is known in the literature by the terms ‘the extinction of experience’ [42] or ‘nature deficit disorder’ [43]. Consequently, to the extent that we observe physically active young people in open spaces at all, it is relatively rarely nature (greenspace) [44].

Stress accompanying negative information on COVID-19 is associated with symptoms such as depression, anxiety and obsessive-compulsive disorder. These can be reduced through physical activity, which, especially among younger members of the population, can contribute to enhancing self-acceptance. To assess the strength of the correlation between physical activity, self-acceptance and pandemic stress, 1046 Korean middle and high-school students aged 14 to 19 years were surveyed. 521 boys and 525 girls participated in an online survey by completing a survey questionnaire. The results of the survey proved the positive impact of physical activity on self-acceptance. Both increased physical activity and increased levels of self-acceptance are factors that reduce stress associated with COVID-19 [45].

The aim of the following study was to assess the extent to which physical activity affected the body’s psychological parameters in the perspective of the movement restrictions introduced during COVID-19 within New Zealand. Participants aged 46.5 years (SD 14.7) completed a questionnaire in spring 2020 consisting of questions from the short version of the International Physical Activity Questionnaire and the World Health Organisation-Five Well-Being Index. The results of the 4007 respondents’ answers showed a positive
A study of the role of exercise in alleviating pandemic-associated intractable psychiatric symptoms also provided interesting information. This was carried out using the Adult Dispositional Hope Scale, the Generalized Anxiety Disorder Scale-7 and the Patient Health Questionnaire-9. The results proved unequivocally the positive effect of physical activity on reducing anxiety and depression. The effect of physical exercise on dispositional hope, which reinforces positive beliefs about the possibility of achieving goals, was also assessed. In this case, the results were significantly positive for both subscale of pathways thinking ($p < 0.001$) and subscale of agency thinking ($p < 0.001$). This provides a basis for enriching psychological prevention through physical activity intervention [47].

A search of the literature is a valuable addition to the results presented here, helping to clarify the positive association between physical activity and mental health in the first year of the COVID-19 pandemic, particularly in relation to the social isolation order at home [24]. Although the association between increased levels of physical activity and improved mental health has been repeatedly confirmed, further randomised clinical trials are needed. These should identify the most optimal types, intensity and frequency of physical activity for mental well-being. In addition, repeated studies in the years following the COVID-19 pandemic appear to be necessary, as its impact on the human psyche may be long-lasting [48].

A necessary addition to this discussion is an analysis of the current information on the importance of contact with the natural environment, recognised here as the second major determinant of the mental wellbeing of modern humans, next to physical activity.

At the time of the governmental restrictions accompanying COVID-19 and concerning, among other things, the closure of city parks and other green spaces, research emerged challenging this aspect of government management. The links between park access and child and parent mental health during the COVID-19 pandemic were investigated, as were the correlations between park access and physical activity levels of children and parents. Children’s mental health was assessed using the Strengths and Difficulties Questionnaire (SDQ) and their parents’ mental health was assessed using The Patient Health Questionnaire-4 (PHQ-4). In contrast, the International Physical Activity Questionnaire (IPAQ) was a tool to assess parents’ physical activity. It was found that access to green spaces was associated with lower total SDQ scores in children and lower total PHQ-4 scores in parents. Access to a park was also associated with more frequent joint participation in recreational activities and with increased parental physical activity [49].

The positive associations of contact with nature with mental health and well-being during the coronavirus pandemic were signalled by a nationwide survey of US adolescents ($n = 624$). This argues for the synergistic positive effects on mental well-being of both physical exercise and proximity to natural surroundings. Regardless, both of these remedies against malaise are guaranteed to result in a stronger attachment to nature [50].

An analysis of 5218 responses from respondents in nine countries helps to support previous findings classifying social isolation during COVID-19 as an important mental health risk. However, contact with nature helped to reduce its strength, especially for the most restricted populations. This includes Spaniards, representing more than 65% of the study group [51].

A cross-sectional study involving 3157 participants (1638 from Portugal, 1519 from Spain) was conducted over six weeks in spring 2020. An online questionnaire was used as a research tool to measure changes in exposure to nature, covering views of nature from home and within public natural spaces. In addition, a visual stress scale was used to examine stress levels, and the 12-item General Health Questionnaire was used to assess psychological distress. A somatisation scale was an additional tool. In Portugal, maintaining/increasing
the rate of visits to natural public spaces during the blockade was associated with lower stress levels, and maintaining or increasing the frequency of nature viewing from home was associated with reduced stress, psychological distress and somatisation. In contrast, in Spain, maintaining or increasing contact with private green space was associated with lower levels of stress both in one’s own home and in private community green space [52].

In the coming months and years, the discussion on the relationship between mental health and staying in nature and undertaking physical activity will certainly become increasingly popular, due to the post-covid effects of human isolation. However, it is difficult to assume that subsequent research will result in markedly different findings from those presented so far.

The findings of this study have to be seen in the light of some limitations. The primary limitation to the generalization of these results is the trouble of repeating the tests under identical conditions. This is because it must be remembered that the pandemic period differentiated the study population in a particular way. Another problem is the relatively small number of students participating in the study, taking into account the short time period of COVID-19, and above all related to the small size of the group organising this research project. The third limitation concerns the indisputable assignment of students to one of the three research groups. This was done on the basis of students’ written declarations and is therefore subjective. There are certainly situations when a student interested in outdoor physical activity spends time inactive or exercises in sports and leisure facilities or at home. This possible lack of consistent affiliation also applies to students in the indoor and inactive groups. The lack of identical research assumptions in the previous analyses does not allow for confrontation of the research results. Therefore, this is a pilot study. Its continuation will be important in view of the observed abandonment of modern man of both physical activity and contact with nature.

Undoubtedly, a practical recommendation in the public health sphere is the need, inspired by the results of this research, to increase the time spent on physical activity, as well as its intensity. New proposals are also needed for the development of sports and recreation infrastructure in green spaces. However, it is worth limiting the development of natural zones in order to maintain sustainable conditions for maintaining or improving health.

The research scheme presented is devoid of four groups. The creation of a $2 \times 2$ arrangement, i.e., four groups into which active outdoor, active indoor, inactive outdoor and inactive indoor students would be randomised, was seriously hampered. This was due to the inactive subjects’ failure to clearly identify the location of this inactivity (outdoor vs indoor). A study of the volume of physical activity carried out in parallel in this sample group, showed that students had very great difficulty in indicating the time spent on high, moderate and low physical activity. Thus, the decision was made not to scale physical activity levels, as the results obtained in this way would not be sufficiently reliable.

6. Conclusions

The themes of self-esteem and psychological mood discussed in this paper require further research referring to determinants such as physical activity and contact with nature. This is because the assumptions of this study were only partially confirmed. However, it is difficult to draw convincing conclusions about the population as a whole if the study participants are only representatives of the younger generation. In times of increasing physical inactivity among young people, it is comforting to note the higher self-esteem and well-being declared by physically active boys and girls. This leads us to believe that physical activity will not disappear from their space of activities and will continue to be seen as a support in times of prevailing anxiety, neurosis and depression. The inclusion of middle-aged and older people in the study will create the possibility of an intergenerational confrontation and facilitate an answer to the question of whether physical activity is a universal, age-independent guarantee for restoring or maintaining emotional balance. In addition, and this is far more debatable at this stage of cognition, it is worthwhile looking for an answer to the question of whether representatives of older age groups react better
emotionally compared to young people to being in a natural space. This would create the conditions for a more reliable assessment of the effect of physical activity in contact with nature towards achieving the highest state of emotional balance.

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