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Original research paper

OUTDOOR PLAY AND TIME SPENT BY SCHOOL-AGED CHILDREN USING DIGITAL TECHNOLOGY*

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A B S T R A C T

Today's children spend less and less time on free, unstructured play, especially outdoor play, due to their numerous commitments and lack of free time. Many interdisciplinary studies indicate that the lack of outdoor play and the quality of leisure time are closely linked to the negative effects of digital technology. The inappropriate and excessive frequency of digital technology use has a significant impact on the well-being, i.e. healthy growth, and development, of early school-age children. The study involved third to sixth grade students (N=155) from a primary school in the city of Rijeka (Croatia). Data was collected using a questionnaire. Descriptive analyses, factor and correlation analyses as well as the Kruskal-Wallis's test and hierarchical multiregression analysis were conducted. The Attitudes Toward Outdoor Play Scale (ATOP scale), i.e. an adapted version of the scale, was used as the measuring instrument. The results of the study confirmed the reliability and validity of the instrument used. Two subscales of the ATOP scale named "Benefits" and "Fears" were identified with acceptable measurement properties and model fit indices. The results of the study show that time spent using digital technologies increases while time spent playing outdoors and assessments of the benefits of outdoor play decrease with children's age and grade.

Key words:
benefits, education, fears, free time, nature.

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INTRODUCTION

Free play, unstructured play, risky play, children's free time, play in nature, and outdoor play have all been the subject of much research, particularly in children's healthy growth and development, as well as in relation to education (Brussoni et al., 2015; Gifford & Chen, 2016; Sum et al., 2022).

Children's leisure time can be structured and unstructured, i.e., it can include a range of activities, such as recreational activities, those aimed at resting, and personality development (Rosić, 2005). Play can be viewed in a similar way: play as a natural, complex activity; as learning; as play in nature; play that takes place outdoors, and as an activity that takes place indoors; structured or unstructured. However, the environments in which play takes place also vary – from the very urban and artificial to rural and natural places (Anđić, 2022).

Current interdisciplinary research on the topic of digital technology use are focusing particularly on the pre- and post-Covid-19 era, and has also updated the problem of decreasing outdoor play, i.e., children's play in nature (Liu et al., 2022; Visser & van Aalst, 2021). Research has associated it with insufficient physical activity, lower academic achievements, attention-deficit/hyperactivity disorder, obesity in children (Lukaš et al., 2022; Sum et al., 2022;), various socio-emotional problems, and free time in front of screens (TV and video games), i.e., use of digital technology and social networks both at home and at school (Babić, 2003; Kourti et al., 2021; Louv, 2005; Moore et al., 2020; OECD, 2021; Rosić, 2005).

Children's outdoor play and leisure time are often influenced by and correlated with numerous factors, both subjective and objective, from socioeconomic status, parental values, availability of content, digital devices, availability of rural and natural areas, but also the school itself and its values (Ilišin, 2003; Lee et al., 2021; Valjan Vukić, 2013). In this sense, the influence of school is vital, and should be focused on educating pupils and young people to have quality leisure time. This is especially important bearing in mind that today's children live in a digital world and are surrounded by media both at school and at home (Valdivia-Vizarreta et al., 2021). In addition to the great responsibility of teachers, parents share that same burden of responsibility, as most of pupils' time in and outside school takes place in the context of the so-called "digital education" (Ciboci et al., 2019; Rek & Kovačić, 2018).

Rogulj (2014, p. 273) emphasizes: "The computer and digital technology are an integral part of children's world and for that reason we must do everything within our power for them to have a positive influence on children's play, with the purpose of ensuring steady overall children's development". The influence of digital technology on preschool and school-aged children is important and can be observed from the aspects of positive influences (information, educational and research opportunities,

etc.) and of influences (from insensitivity, violence, to sedentary lifestyle, etc.) (Đuran et al., 2018; Gottschalk, 2019).

Children's health in early and middle childhood in the context of socio-emotional development and well-being, children's mental health, and children's physical health are closely related to spending time outdoors, i.e., spending time in nature and playing in nature, especially in unstructured play (Anđić, 2022; Bento & Dias, 2017; Dankiw et al., 2020; Gifford & Chen, 2016; Scott et al., 2022; Sugiyama et al., 2023). In their systematic study, Larouche et al. (2023) identified the factors that determine children and adolescents' time spent outdoors: at the individual level (socio-demographic variables of children as gender and age-related factors favouring girls and younger children); interpersonal level (role of parents and their education); community level (school programmes, teachers and other educators, safety risks), and natural environment level (warmer weather, natural and built environment). As part of the conclusion of this study, the authors emphasise that there is strong evidence that boys spend more time outdoors. The authors also noted that "the association between time spent outdoors and age is 'curvilinear', i.e., a significant increase in early childhood and a decrease in time spent outdoors in late childhood and early adolescence" (Larouche et al., 2023, p. 28). Research also shows that children recognize the benefits of playing in nature and its benefits for their healthy development (Anđić, 2022; Beyer et al., 2015; Ernst, 2018).

Previous research in Croatia examined the relationship(s) between the media and the time spent engaged with the media, essentially on samples of preschool children. The findings suggest that preschool children use media such as television even , or that the time they spend with TV media depends mainly on their parents and different factors, while school-age children use media mainly for fun and less for educational purposes (Bistrić, 2021; Blažević, 2012; Karačić & Pasković, 2022; Labaš & Marinčić, 2016; Šimić Šašić & Rodić, 2020). During the pandemic, digital technology was used daily and very frequently for the purpose of distance learning and teaching, especially for school-age children. However, television viewing during the pandemic was also extended to preschool children in Croatia (Bistrić, 2021). In Croatia, the "School on Third" television program was the main form of distance learning for children in primary and secondary school. In addition to this program, additional lessons were also conducted with the help of digital technology. Another fact is that new curricula for primary and secondary schools were introduced in Croatia in 2019 and digital technology is an integral part of the new curricula for school subjects.

With the introduction of the curriculum for the cross-curricular subject "Use of information and communication technology for primary and secondary schools in the Republic of Croatia" (Ministry of Science and Education, 2019), digital technology and the use of digital technology in teaching was particularly emphasized. As one of

the important focal points of this curriculum, the following is stated: "In order to protect the health of students, it is necessary to build a culture of responsible use of computers by familiarizing them [students] with ergonomics, i.e. the correct way to use computers and computer equipment without negative health consequences. It is important that students become aware of the positive and negative sides of digital technology and how it affects people's personal, social, and professional development, their health and the environment." (Curriculum for the cross-curricular subject "Use of information and communication technology for primary and secondary schools in the Republic of Croatia", 2019, pp. 6–8). According to this, digital technology is an important part of education, but it is also important to teach children how to use it responsibly and consider its positive and negative impact.

The research presented here contextualizes the issue of play, especially outdoor play – play in nature, time spent playing outdoors and time spent with digital technology, which are part of education, but also of the daily lives of school-age children. As far as we know, no research has yet been conducted in Croatia to study the impact of this curriculum and to assess its learning outcomes and effects on children's lives, health, and the environment.

There is a research gap, especially when it comes to the links between school-age children's free time, outdoor play, digital technology, and their wellbeing in Croatia. Some of the current research focuses mainly on preschool children and media, others on children's digital literacy and leisure time (Anđić, 2022; Jokić et al., 2022), but play, especially outdoor play, is not sufficiently considered. Outdoor play is not sufficiently recognized as a form of teaching or learning in the new curricula, in contrast to some curricula in the European setting, such as the Danish curricula, the Scottish curricula, etc. In these curricula, outdoor play constitutes an important role, not only in learning and teaching, but also in terms of children's well-being (Anđić, 2022). Therefore, there is a need to explore the relationships between children's perceptions of outdoor play, their perceptions of the benefits of outdoor play as part of their overall wellbeing, and their use of digital technologies, not only in the school environment, but also in their free time, spent at home or outdoors.

The ATOP scale (Attitude Towards Outdoor Play), which was developed by Beyer et al. (2015, p. 1), was used in this study. This scale was developed to examine school-age children and to record their perception of outdoor play. The basis for the creation of this scale was the definition of unstructured play as play outdoors, in nature, without supervision. As the author noted, children behave differently when they are alone and unsupervised. The Health Belief Model provided the framework for the scale, as it is important to identify barriers to outdoor play as fears or obstacles. The authors of the scale conducted interviews and pilot tests before creating the final version of the scale. The results of their research were two subscales entitled Children's Benefits and Fears of Outdoor Play. The authors also concluded that children's outdoor play was directly related to their engagement in outdoor

play, family support, and sedentary lifestyles. In other words: Their perceptions of outdoor play are more related to people and less to the environment itself. Another important conclusion that emerged from this research was the fact that children recognize the benefits of outdoor play, especially in terms of the health aspect of their lives. Therefore, the basis for the research presented in this paper was the ATOP scale, which was used as an instrument to examine children's perceptions of outdoor play and the factors associated with interest in outdoor play, benefits to children, and associated fears.

The aim of this study was to adapt the scale, determine its reliability and validity, and investigate the relationship between time spent using digital technologies, time spent playing , and attitudes towards outdoor play (ATOP scale) in school-aged children in Croatia.

In accordance with the research objective, the following tasks and hypotheses were established:

1. Determine the reliability and validity of the ATOP scale.
2. Determine the participants' assessments on the (ATOP Scale).

   H1: High arithmetic means of the participants' assessments on the ATOP Scale are expected.

3. Determine participants' assessments of the amount of time they spend using digital technology.

   H2: High arithmetic mean values of the participants' assessments of the time spent using digital technology are expected.

4. Determine participants' assessments of time spent in outdoor play.

   H3: Medium arithmetic values of the participants' assessments for time spent in outdoor play are expected.

5. Determine if there is a statistically significant correlation between the participants' socio-demographic variables and the assessments of the ATOP Scale, the time spent using digital technology, and the time spent playing outdoors.

   H4: It is expected that there will be statistically significant correlations between the socio-demographic variables and the participants' assessments of the ATOP Scale, the time spent using digital technology, and the time spent playing outdoors.

6. Determine if there are statistically significant differences between the participants' assessments of ATOP Scale, the time spent using digital technology, and the time spent in outdoor play in relation to the socio-demographic variables.

H5: It is expected that there will be statistically significant differences between the socio-demographic variables, the participants' assessments of the ATOP scale, time spent using digital technology, and time spent playing outdoors.

7. Determine the contribution of individual variables to the explanation of the time participants spend in nature

H6: Gender, grade level, time use of digital technology, and attitudes toward outdoor play are expected to explain the amount of time participants spend in nature.

METHOD

Sample

The research sample consisted of third, fourth, fifth, and sixth grade pupils (N=155) enrolled in a primary school in the city of Rijeka, i.e., in a highly urban area. Of the 155 participants, 31 participants were 9 years old, 50 participants were 10 years old, and 37 participants were 11 or 12 years old. Eighty-four (84) of the participants were male (boys) and 71 were female (girls). In terms of the grade attended, 31 participants were attending the third grade, 49 participants attended the fourth grade, 41 participants attended the fifth grade, and 34 participants attended the sixth grade. The pilot testing, adaptation, and adjustments of the scale itself were carried out in Anđić's research (2022, pp. 155–156), with the prior consent of the author. In this research, the sample consisted of pupils from the second to the fourth grade of primary school, with one school being in a rural area and the other in an urban area (suburb, ring of the city of Rijeka). The whole research construct aimed to measure the connectedness to nature and lower grade primary school pupils' attitudes towards play. In Anđić's research (2022), the second-grade participants (7 and 8 years of age) had difficulties in filling in the questionnaire, so they were excluded from this research. In this research, conducted in February 2023, the sample was changed and expanded, focusing on equalizing the sample by gender and including participants aged 9 to 12, i.e., from the third to the sixth grade.

Measurement and Procedures

The measurement tool used was a questionnaire that contained three questions designed to collect the participants' socio-demographic data. The participants were required to circle their chronological age, the grade they were attending, and their gender. In addition, two questions were asked about the use and frequency of digital

technology use. In the first question, the participants were asked to assess the medium they use. The answers provided were: smartphone, tablet, computer, or none of the above. This was a multiple-choice question, meaning that participants could select multiple answers. The second question referred to the amount of time spent using digital technology. The participants could provide multiple responses, ranging from less than one hour of use to 4 to 6 hours of use. The third question examined how much time the participants spend outside in nature. They were 19ered six choices: from less than an hour to more than two hours. For these questions, the participants were only allowed to choose one answer. The last question was the ATOP Scale by Beyer et al. (2015), which was adapted and translated into Croatian in the research by Anđić (2022). In the original study (Beyer et al., 2015), the scale included 12 items, but in Anđić's (2022) research, after adaptation, it included 14 statements. Beyer et al. (2015, pp. 3–4) based the construction of the scale on attitudes toward outdoor play as an unstructured free activity in natural environments, parks where natural elements such as trees and lawns predominate, but not in playgrounds (due to the greater proportion of artificial materials). Such play or activities may include cycling, walking, hiking, exploring, climbing trees, etc. The scale was also based on the so-called Health Belief model, which emphasizes the health aspect of promoting children's mental and physical health through unstructured play and includes three dimensions: beliefs about well-being, fears related to outdoor play, and orientation toward unstructured play.

Beyer et al. (2015) found that the potential of the scale lies in its adaptability to different populations and cultural backgrounds. The original research was conducted in the United States, where some items often reflect children's fears related to outdoor play in large cities, such as crime, drugs, and abuse. One of the limitations of the original study was its specific sample, Hispanic-Latino children, and the high urban setting. Therefore, the reasons for adaptation were the specific cultural context in which the research was conducted, namely the city of Rijeka, Croatia, which is known as a child-friendly city. Rijeka is also a city with a low crime rate.

Previous research has identified some barriers to outdoor play, e.g., fear of insects, bugs, getting lost, animals, etc. (Anđić, 2022, pp. 151–152), so these topics were included as the content of some of the items in this study, instead of items in the original study related to an American high urban settings and crime issues. To adjust the items in the scale, some items were adjusted, some were replaced, and two new items were added:

- item 7 "I like to explore new places in nature" was replaced with "I like to play outside and observe plants and animals."
- item 8 "I'm afraid of getting lost outdoors in nature" was replaced with "I like to explore new places when I'm outdoors in nature"
- item 9 "I don't like to play outside in nature because there are strangers" was replaced with "I'm afraid of getting lost when I'm outside in nature."

- item 10 "I'm afraid of wild animals or insects outside in nature." It was replaced with "I don't like to play outside because insects and bugs bother me."
- item 12 "I don't like to play outside in nature because there are people with drugs" was replaced with "I don't like to play outside because I'm afraid of being bitten by insects or spiders."

The added items were: item 13 "I don't like to play outside because I'm afraid of wild animals," and item 14 "I don't like to play outside so I don't get dirty" (Anđić, 2022, p. 52).

This adapted version of the ATOP scale was used in this study. The participants had to assess 14 statements, i.e., agree or disagree with them. The assessment scale comprised four levels: 1 – strongly disagree; 2 – disagree; 3 – agree and 4 – strongly agree. Participants were given questionnaires with clear instructions on how to complete them and assess the statements. The research was coordinated at the school by Sonja Ivić, PhD. The research was conducted in accordance with the ethical principles for conducting research on children, with the consent of the Agency for Education, the Ministry of Education and Science, parents, school administration and teachers. All parents received written permission in an envelope and were asked to give their consent for their child to participate in the study. Participation was anonymous and voluntary, and subjects could withdraw from the study at any time. Eleven questionnaires were invalid or not completed. The survey was conducted in February 2023. The data was processed with the statistical packages SPSS v26. and Jasp v17.

Data Analysis

In order to answer the established objectives and hypotheses of this study, calculations were performed to obtain the results of the descriptive parameters, means, standard deviations, kurtosis and skewness. The normality tests (Kolmogorov-Smirnoff and Shapiro-Wilks) were also performed. In addition, exploratory and confirmatory factor analyses were performed (principal components, maximum likelihood method). The evaluation of model fit indices is one of the methods used to show that the hypothesised model can be confirmed by calculating numerical indicators or fit indices. It is a common method used primarily in confirmatory analysis, and the indices are also frequently used for more advanced analyses such as structural modelling. There are many interpretations of the indices, particularly with regard to their acceptability. The most common indices are: 1. Absolute fit indices (use chi values; shows how well the model fits the data): Chi value χ^2 (measure of the discrepancy between the sample and the fitted covariance matrices); RMSEA (Root Mean Squared Error of Approximation, indicates how well the model would

represent the covariance matrix of the populations with unknown but optimally selected parameter estimates), SRMR (standardised Root Mean Square Residual, is standardised RMR and is the square root of the difference between the residuals of the sample covariance matrix and the hypothetical covariance model) and GIF (Goodness of Fit, calculates the proportion of variance attributable to the estimated population covariance). 2. Incremental (comparative or relative, results of comparing the values of the Chi2 value and the base model) adjustment indices are: CFI (comparative fit index, assumes that all latent variables are uncorrelated and compares the sample covariance matrix with this null model), TLI (Tucker-Lewis index, formerly NNFI, evaluates the model by comparing the χ^2 value of the model with the χ^2 value of the null model) (Hooper et al., 2008, pp. 53–55). In this paper, additional fit indices of the model were determined in relation to the scale, taking into account the values of the fit indices according to Hooper et al. (2008): relative χ^2/df, and below 3 as good fit; CFI, TLI (>0.95); RMSEA (<0.50), SRMR (<0.60); GFI (>0.95). A Spearman's rank correlation test calculations, a non-parametric Kruskal-Wallis's test with post-hoc Dunn test and Bonferroni corrections were performed. Finally, hierarchical multi-regression analysis was performed. In the first model, time in nature was entered as the dependent variable, and the independent variables and categorical predictors were gender (0=male; 1=female) and grade level (1=3; 2=4; 3=5; 4=6). In the second model, the time of using digital technologies was entered as a predictor variable, and in the third model, the two subscales benefits and fears were entered as predictor variables and presented as linear composites (averaging and dividing by the number of items). Age was not included in regressions models.

RESULTS

This section presents the results of several analyses conducted: the normality tests (Kolmogorov-Smirnoff and Shapiro-Wilks tests), the exploratory and factor analysis, the Spearman's rank correlation test, the Dunn post-hoc test with Bonferroni correction and multi-regression analysis.

The first research task was to examine the reliability and validity of the ATOP scale. The calculation of Cronbach's reliability coefficient for the whole scale resulted in a low value, which is considered borderline acceptable at α=0.62 (George & Mallery, 2003). The low Cronbach's coefficient shows a low correlation between the items and that it is a heterogeneous construct. It should also be noted that it was already clear from the matrix that the items in question were divided into positive and negative groups, as in the original study. The factor analysis also confirmed that the scale should be divided into two subscales. The Cronbach coefficients of the two subscales confirmed that the ATOP scale should be presented in two subscales with good measurement values: ATOP Benefits and ATOP Fears.

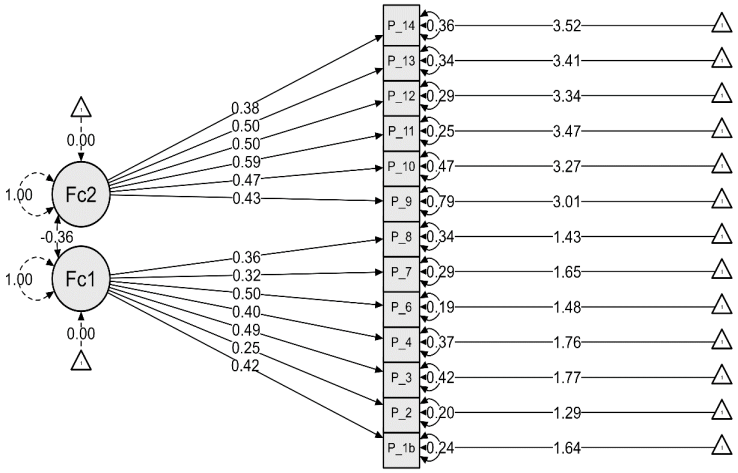
The normality tests (Kolmogorov-Smirnoff and Shapiro-Wilks) showed that the distribution of the scores in the sample was not normal; therefore, non-parametric tests were used (Spearman's rank test, Kruskal-Wallis's test). Tests of sample adequacy measurements provided acceptable values: KMO test (acceptable above 0.60) and Bartlett's sphericity test, which was statistically positive (KMO=0.790; $\chi^2(78) = 546.176$, $p<0.001$). The exploratory analysis resulted in four components, but the scree plot, the existing theoretical framework, and the parallel Monte Carlo analysis indicated the retention of only two components. Analysis using the Jasp program confirmed two components, i.e., a two-factor solution. For this reason, a confirmatory factor analysis (with two factors and oblimin rotation was performed, resulting in an explanation of 35% of the variance. The first factor, titled Benefits, and the second factor, titled Fears, were extracted. The resulting matrix indicated that item 5 *I feel free when I play outside in nature* had a saturation lower than 0.30. The item was removed, and the analysis was repeated. The analysis resulted in two eigen values (3,39; 1,57) that now explained 37,6% of the common variance. The results are presented in Table 1.

Table 1. Results of the factor analysis, factor saturations of the structural matrix for the ATOP Scale

Structure matrix		
	Factors	
	1	2
P_1 Think_better_clear	0.657	
P_2 Healthier	0.481	
P_3 Angry_calm_better_feel	0.597	
P_4 Learn_new_things	0.547	
P_6 New_games	0.757	
P_7 Observe_plants_animas	0.542	
P_8 Explore_new_places	0.504	
P_9 Afraid_to_get_lost		0.456
P_10 Botherme_bugs_insects		0.526
P_11 Afraid_to_get_hurt		0.773
P_12Afraid_bugs_spiders		0.674
P_13Afraid_wild_animals		0.684
P_14Afraid_to_get_dirty		0.502

The structure matrix indicates two factors, while the factor matrix of correlations shows that there is a negative correlation between the factors, with a small to medium effect r=-0.30 (SPSS), r=-0.36 (Jasp) (Cohen, 1988) (Figure 1).

Figure 1. Model plot of the ATOP Scale, factors and factor saturations, mean values, and variances



The fit indices of the model in CFA were calculated and they resulted in the following values: χ^2=136,430; df (76); χ^2/df=1.79, p<0.001; CFI=0.88; TLI=0.85; RMSEA=0.074; RMSEA 90% CI=[0.051- 0.090]; RMSEA p=0.0037; SRMR=0.072; GFI=0.99. If the Chi -square test value (χ^2) is lower than 3, it means that the model is good, but CFI and TLI are lower than they should be, and SRMR and RMSEA values are acceptable (Kline, 2005). According to Kline (2005), it should be noted that χ^2 is sensitive to the sample size. In accordance with the obtained results, i.e., the two factors, but also with the theoretical construct of Beyer et al (2015) about the existence of two subscales and confirmed in the research of Anđić (2022), the ATOP Scale is divided into the Benefits Scale, which describes the benefits and well-being of playing outdoors, and the Fears Scale, which describes children's fears when playing outdoors (Table 2).

Table 2. Measures of the sampling adequacy KMO and Bartlett's test of sphericity for both scales

KMO and Bartlett's test of the scales		Benefits	Fears
Kaiser-Meyer-Olkin Measures of sampling adequacy (KMO)		0.836	0.794
Bartlett's test of sphericity	χ^2	237.722	221.320
	df	21	15
	Significance (p) <	0.001	0.001

The two pre-tests Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity resulted in values that indicate the adequacy of conducting further analyses (Table 2). KMO test values between 0.8 and 1 indicate that the sample is adequate, and Bartlett's test of sphericity with values below 0.05 indicates that the data in the sample are sufficiently correlated to conduct further analyses such as factor analyses.

Benefits scale resulted in one factor (2.43) and explained 34,73% of the variance. Table 3 shows the factor saturations and descriptive indicators of the Benefits Scale. The Fears scale resulted in one factor (2.24) and explained 37,47% of the variance. Table 4 shows the factor saturations and descriptive indicators of the Fears Scale. Confirmatory analyses for each scale resulted in the values shown in Tables 3 and 4.

Table 3. Results of analysis – factor saturations and descriptive indicators of the Benefits Scale (M, SD, distribution of participants' answers)

Benefits Scale	Factor	M	SD	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
1. Playing outside in nature helps me to think more clearly and better.	0.650	0.638	0.643	1.29%	5.16%	49.67	43.87%
2. Playing outside in nature make me healthier.	0.484	0.290	0.509	0	2.58%	23.87%	73.54%

3. When I'm angry, playing outside in nature calms me down and makes me feel better.	0.599	0.774	0.818	3.22%	14.83%	38.16	43.87%
4. I learn new things when I play outside in nature.	0.545	0.761	0.730	1.29%	13.54%	45.16%	40%
6. I like to make up(new) games when I'm outside in nature.	0.772	0.483	0.667	1.29%	5.80%	32.90%	60.0%
7. I like to play outside and observe plants and animals.	0.520	0.651	0.630	0.64%	6.45%	50.32%	42.58%
8. I like to explore new places outside in nature.	0.503	1.432	0.683	1.93%	5.16%	27.09%	65.80%
5. I feel free when I play outside in nature. *	0.206	1.277	0.490	0	1.93%	23.87%	74.19%

Note. *deleted item

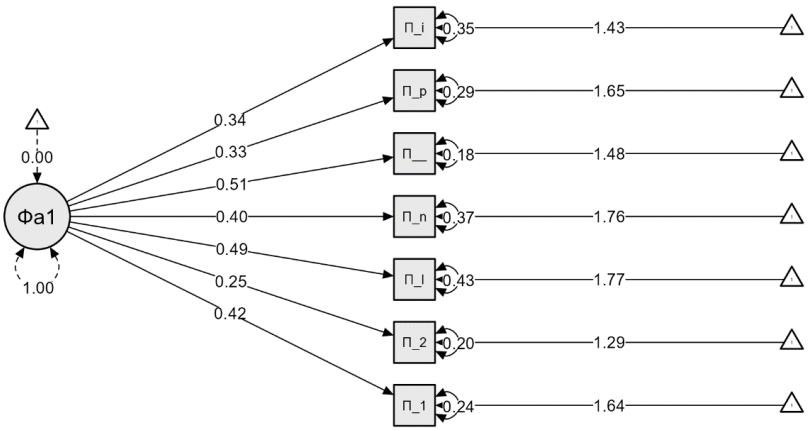
Factor saturation on the Benefits Scale, which contains seven items, ranges from 0.484 to 0.772 and on the Fears Scale, which contains six items, it ranges from 0.447 to 0.77.

Table 4. Results of analysis – factor saturations and descriptive indicators of the Fears Scale (M, SD, distribution of participants' answers) of factor saturations and descriptive indicators of the Fears Scale (M, SD, distribution of participants' answers)

Fears Scale	Factor	M	SD	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
9. I am afraid of getting lost outside in nature.	0.447	3.00	0.990	39.35%	31.61%	19.35%	9.67%
10. I don't like playing outside in nature because insects and bugs bother me.	0.538	3.271	0.832	45.80%	41.29%	7.09%	5.80%
11. I don't like playing outside because I'm afraid of falling or getting hurt.	0.770	3.471	0.775	60.64%	29.67%	5.81%	3.87%
12. I don't like to play outside because I'm afraid of being bitten by insects or spiders.	0.676	.33	0.740	47.09%	41.93%	8.38%	2.58%
13. I don't like to play outside because I'm afraid of wild animals.	0.669	3.406	0.770	54.19%	36.12%	5.80%	3.87%
14. I don't like to play outside so that I don't get dirty.	0.512	.52	0.714	62.58%	29.67%	5.16%	2.58%

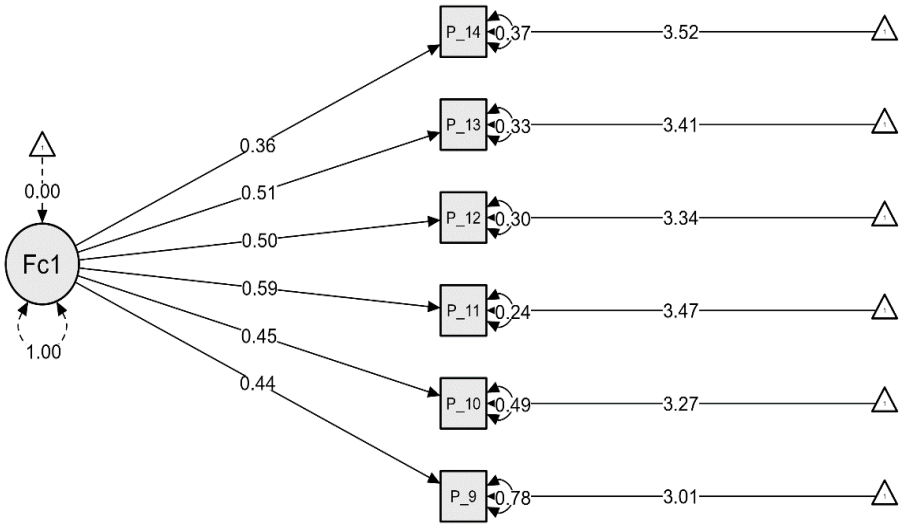
Confirmatory analysis on the Benefits scale resulted in the following values for the fit indices: χ^2=15.516; df(14); χ^2/df=1.10; p=0.212; CFI=0.99; TLI=0.99; RMSEA=0.026. RMSEA 90% CI=[0.000-0.084]; RMSEA p=0.683; SRMR=0.036; GFI=0.99 (Figure 2). The results of the analysis and the determined fit indices indicate a good model fit.

Figure 2. Model plot of Benefits Scale, factor saturations, arithmetic means, and residual variances



Confirmatory analysis for the Fears Scale, resulted in measures (fit indices): χ^2=19.605; df(9); χ^2/df=2.17; p=0.021; CFI=0.95; TLI=0.92; RMSEA=0.087 RMSEA 90 % CI=[0.033-0.140]; RMSEA p=0.111; SRMR=0.044; GFI=0.99. It is obvious that the fit indices support a good model fit (Figure 3)

Figure 3. Model plot of Fears scale, factor saturations, arithmetic means, and residual variances



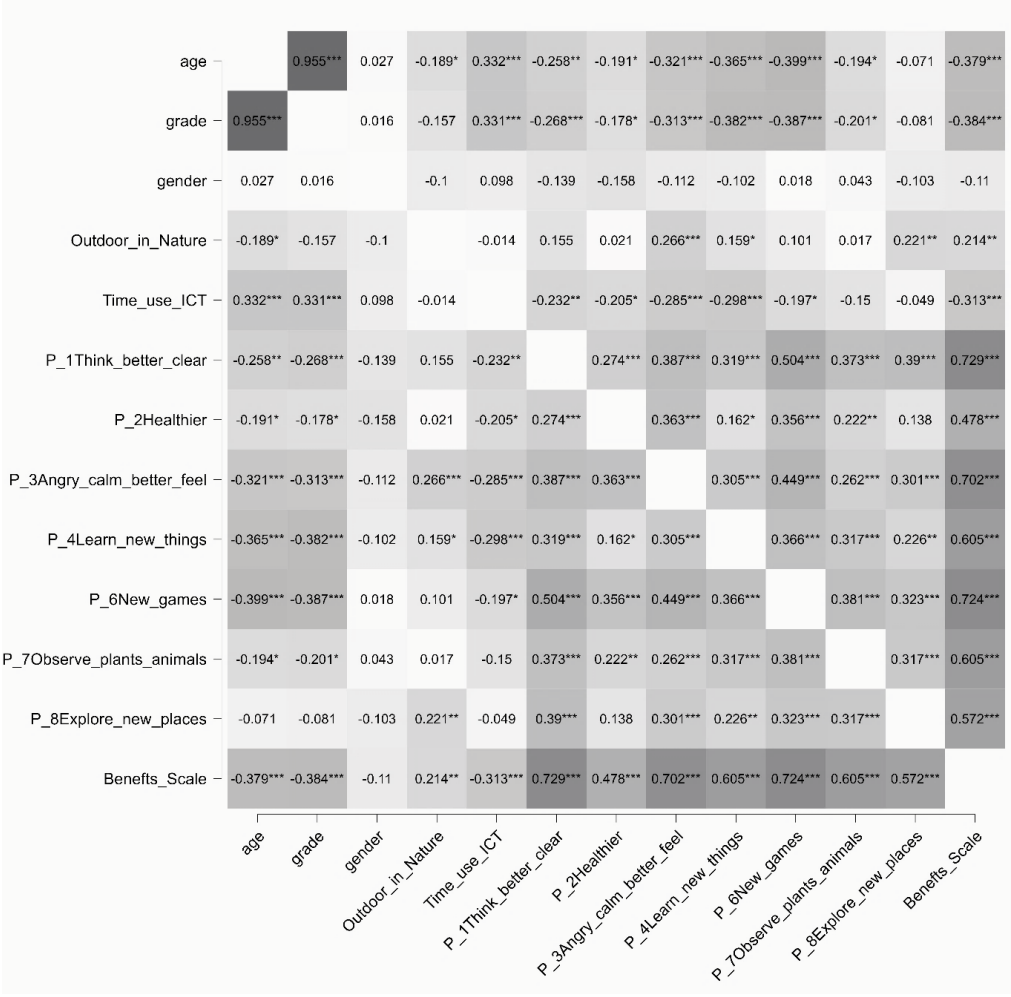
The reliability analysis conducted on the scales resulted in the following reliability coefficients: a Cronbach's coefficient of α=0.77 was obtained for the Benefits Scale and an α=0.76 for the Fears Scale. The results thus obtained are consistent with the results of the research by Beyer et al. (2015), as well as with the results of the research by Anđić (2022), although some differences can be observed.

It should be noted that the lower the value of the arithmetic mean, the higher the score on the ATOP scales. With regard to the descriptive indicators and according to the results obtained, it is evident that the pupils with the highest scores rate themselves as feeling healthier (M=1.29; SD= 0.509) and freer (M=1.27; SD=0.49) when they play outdoors, while they least agree that they are afraid of getting lost (M=3.00; SD=0.99), getting dirty (M=3.52; SD=0.71) and of getting hurt or falling (M=3.47; SD=0.77).

The following are the results of the research on the time spent on digital technology use. The participants could assess how much time they spend using digital technology: less than one hour, one to two hours, more than two hours, a few hours (from four to six), or no digital technology use at home. The arithmetic mean value obtained was M=2.02; SD=0.80, which is a rather low value, i.e., higher values for the arithmetic mean were expected. Also, the results of the research about the time the participants spend playing outdoors resulted in a medium-high arithmetic value of M=2.40, SD =0.64, considering that they had to assess whether they played outdoors for less than one hour, one hour, and up to two or more hours.

Correlation calculations were performed to determine the correlations between attitudes toward outdoor play on the Benefits and Fears scales, time spent using digital technology, and time spent playing outdoors, as well as the correlations with the socio-demographic variables of gender, age, and grade level. Spearman's rank correlations test was performed. It should be noted that the items of both scales were reversed (recoded) to facilitate the calculation and interpretation of the results.

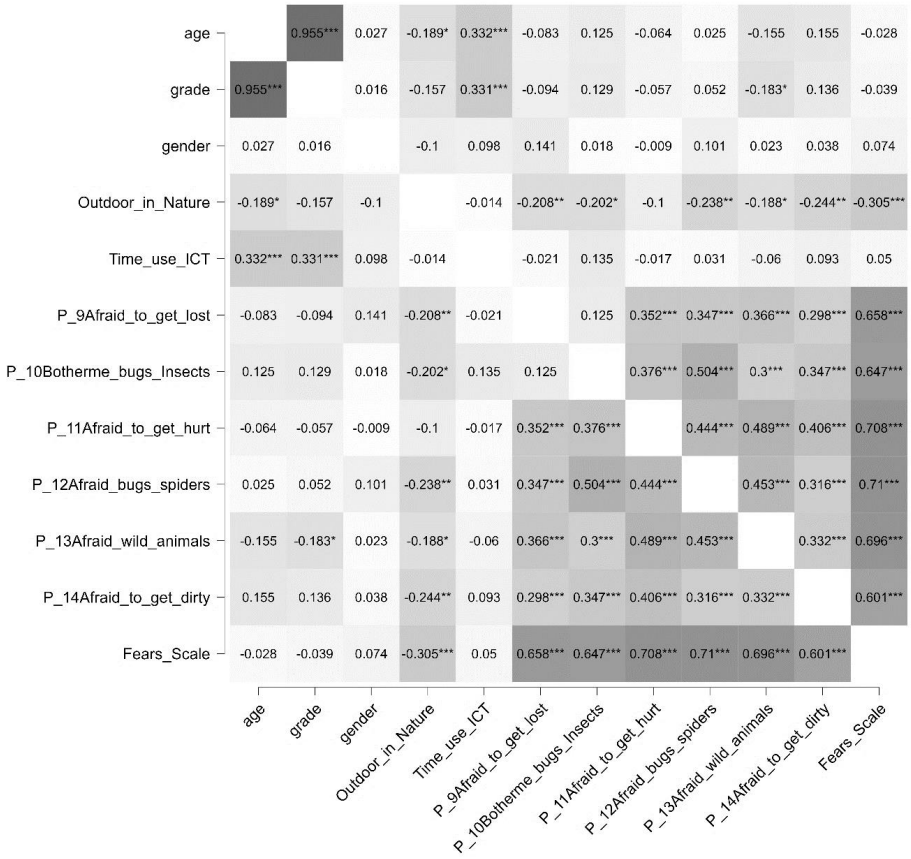
Figure 4. Results of the Spearman's rank correlation test on the Benefits scale (heatmap)



*p<0.05, ** p<0.01. *** p<0.001.

The results show that there are statistically significant positive and negative, low, medium, and strong correlations between the Benefits Scale, the items of the total Scale, and the time spent with digital technology and the time spent on outdoor play (Figure 4). A correlation was found between the time spent with digital technology, i.e., statistically significant, negative, low, and medium correlations between the overall Benefits Scale (rho=-0.313***), but also between the individual items on that Scale, *I learn new things* (rho=-0.298***); *Make up new games* (rho=-0.197*), and the item *Playing in nature when I am angry calms me down and makes me feel better* (rho=-0.285***). The results show that the time pupils spend using technology decreases as their perception of the benefits of time spent outdoors increases.

Figure 5. Results of the Spearman's rank correlation test on the Fears scale (heat map)



* p<0.05, ** p<0.01, ***p<0.001.

A positive, statistically significant, but small correlation was found between the Benefits Scale, rho=0.214***), but also individual items on that Scale, and time spent playing outdoors (rho=0.214**); *playing in nature calms me down* (rho=0.266***); *I learn new things* (rho=0.159*) and *explore new places* (rho=0.221***). The more children play outdoors, learn new things, etc., the more they realize the benefits of outdoor play. It should be noted that the correlation between time spent in nature and time spent with digital technology has not been established. Statistically significant correlations on the Benefits Scale in correlation with age and grade were found with negative and medium effects (rho=-0.379***; rho=-0.384***). A small statistically significant negative correlation was also found between age and time spent playing outdoors (rho=-0.189*). The results show that the perception of the benefits of outdoor play decreases with age and grade level; the older the children are and the higher the grade they attend, the lower their perception of the benefits of outdoor play. Interestingly, gender as a variable did not result in statistically significant values.

Correlation calculations on the Fears Scale resulted in statistically significant correlations between the Fears Scale and the variable time spent in outdoor play, which is negative and of medium effect (rho=-0.305***). It was also found that there is a correlation between age, grade, and the time spent on digital technology use, which is statistically positive and of medium effect (rho=0.331; rho=0.332***) (Figure 5). The results show that the greater the children fears, the less time they spend outdoors.

Furthermore, the Kruskal-Wallis's test and the post-hoc Dunn test with Bonferroni correction were performed to determine whether there were statistically significant differences between the variables. The table shows the test results and the size of the test effects (Table 5).

Table 5. Results of the Kruskal-Wallis tests and the post-hoc Dunn tests with Bonferroni corrections

	Benefits Scale	Fears Scale	ATOP scale	Time spent in outdoor play	Time spent on digital technology use
Age	$\chi^2(3)$ =24,400 p<0.001 η^2=0.16	-	$\chi^2(3)$ =22.998 p<0.001 η^2=0.14	$\chi^2(3)$ =9,710 p=0.02 η^2=0.063	$\chi^2(3)$ =27,569 p<0.001 η^2=0.17
Dunn Post hoc test	9>12 10>11 11>12	-	9>10 9>11 9>12 10>12	9 >10 9 >12	12>9 12>10 12>11
Grade	$\chi^2(3)$ =27,247 p<0.001 η^2=0.17	-	$\chi^2(3)$ =26,256 p<0.001 η^2=0.17	$\chi^2(3)$ =12.116 p<0.001 η^2=0.067	$\chi^2(3)$ =25.403 p<0.001 η^2=0.15
Dunn Post hoc test	3>6 4>6 5>6	-	3>4 3>5 3>6 4>6 5>6	3>4 3>6	3<6 4<6 5<6

Note: p<0.01; p<0.05; p<0.001; η^2 = 0.01 indicates a small effect; 0.06 indicates a medium effect; 0.14 indicates a large effect.

Statistically significant differences were found in relation to age and grade (Table 5). Nine-years-olds scored higher on time spent in outdoor play than ten-year-olds (p=0.012) and twelve-year-olds (p<0.001). Statistically significant differences were found in the time spent on digital technology use. Twelve-year-olds score higher on digital technology use than nine-year-olds (p<0.001) ten-year-olds (p<0.001), and eleven-year-olds (p<0.001). Statistically significant differences were found on the Benefits Scale, with nine-year-olds (p<0.001), ten-year-olds (p<0.001), and eleven-year-olds (p<0.001) scoring higher than twelve-year-olds. On the Fears Scale, no statistically significant differences were found between the participants in relation to age and grade. Statistically significant differences were found in the overall ATOP scale, with nine-year-olds scoring higher than ten-year-olds (p<0.01), eleven-year-olds (p<0.001) and twelve-year-olds (p<0.001) It was also found that ten-year-olds (p<0.01) scored higher than twelve-year-olds.

In terms of grade level, statistically significant differences were found in the variable of time spent in outdoor play, with third-grade participants scoring higher than fourth ($p<0.001$) and sixth-grade participants ($p<0.005$) (Table 5). Statistically significant differences were also found in time spent on digital technology use, where third ($p<0.001$), fourth ($p<0.001$) and fifth-grade participants ($p<0.001$) scored lower compared to sixth-grade participants. On the Benefits Scale, third-grade participants ($p<0.001$) were found to score statistically significantly higher than sixth-grade participants, and fourth ($p=0.00004$) and fifth-grade participants ($p<0.001$) were found to score statistically significantly higher than sixth-grade participants. Statistically significant differences were found in relation to the total ATOP Scale, where third-grade participants scored higher than fourth ($p<0.001$), fifth ($p<0.001$) and sixth-grade participants ($p<0.001$). It was also found that fourth ($p=0.006$) and fifth-grade participants ($p=0.015$) scored higher than sixth-grade participants. No statistically significant differences were found on the Fears Scale in relation to age and grade.

The results obtained are consistent with some previous research findings that suggest that time spent outdoors decreases with age (Anđić, 2022; Keith et al., 2021; Larouche et al., 2023). This is a possible explanation for the obtained results of statistically significant differences in terms of age and grade level, and this was also one of the reasons for expanding the sample in terms of the age of the participants and the grade level they attended. Similar results regarding the increase in time spent using digital technologies by age and grade level were also found by Jokić et al. (2022).

Multiregression hierarchical analyses were performed, and resultes are presented in Table 6. Criterion variable was Time in Nature, and predictor variables were gender, grade, Time in digital technology use, and Benefits and Fears scales.

Table 6. Results of multiregresion hierarchical analysis

Model 1	B	SE	β	p
Constant - Time in Nature	2.593	0.144		0.000
Grade	0.101	0.049	-0.165	0.040
Gender	0.111	0.102	0.087	0.279
Model 2				
Constant - Time in Nature	2.533	0.175		0.000
Grade	-0.112	0.052	-0.182	0.033
Gender	0.118	0.103	0.092	0.253
Time in digital technology use	0.041	0.067	0.052	0.544
Model 3				
Constant - Time in Nature	2.675	0.643		0.000
Grade	-0.113	0.054	-0.185	0.038
Gender	0.089	0.099	0.069	0.372
Time in digital technology use	0.073	0.066	0.092	0.272
Benefits scale	0.106	0.136	0.073	0.436
Fears scale	-0.330	0.097	-0.281	0.001

Model 1 R=0.188; R^2=0.035F (2, 152)=2.766 p=0.065; Model 2 R=0.194 ; R^2=0.038F (1.151)=1.966; p=0.121; Model 3 R=0.365; R^2=0.133F (2.149) =1.966; p<0.001; Durbin Watson 2,135

Note: Note. R – coefficient of determination; R2=effect size of the coefficient of determination; B=unstandardized regression coefficient; SE – standard error; β=standardized regression coefficient.

The results showed that grade (of attendance) (β=-0.185; p<0.038) and Fears (sub) scale were the most significant predictors of time in nature for school-aged children (β=-0.281; p<0.001). which is consistent with previous results. However, gender and Benefits scale were not relevant predictors, even though this was expected. Finally, all predictors explained only 13% of the variance in the criterion. The Durbin Watson value suggests that there are no autocorrelations between variables in the analysis sample.

DISCUSSION

The theoretical construct of the original research by Beyer et al. (2015), as well as the results of this adapted version of the Scale from the research of Anđić (2022) have been confirmed. The results of reliability and content validity, as well as additional measures of the model (model fit indices) showed that the scale of attitudes towards outdoor play (ATOP) measures two dimensions: Benefits and Fears. Therefore, based on the obtained results, the Scale was divided into two uni-dimensional scales, whose separately measured characteristics are more suitable than the whole scale. It should be noted that the determined reliability coefficient Cronbach alpha for the overall scale was at a (just about) acceptable level, while the determined reliability coefficients for the individual (sub)scales are quite satisfactory. As Beyer et al. (2015) did not provide the reliability coefficient for the overall scale, but only for the subscales, it was not possible to compare these results. The results of the coefficients for both subscales show that they are consistent with the original study, as well as with the study by Anđić from 2022, which found adequate reliability coefficients for both scales. The model measures and fit indices confirmed that the scales can be used separately in future research.

The result of the correlation between the factors is interesting; in this study it is rho=-0.30, while in Beyer et al. (2015) rho=-0.20 was determined. The authors explain that this has to do with the fact that "it appears that children's perceptions of benefits and fear are part of a more complex understanding of landscapes as opportunities for outdoor play" (Beyer et al., 2015, p. 10).

Although this research resulted in two scales, small variations in the structure of the scales are apparent. Of particular interest is the fact that item 5, which describes the feeling of freedom in outdoor play, resulted in a high arithmetic mean and was removed from the matrix because the item had a saturation below 0.30. On the one hand, this suggests that participants associate outdoor play with a sense of freedom; on the other hand, it is obvious that the item is not well described or understood by participants (what does freedom mean to each individual?). However, one possible explanation is that children from highly urban areas do not perceive outdoor play as free play.

The original research intent of Beyer et al. (2015) was to examine attitudes toward unstructured play, where the attitude that such play is "free" is part of the description of play as an unstructured activity. At the same time, the research also shows that participants' free time is very often not really considered as leisure and free time, but it is mostly activities of a certain kind, such as courses, training, etc., and not really an unstructured activity (Jokić et al., 2022). Variations and minor differences are also visible in the lower saturations, but also in the arithmetic mean of the item "I am afraid of losing myself...", which has a slightly higher residual variance, suggesting that in the Fears Scale in the future we should think about the items that

are more appropriate for the sample of participants, their age, but especially the availability of natural spaces, including such free unstructured environments since we are talking about participants from a highly urban environment. In this sense, the results differ from the research by Anđić (2022), which was conducted in rural and urban-suburban schools.

The results of the obtained arithmetic means are also in line with the research of Beyer et al. (2015) and the fact that the whole construct is based on the "Health Belief Model"; therefore, the connection with the health aspect of spending time in nature is understandable. However, it is interesting to note that with age, i.e., school grade, the assessment of the benefits of outdoor play also decreases, which is in line with existing research findings (Anđić, 2022; Keith et al., 2021; Larouche et al., 2023). A possible explanation of these results can be the fact that it is a specific age of the participants, who are already in pre-puberty or puberty. This is often associated with research findings suggesting that children at this age show less interest in nature experiences and outdoor play. In other words, this stage in life is often associated with the decline of the so-called feelings of connectedness to nature (Chawla, 2020), i.e., the environment, including such play.

Research has also shown that play, especially outdoor play in the early years and middle childhood, has important effects not only on children's health but also on general well-being (Sia et al., 2023). There is also a strong link between outdoor play in early and middle childhood and cognitive, physical, socio-emotional, and motor development, academic competence, etc. (Ernst et al., 2021). Current research shows that children's early contact with nature through outdoor play has a significant impact on their attitudes, values, and behaviour towards environmental issues, their connectedness to nature, and their education for sustainable development. The optimal age for the development of environmental sensitivity and connection to nature is under the age of 11, and childhood experiences of nature strongly influence attitudes to nature in adulthood (Anđić, 2022; Chawla, 2020; Tortella et al., 2021).

Putting the benefits of outdoor play or spending time in nature in general into the context of recent research findings, it appears that spending time in nature can reduce anxiety and depression and contribute to an individual's cognitive and emotional well-being, e.g. in terms of memory, cognitive skills, problem-solving ability, empathy, etc. (Berman et al., 2008; Faber Taylor & Kuo, 2009; Atchley et al. , 2012; Gidlow et al., 2016), so a reduction in this time is certainly concerning because it can be linked to the amount of time children spend with digital technology, which is particularly visible in older children (Ofcom, 2019; Jokić et al., 2022).

It can be concluded that there is an urgent need to promote children's outdoor play, especially in the early childhood years and early school age, in order to improve children's connectedness with nature and thus their general well-being (Chawla, 2020; Anđić, 2022). However, the results of the scale can be clarified and put into the context of the results for the use of digital technology. The number of

devices increases with age, but so does the amount of time participants spend using digital technology. With age, the evaluation of the benefits of outdoor play and time spent in nature decreases, while time spent with digital technology increases, which is consistent with recent research in Croatia (Jokić et al., 2022), but also with international research (Ofcom, 2019; Wen et al., 2021).

The results shows that children's fears and time spent outdoors have medium-strength effects, particularly in relation to fears of getting dirty, being bothered by insects or large animals, or getting hurt. These results show that children's fears are related to feelings of biophobia (fear of nature, especially bugs, spiders, etc.) and parents' fears regarding children's playing outdoors, which is consistent with some previous research (Anđić, 2022; Olivos-Jara et al., 2020; Visser & van Aalst, 2017). Results of multi-regression analysis showed that fears had a greater impact on time spent in nature then the benefits of outdoor play. Benefits scale as a predictor was not relevant, indicating that children's fears are important when it comes to perceptions of outdoor play. That is an important issue related to their perceptions of outdoor but also to other factors, such as parents, sense of biophobia, or urban settings (Anđić, 2022; Olivos-Jara et al., 2020).

The results also show that children recognize the negative impact of digital technologies on their well-being in terms of their emotional state and learning, but also recognize the benefits of playing outdoors, even if the impact of these contexts is mostly weak. It should also be emphasized that the time spent using digital technology, although with a smaller effect, is negatively related to the items used to assess children's positive emotional states when playing in nature (*I feel better, healthier, etc.*). Time in Nature is explained by attending the grade (advancing in education) and fears scale, which is consistent with previous research (Anđić, 2022) but not with time spent on digital technology use, which was expected. The further participants advance in education, attend higher grade levels, and have more fears related to outdoor play, the less time they spend in nature. The only variable that did not prove relevant in all calculations in this research was gender, which on the one hand was unexpected, as recent research suggests that assessments of outdoor play and digital technology, as well as connectedness to nature, often correlate with gender differences, with girls usually scoring higher than boys (Chawla, 2020). These results are usually explained by the feeling of empathy (which is especially higher in the female gender), which is a key component of connectedness with nature (Keith et al., 2021). However, this was not the case in this study.

CONCLUSION(S)

Based on the research results obtained, it can be concluded that the first three hypotheses have been accepted. The results suggest that the Benefits of outdoor play correlate to time spent with digital technology, age, and grade, which was expected. Statistically significant differences were also found with respect to age, grade, and time use of digital technology. Gender as a variable didn't prove to be significant in this research. In the context of the established hypotheses, it can be also concluded that hypotheses 4, 5and 6 have been only partially accepted.

The results of this study confirm the trend highlighted in previous research that children have too little time for leisure or free time activities if playing outdoors can be understood in this way, and that the time spent with digital technology increases with age, i.e., with education - school grade, which is a worrying trend. Also, its confirmed that attending grade, which can be interpreted as aging, and attitudes toward outdoor play related to fears of participants, does explain (the lack of!) time that children spend in nature. Benefits of outdoor play were not relevant enough to explain the time that children spend in nature. Firstly, the results of this research suggest that children perceive outdoor play as an important part of their lives and it is evident that they recognize the benefits of outdoor play, especially the healthy ones. Secondly, the pedagogical implications of this research can be seen in two (twofold) ways: In the context of education, it shows the urgent need to increase the importance of outdoor play within and beyond the curriculum. In other words, there is a need to emphasize outdoor play as an important factor in learning, and this needs to be considered as a form of teaching method in schools. Although outdoor play is not sufficiently addressed in the current curriculum, teacher autonomy in adapting and planning curriculum activities points to the following: it is the responsibility of teachers to identify opportunities to engage students or pupils in practices that include various forms of outdoor play as methods of learning or as a source of instruction.

Various curricula for school subjects, such as the curricula for the school subject Nature and Society or for Sustainable Development, or even extracurricular activities offer many opportunities to achieve the outcomes of these curricula. The use of digital technology can also be part of outdoor experiences and must be considered as an opportunity that is clearly emphasized in the curricula, in a responsible and appropriate way to avoid negative impacts. To achieve this, competent teachers need to be trained and their professional development encouraged so that they recognize the importance of outdoor play and the use of digital technologies, not only for school learning but also for children's general well-being. The professional development of teachers, their competencies to deliver outdoor experiences and the use of digital technologies in practice is an important topic that certainly needs further analysis and research. How do teachers perceive outdoor play, do they recognize the importance

of outdoor play, how competent are they in planning outdoor experiences in their teaching practice, how do they use digital technology responsibly, and how can the declining interest in outdoor play or activities and connectedness to nature due to advances in education be stopped, etc.? These questions are certainly a topic(s) for further research.

Accordingly, it is necessary to point out the limitations of this study, namely the facts that a convenient and small sample was used, that it involved participants from a single school and the fact that it involved a very urban setting so that it is necessary to be cautious about drawing general conclusions. Although this research was unable to establish a correlation between time spent on outdoor play/nature and time spent using digital technology, this is certainly something that should be addressed in future studies, with larger and certainly more representative samples.

In the end, it should be concluded that the two ATOP subscales have been validated by this research, as two important tools that can be used in future research. In future research, the scales could be enriched by the inclusion of additional items, especially the Fears Scale, so that further reflection and research can be conducted, especially regarding outdoor/nature play, the complexity of play, and its contribution and role in children's well-being, health, and development. The two subscales that emerged from this study have therefore proved to be valuable tools for further research into outdoor play and its importance for children's well-being. It is also clear that the scales should be adapted to the geographical and cultural context of the participants and related to other similar constructs in order to obtain a more complete picture.

The issue of outdoor play and the use of digital technology is significantly linked to health, emotional, psychological, and other factors that are part of children's growth and development. Therefore, the question of implementing outdoor play in the practices of school-aged children is not just a question of research trends, but a question of understanding and contributing to the well-being and enhancing the quality of life of children in modern society. The important variable(s) of this study, which should definitely be emphasized here as a focus of future research, is/are the time children spend with digital technology, the positive and negative effects of which should be considered more systematically, and ways should be found to measure and research them, because there is no question that they have become an indispensable factor of childhood, of every child's daily life, at home, but also at school, as part of their leisure and education.

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