Nature Physical Activity Satisfaction in Parents of Preschoolers: Psychometric Properties of a Questionnaire

Satisfacción con la actividad física en padres de preescolares: Propiedades psicométricas del cuestionario

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Abstract:

Physical activity in nature is one of the major recommendations prescribed by health professionals to bring benefits in all areas, being satisfaction of doing it of the main determinants to ensure that this is achieved. However, parenthood status may affect practice and levels of satisfaction with physical activity. Therefore, the objective of this study is to explore the psychometric properties and factor structure of the Spanish version of the Physical Activity Enjoyment Scale, that assesses satisfaction with physical activity in the natural environment in parents of preschoolers. Reliability testing, as well as exploratory and confirmatory factor analyses, were conducted. The findings revealed a single-factor structure made up of 16 items with high reliability and good and exceptional goodness-of-fit values. Therefore, the instrument can be considered as a free, easy-to-use and quick tool to analyze the satisfaction levels of preschool parents when it comes to physical activity in nature.

Keywords:

Physical activity; nature; validation; questionnaire; parents

Resumen:

La actividad física en la naturaleza es una de las principales recomendaciones prescritas por los profesionales de la salud para aportar beneficios en todos los ámbitos, siendo la satisfacción de realizarla uno de los principales determinantes para conseguirlo. Sin embargo, el estado de paternidad puede afectar a su práctica y niveles de satisfacción. Por ello, el objetivo de este estudio es explorar las propiedades psicométricas y estructura factorial de la versión española de la Escala de Disfrute de la Actividad Física, que evalúa la satisfacción con la actividad física en el medio natural en padres de preescolares. Se realizaron pruebas de fiabilidad y análisis factoriales exploratorios y confirmatorios. Los resultados revelaron una estructura monofactorial compuesta por 16 ítems con alta fiabilidad y valores de bondad de ajuste buenos y excepcionales. Por lo tanto, el instrumento puede considerarse una herramienta gratuita, fácil de usar y rápida para analizar los niveles de satisfacción de los padres de preescolares en lo que se refiere a la actividad física en la naturaleza.

Palabras claves:

Actividad física; naturaleza; validación; cuestionario; padres

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1. Introduction

Urbanization is turning cities into centers of chronic, non-transmissible physical and mental illnesses (Sundquist et al., 2004), making it one of the most significant global health issues of the twenty-first century (Moore et al., 2003). Also, physical activity (PA) has been identified as a fundamental tool to reduce the burden of chronic diseases and morbidity due to an inactive lifestyle, requiring interventions that are effective in increasing PA in the general population (Wu et al., 2017). In this context, the World Health Organization (WHO) recommends that individuals engage in at least 150 minutes of moderate-intensity aerobic exercise per week, or 75 minutes of strenuous aerobic exercise, or an equivalent combination of both (WHO, 2020), increasing the risk of cardiovascular illnesses, type 2 diabetes, breast and colon cancer, as well as early death, if these recommendations are not followed. Therefore, research and policies pay considerable attention to the potential of contact with natural environments to protect or enhance human health (Nilsson et al., 2011), as this contact has been widely positively linked to well-being (Hartig et al., 2014). Previous studies have examined the relationships between natural environments and PA and, interestingly, there may be a synergy between the well-established physiological and psychological benefits of PA and the restorative effects of contact with a natural environment (Thompson-Coon et al., 2011). Consequently, nature PA has become one of the treatments most recommended by professionals for prevent ill health or restore individual mental and physical fitness (Shanahan et al., 2019).

The advantages of PA in the outdoors, including gardening, hiking, and other outdoor pursuits, have been thoroughly documented (Passmore & Howell, 2014). The impacts of PA in natural surroundings have been shown in experimental research to affect biomarkers as well as self-reported stress, mood, and fatigue levels (Bowler et al., 2010; Ward Thompson et al., 2012). Similarly, improvements in both attentional and cognitive capacities have been observed (Berman et al., 2008, 2012). In addition, the initiatives to increase PA in natural spaces have been linked to improvements in social networks as feelings of connectivity and community, a greater appreciation of nature, improvements in self-esteem, and a path out of modern life (Pretty et al., 2007), observing also additional benefits in comparison to those experienced indoors (Pretty et al., 2003). Moreover, people tend to engage in PA when they are in natural areas, exercising for longer periods of time or more intensely (Joseph & Maddock, 2016). This relationship between the benefits found and contact with nature was developed by Markevych et al. (2017), who explained three fundamental pathways leading to these positive associations: harm mitigation (such as reducing noise and pollution), psychological recovery (such as improving attention and reducing stress), and skill development (such as social cohesion and PA).

In this context, satisfaction has been identified as one of the main determinants in the maintenance of a behavior or habit (Rothman et al., 2004), being this assertion supported by several studies focused on healthy habits (Dishman et al., 2010). A person's level of satisfaction can be interpreted as their own, favorable, cognitive evaluation of their life and all of its aspects, taking into account their expectations, objectives, and goals that have been attained (Carrión et al., 2000). In this sense, the regulation of satisfaction with a change in health behavior reflects a constant evaluation of whether the benefits of the new behavior justify the effort (Leventhal et al., 2008). This implies that regular PA's behavioral, psychological, and physiological experiences play a significant role in determining satisfaction (Rothman et al., 2004), whose improvement usually generates an increase in

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the participants' PA levels (Fleig et al., 2011). For example, Baldwin and colleagues (Baldwin et al., 2013) revealed that a range of distinct good experiences with PA, such as feeling like one is closer to achieving one's goal, are associated to everyday satisfaction.

Thus, assessing satisfaction with the performance of PA has become a major focus in the development of the health knowledge area (Lemes et al., 2021). However, the scientific literature shows certain deficits in the instruments that allow the assessment of satisfaction during PA in the natural environment. For example, Baldwin et al. (2013) developed a scale to analyze the experiences and satisfaction experienced by an inactive sample after exercise. However, this scale had only one item out of the 25 that made up the instrument to analyze satisfaction, and the sample only consisted of 116 people, which is characterized as insufficient. Other instruments, such as The Psychological Need Satisfaction in Exercise Scale (PNSE) (Wilson et al., 2006), have excellent psychometric properties in their validation in a university population. Although its focus of analysis is only on psychological aspects when facing physical activity and not after carrying it out, furthermore, no subsequent validations have been found in different population groups. Similarly, Cunningham (2007) adapted different work-related questionnaires to assess the satisfaction of university students participating in physical activity classes, but their high number of items together with the few responses collected in the studies presented can be considered as excluding limitations. Conversely, Kendzierski & DeCarlo (1991) developed and validated the Physical Activity Enjoyment Scale (PACES) based on different descriptions of the enjoyment of physical activity in previous literature and discussions by experts in the field. They also conducted two different studies to validate the scale, which was applied after different physical activities, thus reducing the initial 39 items to 18. Subsequently, this scale has been validated and adapted to different populations, such as children (Paxton et al., 2008) and adolescents (Motl et al., 2001), and translated into different languages (Moreno et al., 2008; Teques et al., 2020).

Therefore, the aim of this study is to explore the psychometric properties and factor structure of the Spanish version of the Physical Activity Enjoyment Scale (Moreno et al., 2008), that assesses satisfaction with physical activity in the natural environment in parents of preschool students in one of the Autonomous Communities of Spain (Extremadura). In this way, public and private institutions will be able to learn first-hand about parents' satisfaction with PA in nature, so that PA interventions in the natural environment can be developed and adapted in a manner that benefits both parents and children.

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2. Materials and Methods

2.1. Participants and Instruments

It was a snowball or chain sampling. In order to characterize the different parents of preschoolers who performed PA in the natural environment, two initial items were proposed in reference to their gender and age (Table 1).

TABLE 1

Frequency distribution of the sample (N = 280).

Variable	Categories	N	%
Gender	Male	101	36.1
	Female	179	63.9
Age	Between 20 and 30	13	4.6
	Between 30 and 40	163	58.2
	Between 40 and 50	102	36.4
	Over 50	2	0.8

Note: N: Number; %: Percentage.

Also, the Spanish version of the Physical Activity Enjoyment Scale (PACES) (Moreno et al., 2008) questionnaire was utilized to gauge the level of satisfaction with PA. The instrument was adapted to Spanish through back translation and was validated through a confirmatory factor analysis (CFA), showing excellent values for both validity and comprehensibility. Likewise, its external validity was tested by correlating the final score of the instrument with the different dimensions of the Spanish version of the Behavioral Regulation in Exercise Questionnaire-2 (Murcia et al., 2007), which analyses different forms of motivation established by self-determination theory (demotivation, external regulation, introjected regulation, identified regulation and intrinsic regulation), showing mean correlations with 4 of them. The phrase "when I am active in nature (performing physical activity, physical exercise, or playing a sport...)" is placed before each of the 16 parts that make up this instrument: 1) I enjoy; 2) I get bored; 3) I don't like it; 4) I find it enjoyable; 5) It's not fun at all; 6) It gives me energy; 7) It depresses me; 8) It is very pleasant; 9) My body feels good; 10) I get something extra; 11) It is very exciting; 12) It frustrates me; 13) It's not interesting at all; 14) It gives me strong feelings; 15) I feel good; and 16) I think I should be doing something else. It employs a Likert-type scale with values from 1 to 5, where 1 represents "total disagreement" and 5 represents "full agreement". Nine of the sixteen questions pertain to accepting physical exercise positively, whereas 7 refer to rejecting PA negatively. The negative elements were reversed since the scale's application results in a score based on the sum of all the items, with 16 serving as the minimum value for a low level of enjoyment of physical exercise and 80 serving as the greatest value for that activity.

2.2. Procedure

It was chosen to create the sociodemographic and PACES data surveys using the Google Forms program. It made it easier to cut costs, provide the questionnaires to the participants, and store the

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participants' answers in the same database (Anderson & Kanuka, 2003). The data was gathered between September and December of 2022.

In order to access the sample, the Department of Education and Employment of the Regional Government of Extremadura's database of public schools in the Autonomous Community of Extremadura (Spain) was used (available at: http://estadisticaeducativa.educarex.es/?centros/ensenanzas/&curso=17&ensenanza_centro=101200001 accessed on September 2022). Contact information was chosen for centers offering the second stage of early childhood education (3 to 6 years). The early childhood education teachers were then informed about the study and asked to collaborate through email. The informed consent form, which needed to be signed by the participants (parents), was issued to the schools with an interest in taking part. Likewise, the centers were provided with the sample inclusion criteria to formalize the questionnaire: 1) having a preschool-age child; 2) performing physical activity in nature at least 3 times a week for 30 minutes; and 3) having the technological resources to access the online questionnaire.

The educational platform of the Regional Government of Extremadura (https://rayuela.educarex.es/) was also used to inform parents of those centers that accepted to collaborate about the objective of the study and to provide a form that asked about different questions related to the inclusion criteria. If the respondents met the inclusion criteria, the same message redirected them to the research participation acceptance form, and later, to the informed consent. Once the parents agreed to participate and signed the informed consent form, they were provided with the PACES questionnaire in electronic format by an URL, which also included the sociodemographic questions. The average time to answer the questionnaire was about 7 minutes. Data were gathered between April and May 2022.

Of the 400 parents initially contacted, only 100 of them met the inclusion criteria and responded to the questionnaire, so the response rate was 25%. Then, it was decided to resend the email and call the center notifying them of the study and the procedures for participating in it because the response rate was insufficient during the first month. Therefore, 200 more parents were contacted, of which 180 met the inclusion criteria and subsequently completed the questionnaire. As a result, the final response rate was 47%.

2.3. Statistical Analysis

The free statistical program FACTOR (v.10.10.02, Rovira I Virgili University: Tarragona, Spain) (Ferrando & Lorenzo-Seva, 2017, p. 10) was used for the exploratory factor analysis (EFA) as well as the Promin method (Lorenzo-Seva & Ferrando, 2019) for factor extraction, taking into account the ordinal character of the scale and of the information extracted from it using a Likert scale. Due to low normality values ($p < .001$), the robust unweighted least squares (RULS) (Unkel & Trendafilov, 2010) approach and polychoric correlation matrix (Morata-Ramírez & Holgado-Tello, 2013) were utilized to define the factor model. Through the most effective application of parallel analysis (Hayton et al., 2004), the appropriate number of dimensions was established. The Kaiser-Meyer-Olkin (KMO) and Bartlett's tests of sphericity were used as sampling adequacy criteria (Kang, 2013).

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The software program AMOS v.26.0.0 was then used to do the CFA (IBM Corporation, Wexford, PA, USA). The components with crossloads greater than 0.40, communalities lower than 0.30 and loads lower than 0.60 were eliminated (Brown, 2015). Indicators were employed to gauge the model's goodness-of-fit, including: 1) the root mean square error of approximation (RMSEA) (Shi et al., 2020); 2) the root mean square of residuals (RMSR) (DiStefano et al., 2018); 3) the comparative fit index (CFI) (Bentler, 1990); 4) the non-normed fit index (NNFI) (Yadama & Pandey, 1995); 5) the chi-square per degree of freedom ratio (CMIN/DF) (García-Santillán et al., 2012); and 6) a chi-squared probability indicating sufficient nonsignificant results ($p > .05$) (Marcoulides, 1990). Additionally, reliability indices such as Cronbach's alpha and McDonald's omega were employed to assess the questionnaire's final solution (Dunn et al., 2014).

3. Results

Table 2 shows the descriptive statistics for each of the questionnaire items. The findings indicate that, in general, participants tend to agree with the positive statements about nature activity, as reflected in the high means, ranging from 4.15 to 4.84 on a Likert scale of 1 to 5. The variability of responses, indicated by the standard deviations and variances, is relatively low for most of the items, implying a consistency in participants' responses. This pattern of responses suggests a predominantly positive perception towards nature activity on the part of the participants.

TABLE 2

Descriptive statistics by item.

When I'm active in nature...	Mean	SD	Variance
1. I enjoy	4.60	0.62	0.38
2. I get bored	4.71	0.68	0.47
3. I don't like it	4.60	0.99	0.99
4. I find it enjoyable	4.64	0.64	0.41
5. It's no fun at all	4.75	0.72	0.52
6. It gives me energy	4.28	1.04	1.08
7. It depresses m	4.84	0.55	0.30
8. It is very pleasant	4.65	0.68	0.47
9. My body feels good	4.71	0.63	0.39
10. I get something extra	4.39	0.92	0.86
11. It is very exciting	4.15	0.90	0.82
12. It frustrates me	4.63	0.70	0.49
13. It's not interesting at all	4.78	0.59	0.35
14. It gives me strong feelings	4.43	0.87	0.76
15. I feel good	4.76	0.60	0.36
16. I think I should be doing something else	4.44	0.87	0.76

Note: SD = Standard Deviation. Each score obtained is based on a Likert scale (1–5): 1 is "Strongly disagree" and 5 "Strongly agree".

With the help of the explained variance based on eigenvalues (Steger, 2006) (Table 3) and the reliability of expected a posteriori scores (EAP) (Zitzmann & Helm, 2021), the RULS approach was able to identify a monofactorial structure for the questionnaire.

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TABLE 3

Eigenvalue-based explained variance, variance proportion and EAP reliability.

Variable	Eigenvalue	Proportion of Variance	EAP Reliability
1	8.43	0.52	
2	1.22	0.07	
3	1.04	0.06	
4	0.96	0.06	
5	0.81	0.05	
6	0.62	0.03	
7	0.56	0.03	
8	0.51	0.03	0.952
9	0.45	0.02	
10	0.34	0.02	
11	0.28	0.01	
12	0.25	0.01	
13	0.17	0.01	
14	0.14	<0.01	
15	0.09	<0.01	
16	0.04	<0.01	

Due to the one-dimensional nature, no rotation technique was chosen. The sampling adequacy indicators that produced positive results (KMO test = 0.791 and Bartlett test = 3141.1; df = 120; p = .000) were used to examine the feasibility of the EFA. The loading matrix for sixteen elements and one factor is shown in Table 4.

TABLE 4

Loading matrix extracted from EFA.

When I'm active in nature...	Factor
1. I enjoy	0.848
2. I get bored	0.703
3. I don't like it	0.814
4. I find it enjoyable	0.835
5. It's no fun at all	0.693
6. It gives me energy	0.890
7. It depresses me	0.648
8. It is very pleasant	0.685
9. My body feels good	0.649
10. I get something extra	0.533
11. It is very exciting	0.725
12. It frustrates me	0.718
13. It's not interesting at all	0.626
14. It gives me strong feelings	0.542
15. I feel good	0.530
16. I think I should be doing something else	0.731

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Because no problematic items were detected, a one-factor, 16-item structure was extracted from the EFA. The polychoric correlation matrix that describes the make-up of the questionnaire is shown in Table 5.

TABLE 5

Polychoric correlation matrix.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1															
2	0.70	1														
3	0.69	0.59	1													
4	0.76	0.66	0.77	1												
5	0.58	0.36	0.62	0.63	1											
6	0.78	0.64	0.70	0.80	0.70	1										
7	0.55	0.46	0.50	0.53	0.54	0.64	1									
8	0.64	0.48	0.51	0.49	0.33	0.57	0.43	1								
9	0.53	0.44	0.56	0.43	0.38	0.42	0.51	0.64	1							
10	0.37	0.53	0.28	0.31	0.32	0.46	0.44	0.28	0.48	1						
11	0.58	0.32	0.58	0.60	0.60	0.69	0.47	0.49	0.50	0.41	1					
12	0.52	0.57	0.60	0.59	0.39	0.64	0.33	0.51	0.50	0.43	0.46	1				
13	0.58	0.34	0.44	0.37	0.49	0.53	0.45	0.44	0.36	0.54	0.43	0.54	1			
14	0.44	0.27	0.35	0.45	00.46	0.36	0.25	0.30	0.30	0.42	0.44	0.39	0.55	1		
15	0.38	0.36	0.46	0.47	0.36	0.47	0.31	0.38	0.25	0.11	0.37	0.48	0.21	0.40	1	
16	0.54	0.52	0.64	0.61	0.41	0.64	0.35	0.61	0.52	0.31	0.56	0.54	0.38	0.42	0.53	1

Figure 1 depicts the questionnaire's final structure, which consists of 16 items all encompassed in a single factor. It displays the following values, from left to right: (1) correlation between factors; (2) standardized regression weights; (3) squared multiple correlations of each variable; and (4) correlations between exogenous variables (tables).

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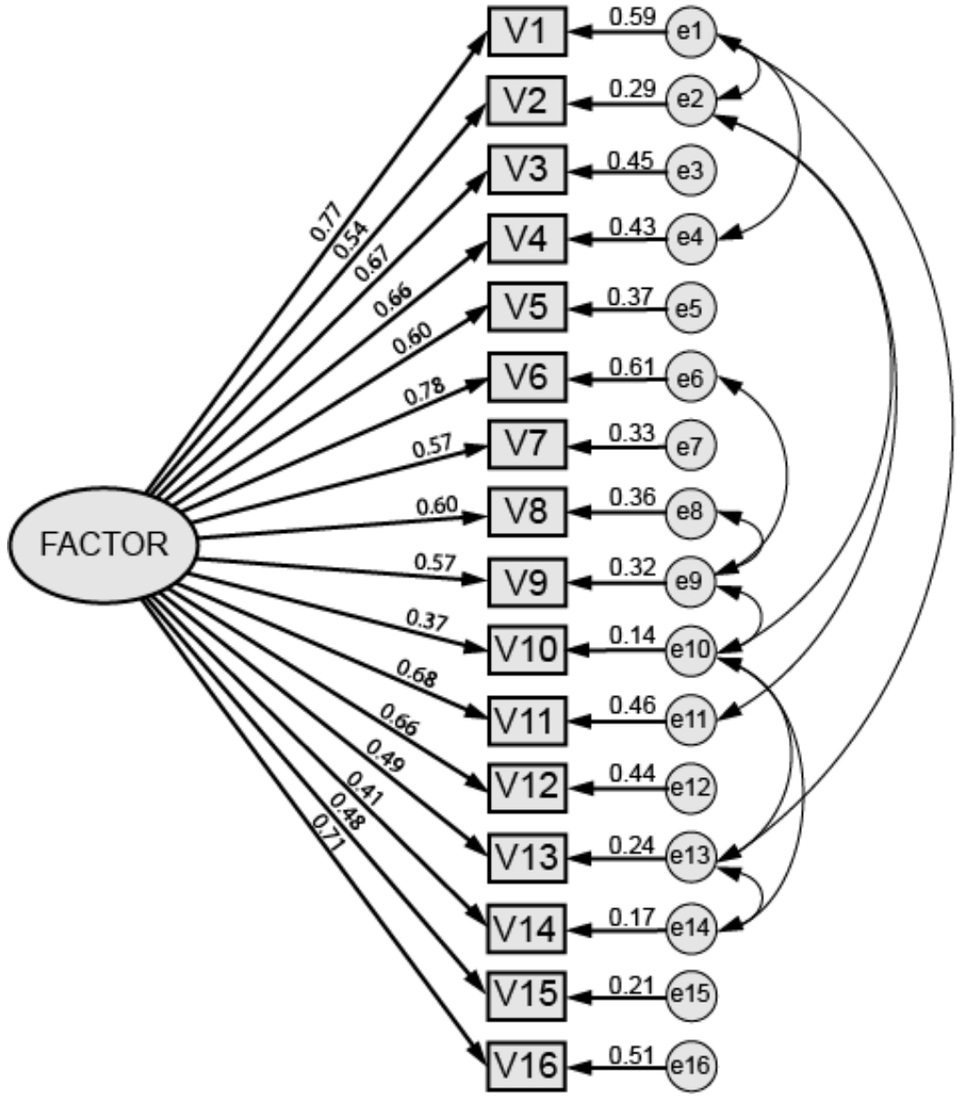

Factor	
e1 <--> e2	0.18
e1 <--> e4	0.23
e1 <--> e13	0.18
e2 <--> e10	0.34
e2 <--> e11	-0.26
e6 <--> e9	-0.24
e8 <--> e9	0.25
e9 <--> e10	0.22
e10 <--> e13	0.28
e10 <--> e14	0.23
e13 <--> e14	0.32

Figure 1. Factor structure of the questionnaire.

Table 6 displays the goodness-of-fit indices for the scale after the CFAs (Sun, 2005), showing all of them an excellent fit between the data and the model (Maydeu-Olivares et al., 2017). The nonsignificant values contributed to the outstanding chi-squared probability. Additionally, the RMSEA was within the optimal range (0.010-0.050), and the RMSR, at less than 0.08, qualified as accurate. The CMIN/DF index also exhibited excellent values given that it must be less than 2 to be an acceptable model fit. NNFI and CFI values greater than 0.9 demonstrated a good fit to the model.

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TABLE 6

Goodness-of-fit indices extracted from the CFA.

Indices	Value
RMSEA	0.048
RMSR	0.027
CFI	0.951
NNFI	0.904
CMIN/DF	1.930
P (χ2)	0.907

Table 7 describes the reliability indices of the questionnaire through Cronbach's Alpha, McDonald's Omega and explained variance.

TABLE 7

Questionnaire reliability.

Indicator	Value
Cronbach's Alpha	0.89
McDonald's Omega	0.89
Explained Variance	7.98

4. Discussion

This research aims to provide a valid and reliable tool to assess the satisfaction of parents to carry out PA in the natural environment, to know how the condition of parenthood affects this healthy habit. The results reported a final monofactorial structure composed of 16 items. This instrument also reported excellent goodness-of-fit indices and satisfactory internal consistency values. Compared to the initial study (Kendzierski & DeCarlo, 1991), the results are very similar in terms of internal consistency (Cronbach's alpha = .93), however, the sample studied was only 60 people and the questionnaire had 2 more items than the current one. These results are consistent with those presented later by Crocker et al. (1995) who conducted a factor analysis of the scale in adolescents participating in summer sports camps, keeping the same number of items in the instrument and finding similar internal consistency values, but limited goodness-of-fit indices after CFA. Similarly, Motl et al. (2001) adapted and validated this scale in more than 1000 adolescents involved in exercise programs within the educational context, being the first to reduce the scale to 16 items and assessing the possible differences between a bifactorial or monofactorial structure. The results showed that although the bifactor structure reported excellent values, they were greatly improved by the monofactorial structure of the questionnaire. In this sense, (Moore et al., 2009) who replicated the previous study, found the same results in favor of the single-factor structure when exploring the psychometric properties of the scale in children. By contrast, the CFA carried out by Latorre-Román et al. (2014), found

a bifactorial structure composed of 16 items for the PACES scale in asthmatic children participating in PA therapy programs.

After the initial success of the scale, several international research groups focused their efforts on adapting the instrument to their native languages, finding results that differed from those of this study and from those reported in the scientific literature. Carraro et al. (2008), carried out the adaptation of this tool to the Italian language in 6000 adolescents, exploring the composition of 16 items and housed in a bifactorial structure. However, the internal consistency values were not as good as in previous research (0.78-0.88) and the goodness-of-fit indices were at the limit of what was recommended by experts. Following this trend, Moreno et al. (2008) adapted the 16-item scale to the Spanish language in a sample of adolescents and adults. This research found very similar results to the present study through factor analysis, yielding a 16-item scale with a single-factor structure and excellent goodness-of-fit indicators. Similarly, Alves et al. (2019) carried out the translation, adaptation and reproducibility of the PACES scale into Portuguese, establishing satisfactory reliability values without being able to perform a validation by confirmatory analysis due to the sample size.

Subsequently, the experts determined the need to reduce the domain of analysis of the instrument, resulting in different reduced versions of the questionnaire. In this sense, Mullen et al. (2011) were the first to reduce the scale to 8 items in order to make it comprehensible to different groups of older adults. This research found excellent values for both reliability and goodness-of-fit indicators, even confirming the invariance of the instrument across different groups and assessment times (longitudinal invariance). To the same extent, Teques et al. (2020) validated this reduced version of 8 items in Portuguese adults from different fitness centers, finding almost identical results as the previous study. Rodrigues et al. (2021) went a step further, showing that this reduced version of 8 items showed better psychometric properties when divided into 2 factors and demonstrating its invariance when comparing responses in both genders in Portuguese adults belonging to different fitness centers.

4.1. Limitations and Future Lines of Research

The study has certain limitations. First, the results obtained from convenience sampling should be interpreted with caution. Next, the different participants who answered the questionnaire all resided in the Autonomous Community of Extremadura (Spain), so there may be certain sociodemographic or cultural variables that influence the scores. Similarly, the PA levels of the parents of the preschoolers were not explored. Also, direct data collection techniques, such as in-person interviews, which provide more accurate and dependable results than telephone or internet surveys, were not used in this study. Finally, this research is characterized by its preliminary nature, since instrument validation is a process that takes times to develop.

As future lines of research, it is clear that the validation of the questionnaire should be extended to the entire national territory. This will make it possible to analyze whether there are socio-demographic characteristics of both parents and children that influence the levels of satisfaction with PA in the natural environment (Gomez-Baya et al., 2018). In addition, broadening the age range of children may be relevant in order to understand from what age they influence parental satisfaction. It would also be interesting to explore the levels of satisfaction when both parents and children engage in PA

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in nature together, as previous studies have indicated that certain types of interventions are more effective when both parents and children are involved (Ling et al., 2016).

5. Conclusions

The current research analyses the psychometric properties, validity and reliability of a questionnaire to determine the satisfaction of parents of preschool children with PA in the natural environment. The results yielded a single-factor structure composed of 16 items, with excellent goodness-of-fit indices and good reliability indicators. Therefore, this scale can be considered as a useful tool for the purpose of assessing parents' satisfaction with PA in nature. In this way, public and private institutions will be able to design PA programs that satisfy both parents and children, increasing their health levels, their PA levels and different social and affective capacities.

6. Author Contributions

Conceptualization, J.R.-R.; Formal analysis, C.M.-I.; Investigation, J. R.-R.; Methodology, I.P.-C. and C.G.-A.; Resources, C.M.-I.; Software, J.R.-R.; Supervision, C.G.-A.; Validation, I.P.-C. and C.M.-I.; Writing – original draft, J.R.-R.; Writing – review & editing, J.R.-R. and C.G.-A. All authors have read and agreed to the published version of the manuscript.

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8. Institutional Review Board Statement

The use of these data did not require approval from an accredited ethics committee, as they are not covered by data protection principles, i.e., they are non-identifiable, anonymous data collected through an anonymous survey for teachers. In addition, based on Regulation (EU) 2016/679 of the European Parliament and of the Council on 27 April 2016 on the protection of individuals concerning the processing of personal data and on the free movement of such data (which entered into force on 25 May 2016 and has been compulsory since 25 May 2018), data protection principles do not need to be applied to anonymous information (i.e., information related to an identifiable natural person, nor to data of a subject that is not, or is no longer, identifiable). Consequently, the Regulation does not affect the processing of our information. Even for statistical or research purposes, its use does not require the approval of an accredited ethics committee.

9. Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

10. Data Availability Statement

The datasets are available through the corresponding author on reasonable request.

11. Conflicts of Interest

The authors declare no conflict of interest.

12. References

Alves, E. D., Panissa, V. L. G., Barros, B. J., Franchini, E., & Takito, M. Y. (2019). Translation, adaptation, and reproducibility of the Physical Activity Enjoyment Scale (PACES) and Feeling Scale to Brazilian Portuguese. *Sport Sciences for Health*, *15*(2), 329-336. https://doi.org/10.1007/s11332-018-0516-4

Anderson, T., & Kanuka, H. (2003). *E-research: Methods, strategies, and issues* (Nachdr.). Allyn and Bacon.

Baldwin, A. S., Baldwin, S. A., Loehr, V. G., Kangas, J. L., & Frierson, G. M. (2013). Elucidating satisfaction with physical activity: An examination of the day-to-day associations between experiences with physical activity and satisfaction during physical activity initiation. *Psychology & Health*, *28*(12), 1424-1441. https://doi.org/10.1080/08870446.2013.822078

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238-246. https://doi.org/10.1037/0033-2909.107.2.238

Berman, M. G., Jonides, J., & Kaplan, S. (2008). The Cognitive Benefits of Interacting With Nature. *Psychological Science*, *19*(12), 1207-1212. https://doi.org/10.1111/j.1467-9280.2008.02225.x

Berman, M. G., Kross, E., Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., Kaplan, S., Sherdell, L., Gotlib, I. H., & Jonides, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of Affective Disorders*, *140*(3), 300-305. https://doi.org/10.1016/j.jad.2012.03.012

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health*, *10*(1), 456. https://doi.org/10.1186/1471-2458-10-456

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (Second edition). The Guilford Press.

Carraro, A., Young, M. C., & Robazza, C. (2008). A contribution to the validation of the physical activity enjoyment scale in an Italian sample. *Social Behavior and Personality: An International Journal*, *36*(7), 911-918. https://doi.org/10.2224/sbp.2008.36.7.911

Carrión, A. C., Mañes, R. J. M., & Sala, F. G. (2000). Estudio de la satisfacción personal según la edad de las personas. *Anales de Psicología / Annals of Psychology*, *16*(2), Art. 2.

Crocker, P. R. E., Bouffard, M., & Gessaroli, M. E. (1995). Measuring Enjoyment in Youth Sport Settings: A Confirmatory Factor Analysis of the Physical Activity Enjoyment Scale. *Journal of Sport and Exercise Psychology*, *17*(2), 200-205. https://doi.org/10.1123/jsep.17.2.200

Cunningham, G. B. (2007). Development of the Physical Activity Class Satisfaction Questionnaire (PACSQ). *Measurement in Physical Education and Exercise Science*, *11*(3), 161-176. https://doi.org/10.1080/10913670701326443

Dishman, R. K., Vandenberg, R. J., Motl, R. W., Wilson, M. G., & DeJoy, D. M. (2010). Dose relations between goal setting, theory-based correlates of goal setting and increases in physical activity during a workplace trial. *Health Education Research*, *25*(4), 620-631. https://doi.org/10.1093/her/cyp042

DiStefano, C., Liu, J., Jiang, N., & Shi, D. (2018). Examination of the weighted root mean square residual: Evidence for trustworthiness? *Structural Equation Modeling: A Multidisciplinary Journal*, *25*(3), 453-466. https://doi.org/10.1080/10705511.2017.1390394

Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, *105*(3), 399-412. https://doi.org/10.1111/bjop.12046

Ferrando, P. J., & Lorenzo-Seva, U. (2017). Program FACTOR at 10: Origins, development and future directions. *Psicothema*, *29*(2), 236-240. https://doi.org/10.7334/psicothema2016.304

Fleig, L., Lippke, S., Pomp, S., & Schwarzer, R. (2011). Exercise maintenance after rehabilitation: How experience can make a difference. *Psychology of Sport and Exercise*, *12*(3), 293-299. https://doi.org/10.1016/j.psychsport.2011.01.003

García-Santillán, A., Escalera-Chávez, M. E., & Córdova-Rangel, A. (2012). Variables to measure interaction among mathematics and computer through structural equation modeling. *Journal of Applied Mathematics and Bioinformatics*, *2*(3), 51-67.

Gomez-Baya, D., R. Mendoza, R., & Tomico, A. (2018). The prospective relationship of sport and physical activity with life satisfaction after a one-year follow-up: An examination of gender differences during mid-adolescence. *Cuadernos de Psicología Del Deporte*, *18*(2), 169-186.

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and Health. *Annual Review of Public Health*, *35*(1), 207-228. https://doi.org/10.1146/annurev-publhealth-032013-182443

Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods*, *7*(2), 191-205. https://doi.org/10.1177/1094428104263675

Joseph, R. P., & Maddock, J. E. (2016). Observational Park-based physical activity studies: A systematic review of the literature. *Preventive Medicine*, *89*, 257-277. https://doi.org/10.1016/j.ypmed.2016.06.016

Kang, H. (2013). A Guide on the Use of Factor Analysis in the Assessment of Construct Validity. *Journal of Korean Academy of Nursing*, *43*(5), 587. https://doi.org/10.4040/jkan.2013.43.5.587

Kendzierski, D., & DeCarlo, K. J. (1991). Physical Activity Enjoyment Scale: Two Validation Studies. *Journal of Sport and Exercise Psychology*, *13*(1), 50-64. https://doi.org/10.1123/jsep.13.1.50

Latorre-Román, P. Á., García-Pinillos, F., Navarro-Martínez, A. V., & Izquierdo-Rus, T. (2014). Validity and reliability of Physical Activity Enjoyment Scale questionnaire (PACES) in children with asthma. *Journal of Asthma*, *51*(6), 633-638. https://doi.org/10.3109/02770903.2014.898773

Lemes, V. B., Araujo Gaya, A. C., Brand, C., Dias, A. F., Cristi-Montero, C., Mota, J., & Gaya, A. R. (2021). Associations among psychological satisfaction in physical education, sports practice, and health indicators with physical activity: Direct and indirect ways in a structural equation model proposal. *International Journal of Pediatrics and Adolescent Medicine*, *8*(4), 246-252. https://doi.org/10.1016/j.ijpam.2020.11.004

Leventhal, H., Weinman, J., Leventhal, E. A., & Phillips, L. A. (2008). Health Psychology: The Search for Pathways between Behavior and Health. *Annual Review of Psychology*, *59*(1), 477-505. https://doi.org/10.1146/annurev.psych.59.103006.093643

Ling, J., Robbins, L. B., & Wen, F. (2016). Interventions to prevent and manage overweight or obesity in preschool children: A systematic review. *International Journal of Nursing Studies*, *53*, 270-289. https://doi.org/10.1016/j.ijnurstu.2015.10.017

Lorenzo-Seva, U., & Ferrando, P. J. (2019). Robust Promin: A method for diagonally weighted factor rotation. *Liberabit: Revista Peruana de Psicología*, *25*(1), 99-106. https://doi.org/10.24265/liberabit.2019.v25n1.08

Marcoulides, G. A. (1990). Evaluation of Confirmatory Factor Analytic and Structural Equation Models Using Goodness-of-Fit Indices. *Psychological Reports*, *67*(2), 669-670. https://doi.org/10.2466/pr0.1990.67.2.669

Markevych, I., Schoierer, J., Hartig, T., Chudnovsky, A., Hystad, P., Dzhambov, A. M., de Vries, S., Triguero-Mas, M., Brauer, M., Nieuwenhuijsen, M. J., Lupp, G., Richardson, E. A., Astell-Burt, T., Dimitrova, D., Feng, X., Sadeh, M., Standl, M., Heinrich, J., & Fuertes, E. (2017). Exploring pathways linking greenspace to health: Theoretical and methodological guidance. *Environmental Research*, *158*, 301-317. https://doi.org/10.1016/j.envres.2017.06.028

Maydeu-Olivares, A., Fairchild, A. J., & Hall, A. G. (2017). Goodness of Fit in Item Factor Analysis: Effect of the Number of Response Alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *24*(4), 495-505. https://doi.org/10.1080/10705511.2017.1289816

Moore, J. B., Yin, Z., Hanes, J., Duda, J., Gutin, B., & Barbeau, P. (2009). Measuring Enjoyment of Physical Activity in Children: Validation of the Physical Activity Enjoyment Scale. *Journal of Applied Sport Psychology*, *21*(sup1), S116-S129. https://doi.org/10.1080/10413200802593612

Moore, M., Gould, P., & Keary, B. S. (2003). Global urbanization and impact on health. *International Journal of Hygiene and Environmental Health*, *206*(4-5), 269-278. https://doi.org/10.1078/1438-4639-00223

Morata-Ramírez, M. de los Á., & Holgado-Tello, F. P. (2013). Construct Validity of Likert Scales through Confirmatory Factor Analysis: A Simulation Study Comparing Different Methods of Estimation Based on Pearson and Polychoric Correlations. *International Journal of Social Science Studies*, *1*(1), p54-61. https://doi.org/10.11114/ijsss.v1i1.27

Moreno, J.-A., González-Cutre, D., Martínez, C., Alonso, N., & López, M. (2008). Psychometric properties of the Physical Activity Enjoyment Scale (PACES) in the Spanish context. *Studies in Psychology*, *29*(2), 173-180. https://doi.org/10.1174/021093908784485093

Motl, R. W., Dishman, R. K., Saunders, R., Dowda, M., Felton, G., & Pate, R. R. (2001). Measuring enjoyment of physical activity in adolescent girls. *American Journal of Preventive Medicine*, *21*(2), 110-117. https://doi.org/10.1016/S0749-3797(01)00326-9

Mullen, S. P., Olson, E. A., Phillips, S. M., Szabo, A. N., Wójcicki, T. R., Mailey, E. L., Gothe, N. P., Fanning, J. T., Kramer, A. F., & McAuley, E. (2011). Measuring enjoyment of physical activity in older adults: Invariance of the physical activity enjoyment scale (paces) across groups and time. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 103. https://doi.org/10.1186/1479-5868-8-103

Murcia, J. a. M., Gimeno, E. C., & Camacho, A. M. (2007). Measuring self-determination motivation in a physical fitness setting: Validation of the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2) in a Spanish sample. *The Journal of Sports Medicine and Physical Fitness*, *47*(3), 366-374.

Nilsson, K., Sangster, M., Gallis, C., Hartig, T., de Vries, S., Seeland, K., & Schipperijn, J. (2011). *Forests, Trees and Human Health*. Springer Netherlands. https://doi.org/10.1007/978-90-481-9806-1

World Health Organization. (25 November 2020). *WHO guidelines on physical activity and sedentary behaviour*. World Health Organization. https://www.who.int/publications/i/item/9789240015128

Passmore, H.-A., & Howell, A. (2014). Nature involvement increases hedonic and eudaimonic well-being: A two-week experimental study. *Ecopsychology*, *6*, 148-154. https://doi.org/10.1089/eco.2014.0023

Paxton, R. J., Nigg, C., Motl, R. W., Yamashita, M., Chung, R., Battista, J., & Chang, J. (2008). Physical Activity Enjoyment Scale Short Form—Does It Fit for Children? *Research Quarterly for Exercise and Sport*, *79*(3), 423-427. https://doi.org/10.1080/02701367.2008.10599508

Pretty, J., Griffin, M., Sellens, M. H., & Pretty, C. G. (2003). *Green Exercise: Complementary Roles of Nature, Exercise and Diet in Physical and Emotional Well-Being and Implications for Public Health Policy*. Essex: Centre for Environment and Society University of Essex.

Pretty, J., Peacock, J., Hine, R., Sellens, M., South, N., & Griffin, M. (2007). Green exercise in the UK countryside: Effects on health and psychological well-being, and implications for policy and planning. *Journal of Environmental Planning and Management*, *50*(2), 211-231. https://doi.org/10.1080/09640560601156466

Rodrigues, F., Forte, P., Teixeira, D. S., Cid, L., & Monteiro, D. (2021). The Physical Activity Enjoyment Scale (Paces) as a Two-Dimensional Scale: Exploratory and Invariance Analysis. *Montenegrin Journal of Sports Science and Medicine*, *10*(1), 61-66. https://doi.org/10.26773/mjssm.210309

Rothman, A. J., Baldwin, A., & Hertel, A. (2004). Self-regulation and behavior change: Disentangling behavioral initiation and behavioral maintenance: Research, Theory, and Applications. En K. Vohs & R. Baumeister (Eds.), *The handbook of self-regulation: Research, Theory, and Applications* (pp. 130-148). Guilford Press.

Shanahan, D. F., Astell-Burt, T., Barber, E. A., Brymer, E., Cox, D. T., Dean, J., ... & Gaston, K. J. (2019). Nature–based interventions for improving health and wellbeing: The purpose, the people and the outcomes. *Sports*, *7*(6), 141. https://doi.org/10.3390/sports7060141

Shi, D., Maydeu-Olivares, A., & Rosseel, Y. (2020). Assessing Fit in Ordinal Factor Analysis Models: SRMR vs. RMSEA. *Structural Equation Modeling: A Multidisciplinary Journal*, *27*(1), 1-15. https://doi.org/10.1080/10705511.2019.1611434

Steger, M. F. (2006). An Illustration of Issues in Factor Extraction and Identification of Dimensionality in Psychological Assessment Data. *Journal of Personality Assessment*, *86*(3), 263-272. https://doi.org/10.1207/s15327752jpa8603_03

Sun, J. (2005). Assessing goodness of fit in confirmatory factor analysis. *Measurement and Evaluation in Counseling and Development*, *37*(4), 240-256. https://doi.org/10.1080/07481756.2005.11909764

Sundquist, K., Frank, G., & Sundquist, J. (2004). Urbanisation and incidence of psychosis and depression: Follow-up study of 4.4 million women and men in Sweden. *British Journal of Psychiatry*, *184*(4), 293-298. https://doi.org/10.1192/bjp.184.4.293

Teques, P., Calmeiro, L., Silva, C., & Borrego, C. (2020). Validation and adaptation of the Physical Activity Enjoyment Scale (PACES) in fitness group exercisers. *Journal of Sport and Health Science*, *9*(4), 352-357. https://doi.org/10.1016/j.jshs.2017.09.010

Thompson-Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does Participating in Physical Activity in Outdoor Natural Environments Have a Greater Effect on Physical and

Mental Wellbeing than Physical Activity Indoors? A Systematic Review. *Environmental Science & Technology*, *45*(5), 1761-1772. https://doi.org/10.1021/es102947t

Unkel, S., & Trendafilov, N. T. (2010). A majorization algorithm for simultaneous parameter estimation in robust exploratory factor analysis. *Computational Statistics & Data Analysis*, *54*(12), 3348-3358. https://doi.org/10.1016/j.csda.2010.02.003

Ward-Thompson, C., Roe, J., Aspinall, P., Mitchell, R., Clow, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning*, *105*(3), 221-229. https://doi.org/10.1016/j.landurbplan.2011.12.015

Wilson, P. M., Rogers, W. T., Rodgers, W. M., & Wild, T. C. (2006). The Psychological Need Satisfaction in Exercise Scale. *Journal of Sport and Exercise Psychology*, *28*(3), 231-251. https://doi.org/10.1123/jsep.28.3.231

Wu, X. Y., Han, L. H., Zhang, J. H., Luo, S., Hu, J. W., & Sun, K. (2017). The influence of physical activity, sedentary behavior on health-related quality of life among the general population of children and adolescents: A systematic review. *PLoS ONE*, *12*(11), e0187668. https://doi.org/10.1371/journal.pone.0187668

Yadama, G. N., & Pandey, S. (1995). Effect of Sample Size on Goodness-Fit of-Fit Indices in Structural Equation Models. *Journal of Social Service Research*, *20*(3-4), 49-70. https://doi.org/10.1300/J079v20n03_03

Zitzmann, S., & Helm, C. (2021). Multilevel Analysis of Mediation, Moderation, and Nonlinear Effects in Small Samples, Using Expected a Posteriori Estimates of Factor Scores. *Structural Equation Modeling: A Multidisciplinary Journal*, *28*(4), 529-546. https://doi.org/10.1080/10705511.2020.1855076