

## Parenting styles and the connection with nature: A look into a nature program

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**Abstract:** Currently, there seems to be a decline in direct experiences of nature, with a consequent decrease in connection with nature, which could unavoidably result in negative consequences, especially in what concerns children. With the goal of narrowing this ever-growing gap, as well as raising awareness for the importance of outdoor spaces/nature as promoters of development and learning, the Invisible Limits Project (IL) was founded. Thus, the present investigation aimed to better understand the enrollment motives, sociodemographic variables, parenting styles and Nature Relatedness (NR) of parents who enrolled their children in IL, as well as to analyze these same variables and identify parent profiles based on NR and frequency of nature contact, while additionally attempting to ascertain the role of contact with nature as a predictor of NR, all in an effort to rethink and improve existing educational offers. The investigation follows a comparative typology, counting 286 total participants, divided into an experimental group (n=135) - comprised of those who enrolled their children in IL - and a control group (n=151), to which the previous criterion did not apply. For the statistical analysis of the collected data, IBM SPSS Statistics v25, jamovi v1.6, JASP 0.16.1.0 and MaxQDA v2020.4 were used. In what pertains to the results, the main reason for parents to enrol their children in an educational experience in nature was the promotion of contact with nature. Additionally, there were no observable differences between groups, regarding both parenting styles and NR. Concomitantly, frequent contact with nature (both during childhood and throughout life) was determined to be a predictor of a higher NR. In view of the results and in view of the current climate changes, as well as life's sustainability on the planet, further studies are required, in order to better understand one's connection with nature.

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### Introduction

For generations now, Scandinavian countries have advocated for the importance of nature and outdoor spaces in children's and young people's education (Bentsen et al., 2009). Due to the socioeconomic, historical and cultural conditions, Wood or Nature Kindergarten emerged in Scandinavia in the 1950's (*Forest Schools* in England). Its pedagogical practices were based upon several theorists such as Rousseau, Pestalozzi, Froebel, Dewey, Montessori, Piaget, Vigotsky, Goleman, Gardner e Csikszentmihalyi, which contributed to its seven principles: [1] a holistic approach to child development and learning; [2] each child is unique and competent; [3] children are naturally active and interactive learners; [4] they need real life and to experience it for themselves; [5] children develop and learn in child-centered contexts; [6] children need time to experiment and develop independent thinking and [7] learning comes from social interaction (Williams-Siegfredsen, 2012).

Inspired by the Nature Kindergartens, the Invisible Limits Project (IL) emerged in Portugal, in February 2016 as a partnership between the Department of Education and Psychology of the University of Aveiro (DEP-UA), the Higher School of Education from the Polytechnic Institute of Coimbra (ESEC-IPC)

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and a private social solidarity institution, Centro de Apoio Social de Pais e Amigos da Escola nº 10 (CASPAE-10), with the support of the Nature and Forests Conservation Institute (ICNF). IL aims to raise awareness and motivate children, families and educative communities to the importance of nature and outdoor spaces as enabling contexts of children and young people's well-being, learning and development. Also, IL advocates a pedagogical approach centered on emergent planning, which is based on the free initiative, interests and abilities of children, who by playing and exploring their environment in their own time and at their own pace attribute meaning and create representations of the surrounding world, thus allowing them a better understanding of it and consequent respect and care (Coelho et al., 2015; Figueiredo et al., 2021).

IL includes three axes of action: 1) Educational Intervention, 2) Research/Monitoring, 3) Contextual training/Consultant. The first axis consists of nature education programs, namely Programa Casa da Mata [PCM] and Summer Camps- Campos de Férias [CF]. PCM is developed in complementarity to the childhood education offer, held during the school period, in articulation with preschools and aimed at children from 3 to 6 years old, with their participation being their parents' decision. CF is a non-formal offer intended for children between 6 and 12 years old, held during non-school periods and whose participation is also of parental responsibility. Both offers take place in Mata Nacional do Choupal, in Coimbra. This space has an area of 79 hectares, follows the Mondego river for a length of 2 km and is rich in fauna and flora, consequently being considered a protected area. The predominant flora includes plane trees, beeches, laurels and eucalyptus, as well as some species planted during the 19th century (Figueiredo et al., 2021).

Nature assumes an essential role in IL offers, thus making it imperative to clarify this concept, as well as to define and classify the possible types of nature experiences that can occur.

### **Nature and Types of Nature Experiences**

According to the American Psychological Association (APA, 2020), nature integrates the phenomena of the natural world, including plants, non-human animals and physical aspects, as opposed to humans and their creations. Kellert (2002) argues the existence of three types of nature experiences, namely: 1) direct experiences; 2) indirect experiences; and 3) vicarious or symbolic experiences.

Direct experiences (1) include physical contact with nature and non-human living species and their respective habitats that mostly function without human intervention and control and are not formally planned, i.e., specific activities or programs. Therefore, children's play in spaces such as forests, streams, backyards, open fields or even community parks can be considered direct experiences of nature.

Regarding indirect experiences (2), these also involve physical contact, but with more restricted contexts, planned by Man. Indirect experiences with non-human living beings and their habitats are the result of human manipulation. This type of experience include contexts such as zoos, museums, aquariums, or even botanical gardens. Contact with animals and/or contexts that are considered an integral part of the child's family life and/or home, such as contact with domestic animals (e.g., cats, dogs, birds and horses) or plants, can also be defined as an indirect experience of nature. In addition to the aforementioned, being in contact with cultivated land, flowers, orchards and farm animals, as well as with all other animals and habitats that inherently depend on human intervention to subsist, may also fall into this category (Kellert, 2002).

Lastly, vicarious or symbolic experiences (3) take place in the total absence of physical contact with nature. What the child experiences are representations or figures from nature, which are usually presented in a realistic way but may be highly stylized or metaphorical illustrations, depending on the context. Thus, these images are disseminated through the main communication channels, such as television, cinema or digital media (Kellert, 2002).

Indirect and vicarious experiences have assumed relevance in children's lives to the detriment of direct experiences, with indoor spaces being the most common in their daily lives, thus reducing opportunities for contact and action with outdoor spaces and nature (Skar et al., 2016; Soga & Gaston, 2016).

Still according to these authors, one of the reasons for this phenomenon is parents' anxiety about their children being exposed to risks that they cannot control. However, this decline in contact with nature may have fewer positive consequences for the child's development and connection with nature (Chawla, 2020). Scientific evidence points to how dependent human beings are from nature. Martin et al. (2020) restates that an individual's health, well-being and their predisposition to act in a protective way towards the planet's health is positively related to maintaining contact with nature.

In the same sense, the studies by Kuo et al. (2019) and Whitburn et al. (2019) indicate that direct experiences in a more regular and intense form foster nature connectedness and improve environmental outcomes (van de Wetering et al., 2022).

Lastly, and regardless of the type of nature experiences provided, it is undeniable that those same contacts will serve as the building blocks of one's perception of – and interaction with – nature, ergo, one's Nature Relatedness (NR), providing, as such, direct consequences in its growth and shaping.

### **Nature Relatedness**

In order to gain a better understanding of these consequences, it is imperative to develop the concept of NR, referring to the individual levels of nature connection, entailing the appreciation and understanding of the interconnectivity between all forms of life on planet Earth. It is important to mention that this construct goes beyond the appreciation of the so-called "pleasant" aspects of nature (e.g., sunset or a calming landscape) and also includes an understanding of the importance of all aspects of nature, including those considered as being less appealing by many (e.g., snakes, spiders, natural catastrophes, among others). Furthermore, NR is relatively stable over time and in situational contexts, however, it is not completely fixed (Nisbet et al., 2009). NR is not only associated with the emotional and cognitive aspects of nature contact but also with the physical aspect, viewed by Chawla (2015) as being essential in promoting the feeling of connection with nature.

Following the aforementioned and adopting an evolutionary perspective, Humanity has spent most of its history in natural spaces, having only moved to urban environments comparatively recently (Capaldi et al., 2014). Thus, NR is based on the hypothesis of biophilia (Kellert & Calabrese, 2015), in which human beings depended on nature in order to guarantee their survival and prosper in the environmental circumstances they were in. This connection was intrinsically linked to their everyday lives, through the satisfaction of basic needs (e.g., nutrition and safety); the monitoring of time and spatial location and also the attention dedicated to the observation of clues and signs in nature, in order to guarantee protection against possible predators (Capaldi et al., 2014).

In view of the above, the lack or decrease in contact with nature during childhood may lead to a decrease in the child-nature connection. Likewise, the degree of parents' nature connection and promotion of their children's nature contact, may condition the child's biophilia (Ahmetoglu, 2017), their direct experiences (Soga et al., 2018), as well as the time spent on other activities that include contact with nature (McFarland et al., 2014).

As stated above, many children's exposure to certain types of nature experiences – and, therefore, their concept of NR – can be associated with certain behaviours (e.g., anxiety, fear, etc.) from their parents, which consequently suggests that a parent's outlook on how to educate their child (parenting style) could directly influence their biophilia, their type (and amount) of nature experiences, and, in essence, their NR.

### **Parenting Styles**

Given the relevant role of parents in decisions regarding their children, it seems pertinent to properly frame the concept of father/mother. Thus, a father/mother is considered the one responsible for making decisions for and socializing their children, fostering adaptation to the social rules and standards considered appropriate in a given community (Baumrind et al., 2010). As such, the exercise of parental authority aims primarily at maintaining family order and guiding children from infancy to adulthood, which is when individuals become as self-determined, self-regulated and have emotional competences that

allow them to achieve their goals and enable their interaction with other elements of society in an adaptive way (Baumrind et al., 2010). Moreover, in order to better understand the processes through which parents influence the development of their children, it is essential to deepen the knowledge about parenting styles, which are defined through three classifications and based on different levels of control, namely: authoritative, authoritarian and permissive, according to the work developed by Baumrind (1971).

The authoritative parenting style is characterized by rational guidance of the children's activities and behavior, with an openness to dialogue and exchange of opinions, where parents try to explain their reasoning when a certain behavior or decision is made. These parents appreciate autonomy, disciplined compliance and also value their children's qualities, stipulating patterns to be adopted in future situations. In addition, these parents try to understand their children's interests, wishes and idiosyncrasies, without making a decision based on them, instead taking a firm stance in situations of disagreement with their children, but expressing their perspective without restricting or neglecting their well-being (Baumrind, 1971).

With regards to authoritarian parenting style, it can be defined by the modeling, evaluation and control of the child's behavior, based on rigid, traditional and socially established rules of conduct. Parents who adopt this parenting style place a high importance on obedience, respect for authority, work and maintaining order, using punitive strategies to deal with situations in which the child's behavior or attitude conflicts with what the parents consider to be appropriate (Baumrind, 1971).

Finally, regarding the permissive parenting style, the author stands out the adoption of non-punitive strategies and the acceptance of children's impulses, desires and behaviors (Baumrind, 1971). Parents with a predominantly permissive parenting style present themselves as a means for the fulfillment of their children's wishes, avoiding the responsibility of shaping or directing their children's behaviors. This parenting style is also characterized by joint deliberation between parents and children regarding family rules and by allowing the child to regulate his or her activities as much as possible, without the parents having to control them.

## Method

The present research followed the comparative typology, with the main objectives being: 1) to characterize the sample according to sociodemographic variables; 2) to identify the enrollment motives regarding nature experiences; 3) to characterize parents' contact with nature throughout life and during childhood; 4) to identify enrolling parents' parenting styles, as well as their NR, and 5) to identify parent profiles based on the NR, frequency of nature contact throughout life (pre-pandemic context), and frequency of nature contact during childhood variables. Thus, the main reasons given by parents for enrolling their children in the IL offers (PCM and CF) will also be analyzed. Finally, the present study will attempt to substantiate whether a greater frequency of nature contact (during childhood and throughout life) is a predictor of a greater NR.

### Participants

This study comprised a sample of 286 participants, distributed into two groups: the Experimental Group (EG; N= 135) and the Control Group (CG; N=151). The inclusion criteria for the EG and CG were being over 18 years old and having children aged between 3 and 10 years old. In addition to these criteria, the EG included parents whose children participated in at least one of the IL nature childhood educational offers (PCM and/or CF), while the CG participants had never enrolled their children in any IL offers specifically, albeit with enrollment in other types of offers (non-formal and informal). Typically, a delayed Control group, wherein the same experience would be provided after the study's conclusion, would be implemented. However, CG participants were not offered the same type of nature experiences, as most of its population was spread out over national territory (Portuguese mainland and island autonomous regions), which made IL offers impractical and implausible in this case. For the purposes of sample

characterization, a descriptive statistical analysis of the gathered data was carried out through the use of the IBM SPSS Statistics v25 software.

As far as age is concerned, the EG participants were aged between 28 and 56 years ( $M=41.87$ ;  $SD=4.00$ ) and the CG participants were aged between 20 and 65 years ( $M=38.58$ ;  $SD=6.61$ ). In regards to gender, both EG and CG are mostly women (85.9% and 84.8%, respectively), as well as married (62.2% and 66.9%, respectively). Moreover, and regarding educational level, 93.4% of EG parents have some degree of higher education, whereas in the CG distribution was essentially centered around high school (35.8%) and higher education (55%) levels. Additionally, in what concerns EG parents' gross annual income 71% earned over 15358.35€, while 23,2% of CG parents earn over 9215.01€ and up to 15358.35€, with another 36,4% earning over 15358.35€ (Table 1).

**Table 1.** Demographic characteristics of the sample

Variable	EG		CG	
	n	%	n	%
<b>Gender</b>				
Female	116	85.9	128	84.8
Male	19	14.1	23	15.2
<b>Marital Status</b>				
Married	84	62.2	101	66.9
Common-law marriage	32	23.7	23	15.2
Divorced	9	6.7	12	7.9
Single	4	3	7	4.6
Separated	6	4.4	7	4.6
Widowed	0	0	1	.7
<b>Educational Level</b>				
1 <sup>o</sup> cycle of Elementary (Year 1 - 4)	1	.7	2	1.3
2 <sup>o</sup> cycle of Elementary (Year 5 - 6)	0	0	2	1.3
3 <sup>o</sup> cycle of Elementary (Year 7 - 9)	0	0	10	6.6
Secondary Education (Year 10 - 12)	8	5.9	54	35.8
1 <sup>o</sup> , 2 <sup>o</sup> e 3 <sup>o</sup> cycles of Higher Education	126	93.4	83	55
<b>Gross Annual Income</b>				
Up to 3071.67€	11	8.1	22	14.6
Over 3071.67€ up to 6143.34€	4	3	12	7.9
Over 6143.34€ up to 9215.01€	4	3	27	17.9
Over 9215.01€ up to 15358.35€	19	14.1	35	23.2
Over 15358.35€	97	71.8	55	36.4

*n*= Sample(count)

## Instruments

Data was collected through a survey package that included a sociodemographic and nature contact information form, the PAQ-P and the *Nature Relatedness Scale* (NR-21).

### *Sociodemographic and nature contact information form*

In order to characterize the sample, a sociodemographic and nature contact questionnaire was designed, consisting of four sections: 1) role in the family nucleus (e.g., father, mother, grandmother), nationality, age, marital status, educational background, job duties (e.g., full-time employee, part-time employee), number of children and economic status of the household; 2) housing environment of the household (e.g., rural, urban, or peri-urban), accessibility to nature/nature elements and frequency of nature contact throughout life (pre-pandemic context); 3) educational experiences in nature, reasons for enrollment and unanimity among parents at the time of enrollment, and 4) parents' experiences of contact with nature as children, namely the activities they practiced, how often they had contact with nature and the main figures present at that time (e.g., parents, friends, grandparents, or cousins).

### *Parenting Styles Questionnaire for Parents (PAQ-P)*

The Parenting Styles Questionnaire for Parents (PAQ-P), a Portuguese adaptation of Burri's Parental Authority Questionnaire (1991), is based on the model of parenting styles proposed by Baumrind (1971)

and measures three dimensions: the authoritarian (items 2, 3, 7, 9, 12, 16, 18, 25, 26, 29), the permissive (items 1, 6, 10, 13, 14, 17, 19, 21, 24, 28) and the authoritative styles (items 4, 5, 8, 11, 15, 20, 22, 23, 27, 30). This instrument was developed to assess the types of parenting styles and socialization patterns between parents and children. The PAQ-P is composed of 30 items, with 10 items corresponding to each parenting style, thus following the structure of the original instrument. The answer is given on a 5-point Likert scale ranging from Strongly Disagree (1), Disagree (2), Neither Agree Nor Disagree (3), Agree (4) and Strongly Agree (Pires et al., 2011).

As far as internal consistency is concerned, the PAQ-P shows good values, namely an  $\alpha=.83$  regarding the authoritative parenting style,  $\alpha=.77$  regarding the authoritarian parenting style and  $\alpha=.75$  for the permissive parenting style. In regard to the rating, the results vary between a minimum of 10 and a maximum of 50 points per factor and the higher the sum of the answers in each parenting style, the greater its preponderance (Pires et al., 2011).

### **Nature Relatedness Scale (NR-21)**

The Nature Relatedness Scale (NR-21), by Nisbet et al. (2009) was translated and adapted to the Brazilian reality by Pessoa (2011) and aims to evaluate the nature connection of the population under study, divided into three factors for this purpose: 1) NR-Self - aims at the identification of the individual with nature, reflecting his own feelings and thoughts towards it; 2) NR-Perspective - investigates the existence of an individual external and nature-related worldview, as well as a sense of duty to take action, regarding one's individual actions and impact on all living things, and 3) NR-Experience - reflects the physical familiarity with nature, as well as the comfort and desire to get in contact with it (Nisbet et al., 2009). The instrument is composed of 21 items, using a 5-point Likert response scale ranging from Strongly Disagree (1), Disagree (2), Neither Agree Nor Disagree (3), Agree (4) and Strongly Agree (5). The constituent factors of the instrument also show good internal consistency, with an  $\alpha=.84$  for the NR-Self factor, an  $\alpha=.66$  for the NR-Perspective factor and also an  $\alpha=.80$  for the NR-Experience. In the version validated for the Brazilian population, however, values of  $\alpha=.77$ ,  $\alpha=.57$  and  $\alpha=.44$  are presented for the NR-Self, NR-Perspective and NR-Experience factors, respectively. As for the rating, the higher the values associated with the three factors, the stronger the connection with nature.

### **Data Collection Procedures**

After obtaining ethical approval and permission from the General Data Protection Regulation (GDPR) and the Ethics Committee (EC), we got authorization from the respective authors to use the PAQ-P and the Nature Relatedness Scale (NR-21)- Brazilian version-, developed the sociodemographic questionnaire and made it available on the FormsUA platform (forms.ua.pt), from June 21 to October 4, 2021. We also obtained authorization from IL to access their contact database of EG's guardians, ensuring all ethical and confidentiality concerns.

The CG was based on geometric spread sampling (snowball), in which individuals who met the inclusion criteria were selected and subsequently the individuals of interest contacted others who fit the aforementioned characteristics, increasing the sample geometrically (Marôco, 2018).

First, participants got informed consent, which included all the information required by the GDPR and EC: the person responsible for the project, the aims, the duration of participation, procedures, risks and benefits associated with participation, the confidentiality and anonymization process, the voluntary nature of participation and the rights to the personal data. It also included the contact number of the main investigator for additional clarification. The second phase consisted of answering the sociodemographic questions, followed by the PAQ-P and, finally, the NR-21.

### **Data Analysis**

In order to access the participants' answers in a more detailed way, a mixed methodology was chosen, which conciliates quantitative and qualitative methods. For the statistical analysis, we used IBM SPSS Statistics v25, Jamovi v1.6 and JASP 0.16.1.0, and for the qualitative analysis, we used MaxQDA

v2020.4. For the sociodemographic characterization of the EG and CG groups, we performed descriptive statistics (mean and standard deviation) using the IBM SPSS Statistics program. Frequencies and percentages of the following variables were also analyzed: gender, marital status, education, socioeconomic status, parenting style, enrollment of children in an educational experience in nature, contact with nature and its frequency during childhood and throughout life (pre-pandemic context), figures present at the time of contact with nature, household location (rural, urban or peri-urban) and access to nature in the area of residence. Concomitantly, with Jamovi, we assessed NR variable normality using a Shapiro-Wilk test (Shapiro et al., 1968). Considering that the NR variable did not obey a normal distribution, the comparison between groups was assessed through a Wilcoxon W test (Rey & Neuhäuser, 2011). Additionally, a general linear model was applied, to verify whether a more frequent contact with nature during childhood and throughout life (pre-pandemic context) could be a predictor of a greater NR (Lee, 2020). Finally, with JASP, a cluster analysis with the K-means method and optimization of the BIC value (Naeem & Wumaier, 2018) was conducted, allowing for the verification of fluctuation profiles between the NR variables, contact with nature during childhood and contact with nature throughout life (pre-pandemic context). Regarding content analysis, we analyzed the reasons for enrollment (EG and CG) and non-enrollment (CG) in educational experiences in nature and the activities in nature performed by parents as children. To this end, we used an open categorization method (Amado, 2014), which consists of creating a system of categories inferred from answer analysis. In order to assess and ensure the study's internal consistency, we performed the inter-coder agreement test. This test consisted of content analysis, first by coder 1 and then by coder 2 and, in a final phase, we made a comparison between the codifications assigned by the two coders, to each of the excerpts (Lima, 2013), namely: 1) EG parents' motives for enrolling their children in IL offers, extracting an agreement of 87.93% and a Cohen's Kappa of .87; 2) CG parents' motives for enrolling their children in educational experiences in nature, obtaining an agreement and Cohen's Kappa coefficient of .83; 3) reasons why CG parents did not enroll their children in educational experiences in nature reached an agreement of 86.79%, additionally determining a Cohen's Kappa coefficient of .85; 4) and, finally, we took into account the main activities developed by parents, as children, in moments of contact with nature and, with regards to the EG, we obtained an agreement of 98.51% and a Cohen's Kappa coefficient of .98 and the CG revealed an agreement of 96.59%, accompanied by a Cohen's Kappa coefficient of .96.

## Results

All EG participants enrolled their children in an IL educational experience in nature, with 60.7% (n=82) of the total (N=135) participating in PCM and 39.3% (n=53) in CF. Regarding the CG participants (N=151), only 13.9% (n=21) said they had enrolled their children in an educational experience in nature, being that the most reported activities were scouts and summer camps, noting a preponderance of non-formal educational offerings.

As for the reasons listed for the enrollment in PCM and CF offers, the following stand out: "the importance of promoting contact with nature" (n=44; 32.9%), "appealing and innovative offer" (n=25; 18.4%) and "promotion of socio-emotional development" (n=23; 16.6%).

With regard to CG, the main reasons for enrollment include: "contact with nature" (n=59; 38.8%), "nature exploration" (n=30; 16.5%) and "socioemotional development" (n=18; 11.8%) of the child. The main reasons for not enrolling their children were "not provided" (n=33; 22%); "age factor" (n=34; 22.6%), "too young to be part of these programs" and "family alternatives" (n=28; 18.6%), where parents provide activities in nature.

With regard to the existence of contact with nature in EG parents' childhood, 131 (97%) parents indicated having had such. As for the CG, 143 (94.7%) participants reported having had access to nature throughout their childhood. In terms of frequency of nature contact during childhood (Table 2), the answers "every day" (n=55; 40.7%), "between 1 and 2 times a week" (n=33; 24.4%) and "between 3 and 4 times a week" (n=31; 23%) stand out in the EG and the "every day" (n=67; 44.4%) and "between 1 and 2 times a week" answers (n=37; 24.5%) in the CG.

**Table 2.** Frequency of nature contact during childhood (weekly)

Contact with nature during childhood (weekly)	EG		CG	
	<i>n</i>	%	<i>n</i>	%
Never	2	1.5	3	2
Between 1 and 2 times a week	33	24.4	37	24.5
Between 3 and 4 times a week	31	23	28	18.5
Between 5 and 6 times a week	14	10.4	15	9.9
Everyday	55	40.7	67	44.4
Omitted	0	0	1	.7
Total	135	100	151	100

*n*= Sample(count)

We also tried to find out the frequency of participants' contact with nature throughout their lives (pre-pandemic context). In the EG, 66.7% (*n*=90) of participants mentioned contact with nature "between 1 and 2 times a week" and, in the CG, 43% (*n*=65) of participants answered "between 1 and 2 times a week" and 32.5% (*n*=49) "every day" (Table 3).

**Table 3.** Frequency of nature contact throughout life (weekly)

Contact with nature throughout life (weekly)	EG		CG	
	<i>n</i>	%	<i>n</i>	%
between 1 and 2 times a week	90	66.7	65	43
between 3 and 4 times a week	29	21.5	27	17.9
between 5 and 6 times a week	6	4.4	10	6.6
Everyday	10	7.4	49	32.5
Total	135	100	151	100

*n*= Sample(count)

For a more effective understanding of the contact with nature throughout life, the participants were asked about their living environment and access to nature. 83% of the EG participants (*n*=112) reported an urban housing context and in the CG the most mentioned were urban (*n*= 70; 46.4%) and rural (*n*= 47; 31.1%). Regarding access to nature near their area of residence, 89.6% of the EG participants (*n*=121) and 87.4% of the CG (*n*=132) indicated that it was available (Table 4).

**Table 4.** Housing environment of the household and access to nature

Housing environment characteristics	EG		CG	
	<i>n</i>	%	<i>n</i>	%
<b>Environment</b>				
Rural	8	5.9	47	31.1
Urban	112	83	70	46.4
Periurban	15	11.1	34	22.5
<b>Access to nature</b>				
Yes	121	89.6	132	87.4
No	14	10.4	19	12.6

*n*= Sample(count)

One of this study's aims was to characterize the parenting style of EG and CG participants. Drawing from the results, it is possible to see that the predominant parenting style in both groups is the authoritative one - 97.8% (*n*=132) and 96.7% (*n*=146) for the EG and the CG, respectively (Table 5).

**Table 5.** Predominant parenting style

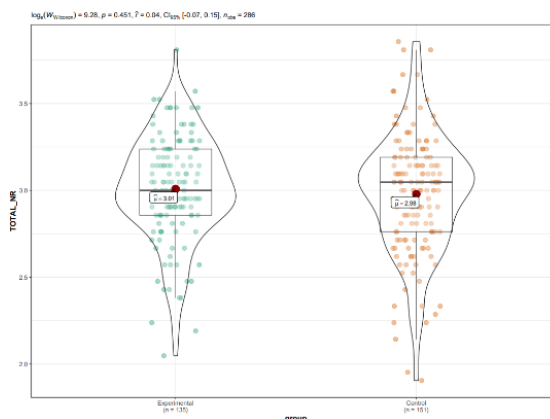
Parenting style	EG		CG	
	<i>n</i>	%	<i>n</i>	%
Authoritarian	2	1.5	2	1.3
Authoritative	132	97.8	146	96.7
Permissive	1	.7	3	2
Total	135	100	151	100

*n*= Sample(count)

We then proceeded to the analysis of the NR variable which did not obey a normal distribution, thus the comparison between groups was made through a non-parametric analysis. Figure 1 shows the violin plots with the distribution, the boxplot and the mean by group. By looking at figure 1, we can see that the

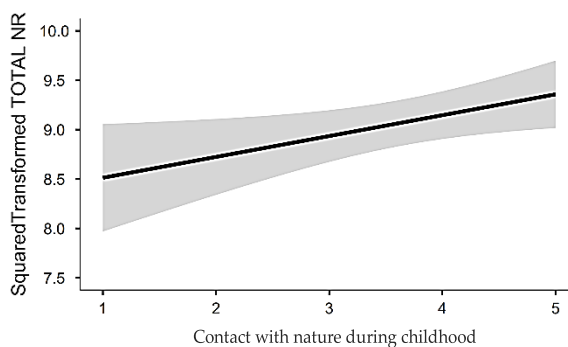


distribution is very similar between the two groups. However, it is interesting to note that the mean NR is slightly higher in the EG ( $M=3.01$ ,  $SD=.30$ ) than in the CG ( $M=2.91$ ;  $SD=.34$ ). Yet, the median is slightly higher in the CG.

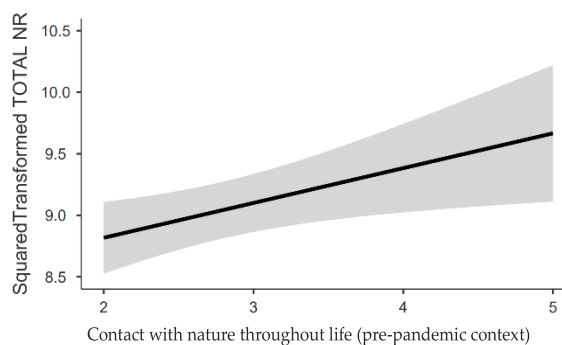


**Figure 1.** NR variable distribution both in EG and CG

In order to understand whether contact with nature during childhood and contact with nature throughout life (pre-pandemic context) were significant predictors of NR, the general linear model was applied. Considering that the variable NR did not follow a normal distribution and that the present model requires this assumption, it was modified through a squared transformation. In addition to the predictors listed above, the group variable was also taken into account as a predictor. Although the group was already found to have no impact on NR, this variable was posed for the study of potential interaction effects with the other predictor variables. The results of this analysis showed a significant and main effect of contact with nature throughout life (pre-pandemic context) ( $F(1,279)=5.953, p=.015$ ,  $\eta^2p=0.045$ ) and contact with nature during childhood ( $F(1,279)=5.030, p=.026$ ,  $\eta^2p=0.021$ ), showing that the higher the contact in both variables, the higher the NR (figures 2 and 3).



**Figure 1.** Contact with nature during childhood as a predictor of NR



**Figure 2.** Contact with nature throughout life (pre-pandemic context) as predictor of NR

The partial eta square, which gives us the effect size, shows us that lifelong nature contact (pre-pandemic context) has a greater influence on NR than contact with nature during childhood. However, the following interaction effects were not detected: contact with nature throughout life (pre-pandemic context) \* group ( $F(1,279)=0.0516, p=.820, \eta^2p=0.000$ ) and contact with nature during childhood \* group ( $F(1,279)=0.4340, p=.511, \eta^2p=0.002$ ).

The goal of categorizing and grouping parents according to their nature contact and their NR, as well as the lack of results per group, together with some intra-group variability, led us to perform a cluster analysis, from a purely exploratory standpoint, in what concerns the variables in the study. For this analysis, in addition to the NR variable, we equated the frequencies of contact with nature during childhood and throughout life (pre-pandemic context). The result of clustering with the K-means method and with BIC value optimization returned 8 clusters that together explain 84.4% of the variance and a BIC of 293.970.

Clusters were then sorted into different named profiles, which were established inferentially, given each cluster's distribution, which was based on the interaction between the NR, frequency of nature contact throughout life (pre-pandemic context), and frequency of nature contact during childhood variables. Figure 4 shows the 8 clusters and its relations with the aforementioned variables.

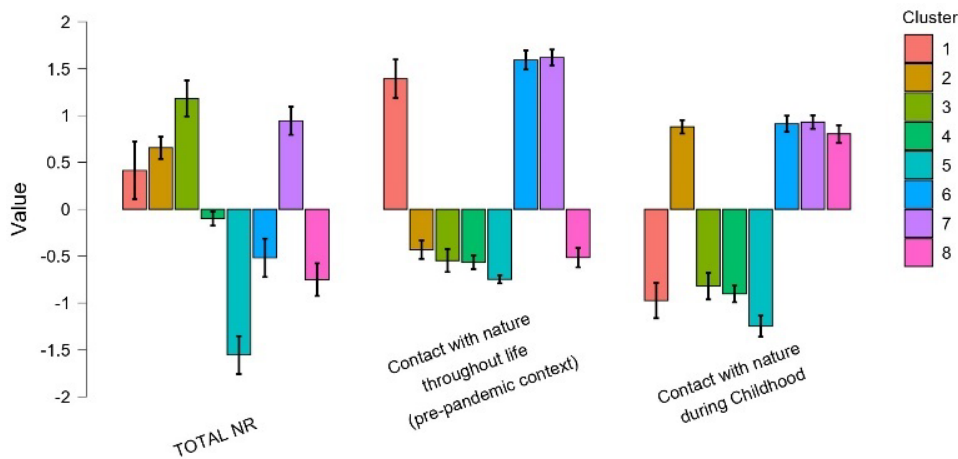


Figure 4. Cluster analysis considering NR and contact with nature during childhood and throughout life

As we can see, the 8 clusters have distinct fluctuation profiles among the 3 variables, so after its analysis and interpretation, we proceeded to name and describe these profiles (Table 6).

Table 6. Clusters' description considering NR, contact with nature during childhood and throughout life as variables

Cluster's name	Description
1. Active nature lovers with one contact after childhood	Individuals who have a high NR and had one significant contact with nature after childhood.
2. Active nature lovers with childhood contact	Individuals who have a high NR and have had significant contact with nature during childhood only.
3. Passive nature lovers	Individuals who have an extremely high NR, but have not had significant contact with nature neither during childhood nor throughout their lives.
4. Disconnected from nature without contact	Individuals who have a low NR and have not had significant contact with nature during childhood and throughout their lives.
5. Indifferent to contact with nature	Individuals with an extremely low/inexistent NR, who have not had significant contact with nature, neither during childhood nor throughout their lives.
6. Disconnected from nature, but with frequent contact during childhood and throughout life	Individuals with a low NR and who have had significant contact with nature both during childhood and throughout their lives.
7. Active nature lovers with frequent contact during childhood and throughout life	Individuals with an extremely high NR, who have had significant contact with nature during childhood and throughout their lives.

8. Disconnected from nature, but with childhood contact	Individuals with a low NR, who have had significant contact with nature during childhood only.
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Following this, we checked the proportion of individuals in each cluster, in order to understand the variations depending on the group (EG or CG). The results of this analysis can be seen in Table 7. Since the parents of the EG had the initiative to place their children in a formal educational experience in nature, we sought to understand which cluster profiles were more frequent in the group in question. Inferentially, a significant association was recorded between clusters and the EG,  $\chi^2(7)=35.9$ ,  $p < .001$ . Descriptively, the results show a superiority of the EG, regarding the percentage of individuals "disconnected from nature with no contact" (4), "active nature lovers with childhood contact" (2) and "disconnected from nature, but with childhood contact" (8).

**Table 7.** Clusters' absolute frequencies, per group

Cluster	EG		CG	
	n	%	n	%
1. Active nature lovers with one contact after childhood	3	2.2	9	6
2. Active nature lovers with childhood contact	30	22.2	19	12.7
3. Passive nature lovers	18	13.3	8	5.3
4. Disconnected from nature without contact	33	24.4	32	21.3
5. Indifferent to contact with nature	12	9	20	13.3
6. Disconnected from nature, but with frequent contact during childhood and throughout life	6	4.4	22	14.7
7. Active nature lovers with frequent contact during childhood and throughout life	7	5.2	27	18
8. Disconnected from nature, but with childhood contact	26	19.3	13	8.7
<b>Total</b>	<b>135</b>	<b>100</b>	<b>150</b>	<b>100</b>

*n*= Sample(count)

## Conclusion and Discussion

The study carried out and presented here aimed at better understanding the enrollment motives, sociodemographic variables, parenting styles and NR of parents who enrolled their children in IL, as well as analyzing these same variables and identifying parent profiles based on NR and frequency of nature contact, while additionally attempting to ascertain the role of contact with nature as a predictor of NR, all in an effort to rethink and improve existing educational offers.

According to the obtained results, EG participants were aged between 28 and 56 years, with CG participants aged between 20 and 65 years. Regarding gender, both EG and CG participants are, in the majority, married (62.2% a 66.9%, respectively) women (85,9% and 84,8%, respectively).

As far as academic qualifications are concerned, EG parents indicate "1st, 2nd and 3rd cycles of Higher Education" as their level of education (93,4%), while CG parents indicate "1st, 2nd and 3rd cycles of Higher Education" (35,8%) and "Secondary Education" (55%). According to Schoeppe et al. (2015), parents with a lower level of education have a lower predisposition for their children's access to outdoor spaces/nature. Once again, the present study/research makes this information verifiable due to the fact that EG parents have high educational qualifications and, concomitantly, enroll their children in educational offers in nature. However, more research is needed to objectively ascertain whether or not socioeconomic status and education are predictors of greater contact with nature since the available information only mentions contact with outdoor spaces as a predicting factor.

Related to the annual income, it is possible to ascertain that EG parents have a higher gross annual income, with particular emphasis on "over 15358.35€". As for the CG parents, unlike the previous ones, these reveal an income with greater dispersion, with "over 15358.35€", "over 9215.01€ up to 15358.35€" and "over 6143.34€ up to 9215.01€" standing out.

Building on the work of Ghimire et al. (2015), individuals with a higher socioeconomic income tend to have fewer constraints and restrictions to contact with outdoor spaces/nature. These data are in line with

the work developed here, thus being possible to establish that parents with a higher socioeconomic level have high contact with nature throughout their lives (pre-pandemic context) and enroll their children in educational offers in nature.

Following on from the above, and regarding the state of the art and current literature, it is essential to mention that Wood or Nature Kindergartens (Forest Schools in England) are of Scandinavian origin, which makes the reasons why educational offers are appealing to parents, its benefits and effects and the characteristics of parents who opt for these offers, are more reported, recognized and detailed in the underlying cultures of these countries. In contrast, up until 2013, this was not the case for Portugal, given the scarcity of this type of offer (Figueiredo et al., 2013). Nonetheless, nowadays the educational offers are diversified, although many are non-formal.

In this sense, regarding the reasons given for enrolling children in educational experiences in nature, "contact with nature" is consensual among EG and CG, which confirms the studies of Silva (2019) and Costa (2021). Another prominent reason is the development of social and emotional skills, which besides being consensual between both groups, is also corroborated by the work developed by Costa (2021). Similarly, the study developed by Silva (2019) points to social and emotional skills development as the second reason for enrolling children in educational experiences in nature. However, Silva (2019) created a single category for development, encompassing the motor, cognitive and socio-emotional dimensions, which makes it difficult to compare the results.

According to the answers obtained by EG parents, and in addition to the previous reasons, the innovative and appealing aspect of educational offers in nature is related to the fact that they are an alternative to kindergartens/schools and play spaces. This takes into account the work of Silva (2019), where parents also indicated the experience of different activities from those performed at kindergarten as one of the reasons for enrolling their children. In fact, in Portugal, playing and learning spaces, in addition to being not very diversified (in terms of materials and stimuli), are mainly limited to indoor spaces, which may lead to negative consequences for the child's development, since the existence of experiences that promote exploration, challenge and adventure are of paramount importance in childhood, according to Figueiredo et al. (2013). It is important to bear in mind that these experiences of exploration, challenge and adventure are not exclusively associated with nature, as they can be accessed in other contexts.

Concomitantly with the aforementioned experiences, nature allows children to develop awareness of their attitudes and behaviors' effect on nature, thus leading to the increase of their connection with nature and environmental concerns, as well as the sedimentation of the understanding of their place in it (Gill, 2014). In this sense, the studies developed by Silva (2019) and Costa (2021) corroborate what was previously mentioned, since they point to an increase in children's environmental awareness when they participate in PCM, according to their parents' perception. Nevertheless, and given that parents are inherently involved in choosing and making decisions regarding their children's educational offers, it is pertinent to take a critical look at the parenting styles of parents who chose to enroll their children in educational experiences in nature.

Through the results obtained, we can affirm that these parents present a predominantly authoritative style. However, current literature has little information regarding the influence of parenting styles on parents' choices about educational offerings in nature. Therefore, through the analysis of the principles that govern Wood/Nature Kindergartens or Forest Schools (which served as inspiration for the IL), it's possible to see that, in general, these favor the development of competences such as resilience, autonomy, confidence and creativity, which is similar to parents with an authoritative parenting style, so we can hypothesize these parents may prefer educational offerings such as IL. However, this needs further research.

Since parents play a key role in decision-making regarding the most different aspects of the child's life, it becomes important to discuss the influence they play in children's nature contact and, consequently, their NR. Based on the results obtained in this study, we were able to confirm that contact with nature during childhood and throughout life (pre-pandemic context) is a predictor of a greater NR, a conclusion

that is in line with what is proposed and postulated by the current investigation (Soga et al., 2016). The results are also consistent with the work of Wood and Smyth (2019), who indicated that greater exposure to and participation in physical activity in nature during childhood was associated with a greater nature connection.

Finally, and following this line of thought, according to the work of Sugiyama et al. (2021) and Passmore et al. (2021), a greater interest in nature and a greater NR in adulthood on the part of parents/caregivers may then lead to a greater willingness to provide contact with nature to their children, which, inferentially, will also translate into a greater NR on the children's part. Therefore, parents' pursuit for increasing their children's contact experiences with nature coincides with the main reason mentioned when enrolling them in IL, since they find that they experienced and appreciated the contact they had with nature as children, thus awakening an expressed need for their children to experience something similar. This observation is supported by the fact that there is an inevitably growing tendency in the general population to choose indirect and especially vicarious experiences over traditional direct experiences (Skar et al., 2016). To support this, it is pertinent to recall the results of the clusters with a more evident expression in the EG and with particular emphasis on "active nature lovers with childhood contact" (2) and "disconnected from nature, but with childhood contact" (8). In these two clusters, despite the differences in NR (with cluster 2 individuals showing a high NR and cluster 8 individuals a low NR), it can be seen that contact with nature during childhood was quite frequent, which seems to have had an impact on EG parents, since they enrolled their children in an educational experience in nature.

There is also a third cluster of high expression in the EG, which corresponds to the "passive nature lovers" (3) who demonstrated a high NR, but did not have frequent contact with nature, neither during childhood nor throughout life (pre-pandemic context). This cluster allows us to reflect, again, on parents' motivations for enrolling their children in IL. Since there was no contact with nature during childhood and EG parents were not able to maintain this contact with nature throughout life, it is possible to equate that parents may have found in IL a way to make up for the absence of their own contact with nature, as well as a way to promote the benefits of contact and connection with nature in their children. As for CG parents, the clusters with the most expression were "disconnected from nature without contact" (4), "active nature lovers with frequent contact during childhood and throughout life" (7) and "disconnected from nature, but with frequent contact during childhood and throughout life" (6), which corroborates the results obtained regarding the frequency in nature contact during childhood and throughout life (pre-pandemic context) and the enrollment of children (or lack thereof) in educational offers in nature. To build on these results, we call forth the main reason found for not enrolling children in this type of offer, which according to these parents is the fact that there are alternatives that can be provided as a family. Also, regarding CG parents who chose to enroll their children in educational experiences in nature, non-formal educational options are denoted as the main choice (scouts and summer camps).

Hence, it is important to consider that nature programs like IL may present themselves as a viable and advantageous choice in offering direct or indirect nature contact experiences to a wider target audience, as it provides nature contact experiences in both formal and non-formal settings.

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