

Article

Contribution of Public Playgrounds to Motor, Social, and Creative Development and Obesity Reduction in Children

Pedro Gil-Madrona ^{1,*}, María Martínez-López ², Alejandro Prieto-Ayuso ^{3,4}, Linda Saraiva ⁵, Javier Vecina-Cifuentes ⁶, Tomás Vicente-Ballesteros ⁶, Rafael Moratilla-López ⁷ and Guillermo F. López-Sánchez ^{8,*}

¹ Faculty of Education of Albacete, University of Castilla–La Mancha, 02071 Albacete, Spain

² Faculty of Psychology, National Distance Education University (UNED), 28015 Madrid, Spain

³ Faculty of Education of Cuenca, University of Castilla–La Mancha, 16071 Cuenca, Spain

⁴ Albacete Balompié S.A.D., 02006 Albacete, Spain

⁵ School of Education, Polytechnic Institute of Viana do Castelo, 4901-908 Viana do Castelo, Portugal

⁶ Faculty of Law of Albacete, University of Castilla–La Mancha, 02071 Albacete, Spain

⁷ Faculty of Economic and Business Sciences of Albacete, University of Castilla–La Mancha, 02071 Albacete, Spain

⁸ Faculty of Sport Sciences, University of Murcia, 30720 Murcia, Spain

* Correspondence: Pedro.Gil@uclm.es (P.G.-M.) and gfls@um.es (G.F.L.-S.)

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Abstract: The objective of this work was to examine the perceptions of adults responsible for the care of children in their leisure time about the contribution of public playgrounds to motor, social, and creative development and obesity reduction in children, analyzing these perceptions according to sex, age, educational level, and level of involvement in the child's education of the participants. The sample consisted of 1019 adults responsible for the care of children in their leisure time in Albacete (Spain). A validated questionnaire was the instrument used to assess perceptions of participants on the influence of the public playgrounds in motor, social, and creative development and obesity reduction of children. The instrument was validated on a first sample of convenience and had good reliability ($\alpha = 0.997$) and construct validity (CFI = 0.997). The results showed that most participants agreed with the positive contribution of public playgrounds to social skills (78.8%), motor skills (53.7%), creativity (52.2%), and obesity reduction (48.8%) in children. Women, those between 30 and 49 years, those with a higher educational level and those with a higher level of involvement in the child's education had more positive perceptions regarding the impact of public playgrounds to motor, social, and creative development and obesity reduction in children. These results should be taken in consideration to foster the use of public playgrounds in all sectors of population.

Keywords: outdoor learning; child development; public health; families

1. Introduction

Life of children in large cities has been a topic of discussion and reflection in many countries [1–3]. In consequence, several initiatives have been put into practice in many cities in order to promote physical activity, welfare, and health in children [4–7], one of them being the creation of playing areas for children [8].

Many authors [9–11] have focused attention on defining these recreational areas for boys and girls. Various studies have shown that outdoor play in childhood produces results in development that cannot be achieved indoor. In the first place, we can highlight those studies that focus attention

on improving cognitive and motor aspects of child development because of play in playgrounds. In this sense, the studies carried out by Fjørtoft [12–14] found a strong association between the number of natural characteristics in a game environment (e.g., grass, trees, hills, running water, and sand) and the level of activity of children. Additionally, children who participate in active playground games develop memory, information processing, and other cognitive skills necessary for learning [15,16]. Castelli, Hillman, Buck and Erwin [17] found a proportional relationship between play and performance in mathematics and reading in the Primary Education stage (6–12 years). Secondly, we should highlight those studies that focus on improving social skills. For example, some studies concluded great social improvements in children playing in public children's parks [10,17–20]. Such scientific evidence must convince policymakers to increase and improve the playgrounds of cities.

As already mentioned, the literature on playgrounds is scarce. Different studies are oriented to analyze the aspects associated with the type of leisure developed by families [21–23], analyzing factors such as the area [24,25]. However, no specific studies have been found in the literature about the socio-economic status of children, or analyzing the perception and convictions that families have about the possible benefits of playful activities, or the influence that public playgrounds can have in the development of the cities providing environments of development for the children. Thus, the information obtained through this study could be of great interest in providing theoretical foundations in future action programs aimed at involving families in the sustainable development of cities.

The objective of this work was to examine the perceptions of adults responsible for the care of children in their leisure time about the contribution of public playgrounds to motor, social, and creative development and obesity reduction in children, analyzing these perceptions according to sex, age, educational level, and level of involvement in the child's education of the participants. To our knowledge, this is the first study analyzing all these factors in a large sample of adults responsible for the care of children in their leisure time. The hypothesis was that the majority of adults responsible for the care of children in their leisure time would have positive perceptions about the contribution of public playgrounds to motor, social, and creative development and obesity reduction in children, and that there would be significant differences according to sex, age, educational level, and level of involvement in the child's education of the participants.

2. Methods

2.1. Participants

The sample consisted of 1019 adults responsible for the care of children in their leisure time in Albacete (Spain). This city was chosen because of the ease of access to the sample. In order to ensure a representative sample, the evaluation was carried out on the 41 existing parks in the city of Albacete (Spain): 1. De la Cruz; 2. Carretas-Huerta de Marzo; 3. Parque Abelardo Sánchez; 4. Plaza Antonio Andújar; 5. Plaza de las Carretas; 6. Plaza de Villacerrada; 7. Plaza Depósito del Sol; 8. Plaza Jesús de Medinaceli; 9. Ajardinada Seminario; 10. Doctor Marañón; 11. Fernando Poo; 12. Ismael Belmonte; 13. Jardín Barrio la Unión; 14. Plaza de Miguel Ángel Blanco; 15. Plaza Dr. Ferrandis; 16. Residencial el Jardín; 17. Vereda de Jaén I; 18. Vereda de Jaén II; 19. Ajardinada Apr-2; 20. Ajardinada Calle Doctor Barraquer; 21. Hospital; 22. Parque Sur; 23. Sepulcro Bolera; 24. Hermanos Falcó; 25. Universidad; 26. Industria; 27. San Antonio Abad; 28. Polígono San Antón; 29. La estrella; 30. La milagrosa; 31. Fiesta del Árbol; 32. Vía Verde; 33. Virgen del Pilar; 34. Plaza Maestro Checa; 35. Plaza del Pelibayo; 36. Anguijes; 37. Cuasiermas; 38. Argamasón; 39. Campillo de las Doblas; 40. Cerrolobo; 41. Salobral.

A total of 25 adults who were in charge of at least one child were selected randomly (simple random sampling) within each park. The distribution of the sample according to sex, age, and educational level is presented in Table 1.

Table 1. Sample characteristics (%).

Sex	Females: 73		Males: 27
Age	<30 years: 13	31–49 years: 67	>50 years: 20

Educational level	No: 10.4	Primary: 25	Secondary: 32.7	University: 31.3
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For the elaboration of this work, a quantitative methodology was followed in order to verify the installation of play areas such as playgrounds, and a simple survey format was used to facilitate a proper analysis of all the variables included. All participants signed written informed consent, where the objective and the confidentiality of this study were explained. Furthermore, this research was approved by the Ethics Committee of the University of Castilla-La Mancha (UCLM 151-2017).

2.2. Instruments

In order to obtain an objective evaluation of the perception of the families about the influence of the public playgrounds in motor, social, and creative development and obesity reduction of children, a Likert scale was created (scale and frequencies of answers presented in Table 2), after a deep analysis of the available information [14,26–31]. The scale was composed of five categories: 1. Totally disagree; 2. Somewhat disagree; 3. Neither agree nor disagree; 4. Quite agree; 5. Totally agree. The different elements or areas of interest considered in the scale were:

- Impact of parks on the social development of children: Measuring the degree in which parents considered that playgrounds contribute to the development of children's social skills.
- Impact of parks on the psychological development of children: Measuring the degree in which parents considered that parks contribute to the development of children's creativity.
- Impact of parks on motor development and physical health of children: Measuring the degree in which parents considered that parks contribute to the development and improvement of children's motor and perceptual-motor skills.
- Impact of parks in reducing the children's chances of suffering from obesity: Measuring the degree in which parents considered that parks contribute to the reduction of childhood obesity.

Content validation of the scale was performed using expert judgment in order to ensure that the scale contains an adequate and representative sample of items. Moreover, in order to validate the construct and know the reliability of the scale, we proceeded to apply the instrument on a first convenience sample composed of 140 families who were in charge of a child in a park. The exploratory factor analysis applied with varimax rotation identified the existence of a single factor that explained 55.326% of the total variance. The sample adequacy measure of Kaiser-Meyer-Olkin (KMO) showed a value of 0.715; obtaining also the Bartlett's sphericity test a probability associated with its statistic ($\chi^2 = 941.540$; $df = 6$) of $p = 0.000$. The confirmatory factor analysis confirmed the existence of a single factor in the scale. The indices obtained showed a good fit to the data model: Comparative fit index (CFI) of 0.995, Tucker-Lewis index (TLI) of 0.985, root mean square error of approximation (RMSEA) of 0.049, standardized root mean square residual (SRMSR) of 0.016, goodness fit index (GFI) of 0.997, adjusted goodness of fit index (AGFI) of 0.983. Finally, due to the high sample size ($N = 1019$ participants), the calculation of the goodness of fit statistic χ^2 was not considered adequate. The reliability analysis using Cronbach's alpha showed a high internal consistency of the scale ($\alpha = 0.931$). Good values were also obtained for the composite reliability (CR = 0.833) and for the average variance extracted (AVE = 0.567).

The following descriptive data of participants were also obtained: sex, age, educational level, and level of involvement in the child's education.

2.3. Data Analysis

Descriptive analysis of frequencies was carried out in order to compute the frequencies obtained in each of the items listed in the scale. Moreover, contingency tables were obtained in order to know the possible impact on the items of the factors gender, age, educational level, and level of involvement in the child's education of the adults responsible for the care of children in their leisure time (Tables 3–6). Among the information to be obtained in these contingency tables, rectified standardized residuals were requested in order to identify those cells where there was a significantly higher or lower proportion of cases observed compared with expected cases assuming independence between

both variables; these percentages were also obtained by columns in order to know the relative distribution of cases across categories or levels for each factor. Chi-square test was used as a global indicator to test the hypothesis of independence between each item and factor. Finally, in the case of ordinal variables (age group and educational level), Gamma test was applied in order to identify linear associations between each item and ordinal factors. These results were complemented by calculating the effect size: Cohen's *d* for Student's *t*-test and η^2 for ANOVA analysis. The analyses were carried out with the Statistical Package for the Social Sciences 23.0 (SPSS 23.0).

3. Results

Regarding the item referring the development of social skills, 38.8% quite agreed and 40% totally agreed, which supposes a 78.8% of total agreement. With respect to the child's creativity, 35.8% strongly agreed and 16.4% fully agreed, which means a 52.2% of total agreement. In the development of motor skills, 38% quite agreed and 15.7% fully agreed, which supposes a 53.7% of total agreement. Finally, in the item corresponding to the reduction of obesity, 31.1% quite agreed and 17.7% totally agreed, (i.e., 48.8% of total agreement) (Table 2).

Table 2. Frequency distribution (%) in the different aspects covered.

	1. Totally Disagree	2. Somewhat Disagree	3. Neither Agree nor Disagree	4. Quite Agree	5. Totally Agree
The child develops social skills	1.2	3.5	16.5	38.8	40.0
The child develops creativity	2.9	12.8	32.1	35.8	16.4
The child develops motor skills	5.4	14.0	26.9	38.0	15.7
The child reduces the likelihood of obesity	4.5	15.2	31.5	31.1	17.7

The sex factor (Table 3) exerted a significant impact in favor of women on the item in which the child reduces the chances of obesity: χ^2 (4, *N* = 1016) = 21.28, *p* < 0.01; Somers' *D* = 0.007; Cohen's *d* = 0.29. In the other items analyzed, the sex factor had not a significant impact: The child develops social skills: χ^2 (4, *N* = 1016) = 5.93, *p* > 0.05; Somers' *D* = 0.002; Cohen's *d* = 0.15. The child develops his creativity: χ^2 (4, *N* = 1016) = 3.99, *p* > 0.05; Somers' *D* = 0.001; Cohen's *d* = 0.13. The child develops motor skills: χ^2 (4, *N* = 1016) = 0.99, *p* > 0.05; Somers' *D* = 0.000; Cohen's *d* = 0.06.

Table 3. Contingency table: Sex factor.

	Chi Square	df	Sig	Somers' D	Sig	Cohen's d
The child develops social skills	5.933	4	0.204	0.002	0.219	0.15
The child develops their creativity	3.999	4	0.406	0.001	0.417	0.13
The child develops motor skills	0.997	4	0.910	0.000	0.904	0.06
The child reduces the likelihood of obesity	21.281	4	0.000	0.007	0.001	0.29

The age factor (Table 4) had a significant impact in favor of those between 30 and 49 years on three of the analyzed items: The child develops social skills: χ^2 (8, *N* = 1016) = 17.96, *p* < 0.05; Somers' *D* = −0.015; Cohen's *d* = 0.27; the child develops his creativity: χ^2 (8, *N* = 1016) = 26.30, *p* < 0.01; Somers' *D* = −0.112; Cohen's *d* = 0.32; the child develops motor skills: χ^2 (8, *N* = 1016) = 20.98, *p* < 0.01; Somers' *D* = 0.096; Cohen's *d* = 0.29. It had not a significant impact on: The child reduces the odds of obesity: χ^2 (8, *N* = 1016) = 2.91, *p* > 0.05; Somers' *D* = −0.006; Cohen's *d* = 0.11.

Table 4. Contingency table: Age factor.

	Chi Square	df	Sig	Somers' D	Sig	Cohen's d
The child develops social skills	17.966	8	0.021	−0.015	0.553	0.27
The child develops their creativity	26.301	8	0.001	−0.112	0.000	0.32
The child develops motor skills	20.984	8	0.007	0.096	0.001	0.29
The child reduces the likelihood of obesity	2.912	8	0.940	−0.006	0.821	0.11

The educational level factor (Table 5) had a significant impact in favor of those with a higher educational level on the four items analyzed: The child develops social skills: χ^2 (12, N = 1016) = 46.99, $p < 0.01$; Somers' D = 0.088; Cohen's d = 0.143; the child develops his creativity: χ^2 (12, N = 1016) = 49.91, $p < 0.01$; Somers' D = 0.091; Cohen's d = 0.44; the child develops motor skills: χ^2 (12, N = 1016) = 27.22, $p < 0.01$; Somers' D = 0.027; Cohen's d = 0.33; the child reduces the odds of obesity: χ^2 (12, N = 1016) = 39.57, $p < 0.01$; Somers' D = 0.097; Cohen's d = 0.39.

Table 5. Contingency table: Educational level factor.

	Chi Square	df	Sig	Somers' D	Sig	Cohen's d
The child develops social skills	46.992	12	0.000	0.088	0.001	0.43
The child develops their creativity	49.916	12	0.000	0.091	0.001	0.44
The child develops motor skills	27.22	12	0.007	−0.027	0.305	0.33
The child reduces the likelihood of obesity	39.578	12	0.000	0.097	0.000	0.39

The level of involvement factor (Table 6) also had a significant impact in favor of those with a higher involvement on the four items analyzed: The child develops social skills: χ^2 (8, N = 1016) = 80.19, $p < 0.01$; Somers' D = 0.210; Cohen's d = 0.56; the child develops his creativity: χ^2 (8, N = 1016) = 24.16, $p < 0.01$; Somers' D = 0.033; Cohen's d = 0.31; the child develops motor skills: χ^2 (8, N = 1016) = 40.19, $p < 0.01$; Somers' D = 0.175; Cohen's d = 0.40; the child reduces the odds of obesity: χ^2 (8, N = 1016) = 35.27, $p < 0.01$; Somers' D = 0.142; Cohen's d = 0.37.

Table 6. Contingency table: Level of involvement factor.

	Chi Square	df	Sig	Somers' D	Sig	Cohen's d
The child develops social skills	80.198	8	0.000	0.210	0.000	0.56
The child develops their creativity	24.169	8	0.002	0.033	0.252	0.31
The child develops motor skills	40.196	8	0.000	0.175	0.000	0.40
The child reduces the likelihood of obesity	35.279	8	0.000	0.142	0.000	0.37

The global scale score that measured the overall impact of playgrounds on children's development and obesity reduction averaged 3.69 (SD = 0.62). Segmenting this score by sex, men obtained a mean of 3.66 (SD = 0.64) and women mean of 3.70 (SD = 0.64). However, Student's t-test for independent samples has not yielded evidence of significant differences: t (1014) = −0.997, $p > 0.05$; Cohen's d = −0.06.

In the analysis of the scale according to the age factor, people under the age of 30 obtained an average of 3.65 (SD = 0.71), those between 30 and 49 years obtained an average of 3.72 (SD = 0.62), and those who were older than 50 years had a mean value of 3.61 (SD = 0.61). The ANOVA test did not show evidence that the age factor printed significant differences on the scale: F (2,1012) = 0.905, $p > 0.05$; $H_2 = 0.002$.

The analysis of the scale according to the educational level factor gave the following results: in the group of people without studies an average of 3.50 (SD = 0.59), in the group of people with primary education studies a mean of 3.69 (SD = 0.65), in the group with secondary education studies an average of 3.69 (SD = 0.63) and, finally, in people with university studies an average score of 3.73 (SD = 0.64). The ANOVA test showed that the educational level factor printed significant differences

on the scale object of study: $F(3.1000) = 3.542$, $p < 0.05$; $H2 = 0.011$. The post hoc Bonferroni test showed significant differences between those without studies and those with primary education studies ($dif = -0.19$; $p < 0.05$); also, between those without studies and those with secondary education ($dif = -0.19$; $p < 0.05$); and between those without studies and those with university education ($dif = -0.23$, $p < 0.01$).

The analysis of the scale according to the level of involvement yielded the following results: in the group of people with low involvement an average of 3.52 ($SD = 0.66$), in the people with medium involvement 3.69 ($SD = 0.64$), and in those with high involvement 3.90 ($SD = 0.55$). The ANOVA test showed evidence that the level of implication factor printed significant differences on the scale object of study: $F(2.1016) = 28.475$, $p < 0.01$; $H2 = 0.058$. The post hoc Bonferroni test showed significant differences between low involvement individuals and those with medium involvement ($dif = -0.16$, $p < 0.01$); also, between those with low involvement and those with high involvement ($dif = -0.37$; $p < 0.01$); and between those with medium involvement and those with high involvement ($dif = -0.21$, $p < 0.01$).

4. Discussion

Regarding the perception of participants on the influence of playgrounds on physical, psychological, and social development of children, they gave playgrounds a main role, especially in the development of social skills. Certainly, playing with other children leads to mutual interactions between children and the development of social skills [32,33]; outdoor games have been considered socially essential for the human development and the welfare of childhood through centuries [33–36].

Outdoor games also have a significant role in the development of psychological skills such as creativity, as well as the development of motor skills and the prevention of obesity, although there is less agreement among participants in this point. In this sense, many studies mention the potential of children's games in the development of creativity [37], imagination [29], and motor development [38], as well as in the prevention of problems related to childhood obesity [39] and the promotion of physical activity among children [40].

Families should be especially aware of the importance for education of parks and playgrounds' facilities. For example, there is general agreement when it comes to accept the government's proposal to ban smoking at playgrounds as a positive measure. Thus, the role of families in the education of young children outdoor is essential [10].

In the present study, sex was also a relevant factor in the explanation of some of the issues analyzed. According to the scale that shows the perception of participants about the influence of parks and playgrounds on physical, psychological, and social development of children, women tended to be more aware of the physical benefits that playgrounds bring to children, especially regarding the reduction of obesity. Additionally, those between 30 and 49 years, those with a higher educational level and those with a higher level of involvement in the child's education had more positive perceptions regarding the impact of public playgrounds to motor, social, and creative development and obesity reduction in children.

These results should be taken into account because the presence of adults is a factor that increases the performance of physical activity in children [41–43]. In addition, the adjoining and centrality of the different areas of playgrounds are determining factors in the increase of physical activity and; therefore, the benefits that it achieves [44]. In short, outdoor parks are crucial for the development of children's physical activity [45,46]. As Scott [47] states, outdoor games help children grow, and this is why the results of the present study should be taken in consideration to foster the use of public playgrounds in all sectors of population.

The main strengths of this study were the large representative sample and the use of a valid and reliable instrument. However, the results of this study should be considered within its limitations. Only participants from Albacete (Spain) were measured and most participants were females. Therefore, future studies should analyze samples from other regions and with a sex distribution more homogeneous.

5. Conclusion

Most participants agreed with the positive contribution of public playgrounds to social skills, motor skills, creativity, and obesity reduction in children. Women, those between 30 and 49 years, those with a higher educational level, and those with a higher level of involvement in the child's education had more positive perceptions regarding the impact of public playgrounds to motor, social, and creative development and obesity reduction in children. These results should be taken in consideration to foster the use of public playgrounds in all sectors of population.

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