sustainability

MDPI

Article

Building Child-Friendly Cities for Sustainable Child Development: Child-Friendly City Scale-Child Form

Özkan Sapsağlam [1,*] and Ali Eryılmaz [2]

[1] Department of Preschool Education, Yildiz Technical University, Istanbul 34349, Turkey
[2] Department of Educational Sciences, Yildiz Technical University, Istanbul 34349, Turkey; aeryilmz@yildiz.edu.tr
* Correspondence: ozkan@yildiz.edu.tr

Abstract: Designing child-friendly cities is very important for sustainable human development. Child-friendly cities encourage children to grow up in a healthy, safe, and supportive environment. The concept of the "Child-Friendly City" emerged in 1996 at the United Nations Habitat II Conference in Istanbul. This movement promoted supporting children's development, assuring compliance with their basic rights, and pursuing their subjective well-being through the qualities of the environments of cities. Developing measurement tools to determine the effects of the qualities of the city and its environment on children and what is expected from "Child-Friendly Cities" is crucial. The first aim of this study was to utilize exploratory factor analysis (EFA) to develop the Child-Friendly City Scale-Child Form and provisionally examine its factor structure during this process. The second aim was to examine the factor structure of the developed scale through confirmatory factor analysis (CFA). Participants were 527 middle school students who were divided into two groups for CFA and DFA, 204 in the first group and 323 in the second group. The results of both EFA and CFA supported the developed scale, which has eight dimensions. The Child-Friendly City Scale-Child Form was found to be valid and reliable through various tests. This study contributes to the literature by providing an empirically tested 8-dimension tool to measure children's perceptions of the child-friendliness of their cities.

Keywords: environment; child; sustainability; child friendly city; scale

Citation: Sapsağlam, Ö.; Eryılmaz, A. Building Child-Friendly Cities for Sustainable Child Development: Child-Friendly City Scale-Child Form. *Sustainability* **2024**, *16*, 1228. https://doi.org/10.3390/su16031228

Received: 2 January 2024
Revised: 23 January 2024
Accepted: 30 January 2024
Published: 1 February 2024

1. Introduction

Human beings are inherently social and societal entities. Due to this characteristic, they are particularly susceptible to the influences of both physical and social environments. During periods of rapid development, such as childhood and adolescence, individuals experience heightened levels of environmental impact. Throughout the 20th century, numerous theories were proposed to elucidate the effects of the environment on children's development. In his psychosocial development theory, Vygotsky [1] contended that children's development and learning are facilitated through social and cultural interactions within their environment. In Piaget's [2] cognitive development theory, social transmission is one of four factors that significantly influence cognitive development. Bandura's [3] social-cognitive learning theory emphasizes the importance of the environment by addressing the reciprocal influences between individuals and their surroundings. Expanding on the assumptions of these theories, Bronfenbrenner [4] proposed the bioecological theory, which comprehensively underscores the impact of the environment on children's development. Erikson [5] posited that encountering and resolving psychological crises within a societal context spurs development. However, it is important to note that these theories predominantly focus on explaining the effects of the psychological context of the environment on child development. However, the physical and sociocultural characteristics of the environment also exert considerable influence on children's development.

The Industrial Revolution increased not only mechanization but also urbanization. Over the past decades, urban populations have continually grown. For instance, in 1960, 34% of the world's population of 3.03 billion lived in cities, whereas by 2020, this figure had risen to 56% of 7.88 billion. It is estimated that by 2050, seven out of every ten people will live in urban areas [6]. Rapid urbanization presents numerous challenges for children, such as access to education, adequate and healthy nutrition, developmental opportunities, and green spaces. Globally, 1 billion children struggle to survive in living conditions that lack access to sufficient education, healthcare, housing, nutrition, sanitation, and/or clean water [7]. Children are also among the most vulnerable groups affected by local or international crises or environmental problems [8]. Compared to other demographic groups, children and the elderly are more sensitive to global warming, climate change, urbanization, and health issues arising from urbanization [9]. The International Organization for Migration [10] has identified children along with women and the elderly as groups at risk, particularly as they migrate to densely populated areas in which urbanization has negatively impacted both the environment and human health [10,11]. Cities consume 75% of the world's energy production and account for 80% of global carbon dioxide emissions [12]. Studies of the effects of urban conditions on children primarily focus on its impact on their health, developmental processes, and psychological well-being.

Numerous studies have examined the effects of cities on children's physical health. It has been estimated that approximately 381,000 premature deaths occur annually in Europe due to excessive urbanization [13]. Onywera et al. [14] reported that children living in urban areas are less active than those living in rural areas. For example, they found that urban children walk approximately 3000 fewer steps a day than their rural counterparts. Children in cities are also heavily exposed to excessive levels of lead and mercury. Lead exposure has been found to impair children's cognitive and behavioral functioning [15], while mercury exposure is particularly damaging to newborns' cognitive development, leading to behavioral issues later on [16]. Exposure to traffic-related air pollution has also been found to negatively affect children's cognitive performance [17]. Overall, numerous studies have shown the ill effects on the physical, mental, and cognitive well-being of children who live in low-quality urban conditions, in which they lack access to clean water and are exposed to environmental risks such as crowdedness, pollution, and limited or substandard housing [18].

With regard to children's cognitive and mental health, living in overcrowded urban environments with excessive noise levels not only degrades child-parent interactions but also negatively affects children's reading comprehension and academic achievement. Evans [15] reported that behavioral disorders were more prevalent among children living in compact areas with a predominance of high-rise buildings. Similarly, Gilchrist et al. [19] noted that landscaping that featured trees, grass, shrubs, and flowering plants in or in the workplace had a positive effect on employees' well-being, an effect that would also apply to school children. Bratman et al. [20] compared the effects of walking experiences in natural and urban settings on emotion and cognition and found that nature walking was significantly more likely to lead to improvements in participants' cognitive abilities and a decrease in negative emotions. Bradley and Putnick [21] also found that being raised in environments that provided resources that supported their development positively affected children's cognitive development. Berman et al. [22] reported that not only participating in nature activities but also examining images and replications of nature had a positive effect on children's cognitive skills and ability to pay attention. Students' academic achievements are positively affected by the quality of the resources of the schools they attend [23]. In sum, there is strong evidence of the need for cities to become safer, healthier, and more livable spaces for children while supporting their social and cognitive development, which has led to the emergence of the "child-friendly city" concept.

Child-friendly cities encourage children to grow up in a healthy, safe, and supportive environment. These cities provide physical facilities such as playgrounds, parks, green spaces, and bike paths to encourage children to participate in physical activities and

outdoor play [24,25]. In addition, child-friendly cities promote mental and social development by prioritizing access to quality education, health care, and cultural activities [26,27]. Child-friendly cities (CFC) have three dimensions: rights, physical environment, and governance [28]. These cities also place emphasis on community participation and ensure that children have opportunities to meaningfully participate in decision-making processes that affect their lives [29–31]. It can be observed that the three dimensions of sustainability [32,33] are highly compatible with the mission of a child-friendly city. By prioritizing children's needs and rights, child-friendly cities create a foundation for sustainable child development and enable children to reach their potential and make positive contributions to their communities. Addressing children's views is crucial for sustainable development. [34]. It is evident in the literature that there is a lack of measurement tools specifically designed to capture children's perceptions of child-friendly cities. However, it is the children who are the primary reason for the existence of child-friendly cities. Therefore, it is crucial to measure the characteristics of child-friendly cities from the perspective of children themselves. This study aims to measure child-friendly city features from children's perspectives, with the objective of promoting healthy and sustainable child development.

The concept of a "child-friendly city" was born at the United Nations Habitat II Conference held in Istanbul in 1996. At this conference, it was stated that the well-being of children is one of the most important indicators of a healthy society. It was also noted that child-friendly cities are the best cities for people of all age groups. In September 2000, the Secretariat for Child-Friendly Cities (CFC) was established within the United Nations. The child-friendly city concept has since been widely addressed and evaluated. Riggio [35] defined child-friendly cities as those in which children's rights are provided and protected by governments, echoed by Chatterjee [36], who stated that child-friendly cities aim to create good quality living conditions for all children while considering their human rights. Taking a more articulated approach to the concept, Horelli [37] proposed a 10-dimensional theoretical framework for investigating the attributes of a child-friendly city, described as offering support to both children and child-focused individuals. This framework includes housing and living space, basic services (health, education, and transportation), family and relatives, peers and community (sense of belonging and continuity, safety and security, ecology (natural surroundings), urban and environmental qualities, provision and distribution of resources, poverty reduction, and good governance.

Increasing the child-friendliness of cities is a necessity in today's rapidly urbanizing world, which prompted the CFC to recommend increasing relevant research [35]. Accordingly, studies on the concept of the child-friendly city have included Topsümer et al.'s [38] article, "City and Child-The contribution of the Child-friendly City Initiative to the City Image;" Koç et al.'s [39] "Child-friendly City Initiative and Ankara through the Eyes of Children;" Berkün's [40] "Evaluation of Child-friendly City Administrations by Children: the Bursa Example;" Akbay's [41] "Child-friendly Cities, Child Rights, and the "Pandemic;" Memiş's [42] "From Cities of Children to Children's Cities: Child-friendly Smart Cities;" Riggio's [35] Child-friendly Cities: Good Governance in the Best Interests of the child;" Nam and Nam's [43] "Child-friendly City Policies in the Republic of Korea;" Tayefi Nasrabadi et al.'s [44] "Let children Plan neighborhoods for a Sustainable Future: A Sustainable Child-friendly City Approach;" Tucker et al.'s [45] "Architects' Professional perspectives on child- and family-friendly apartment design in Australia;" Andal's [46] "Children's Spaces in Coastal Cities: Challenges to Conventional Urban Understandings and Prospects for Child-friendly Blue Urbanism;" and Derr and Tarantini's [47] "Because We are all People: Outcomes from and Reflections on Young People's Participation in the Planning and Design of Child-friendly Public Spaces.

In conclusion, several studies related to child-friendly cities have been conducted at the theoretical level [40–45]. Researchers aiming to determine and measure the characteristics of child-friendly cities have examined children's opinions [48,49], different countries' practices [43], particular child-friendly city criteria [30], and cultural perspectives [50].

However, the literature includes no investigations of empirical measurement tools to assess this theoretical construct from the perspective of children.

In the progression and elaboration of the 'child-friendly city' concept, a thorough review of prior research indicates that this subject has mainly been analyzed and assessed within the realms of public services, municipalities, and other local government entities [35,40,43,44,46]. Significantly, the essence of a child-friendly city intrinsically encompasses the well-being and development of the child. This underscores the imperative for a diverse array of scientific disciplines, especially those focusing on child development and education, to pivot their attention toward this critical concept. Nevertheless, a gap in the literature is evident: there is a noticeable lack of engagement from professionals such as preschool educators, teachers, school psychologists, educational psychologists, social service experts, and school psychological counselors in this area of study. The necessity for a systematic measurement of the child-friendly city concept is paramount, not only to quantify its parameters but also to pave the way for comprehensive psycho-social studies tailored to enhance these environments. Such studies are vital in creating more inclusive, nurturing urban spaces that cater to the multifaceted needs of children. This research endeavors to bridge this gap by proposing and developing a robust scale for evaluating the efficacy of child-friendly cities. By doing so, it seeks to bolster the existing body of knowledge while also highlighting the critical role of interdisciplinary approaches in fostering environments that support the holistic development of children within urban settings.

Accordingly, the aim of this research was to develop an original, valid, and reliable measurement tool that will form the basis for child-friendly city studies that privilege the actual experiences of children. In particular, the development of a child-friendly city scale from the perspectives of children is important because the concept belongs to them, and the policies and provisions made in cities should meet their felt needs and preferences. Moreover, empirically measuring the child-friendly city characteristics presented theoretically and conceptually, according to Horelli [37], could provide important contributions to the explanations of existing theories. Thus, a study addressing the development of such a scale makes a significant contribution to the literature.

2. Materials and Methods

As noted, the general purpose of this study was to develop the Child-Friendly City scale and examine its psychometric properties. Woolcock et al. [51] stated that both conceptual analysis and applied research are needed to investigate how the well-being of children and young people is affected by different urban environments. In this context, the first aim of this study was to use exploratory factor analysis (EFA) to develop the factor structure of the Child-Friendly City scale. The second aim was to investigate the factor structure of the developed scale using confirmatory factor analysis (CFA).

The usual stages of scale development were followed. Initially, individual qualitative interviews were conducted face to face with 15 male and 15 female middle school students, who responded to open-ended questions based on the child-friendly city dimensions categorized by Horelli [37], as exemplified below:

C1: Please evaluate your satisfaction with your home. (Residential Living Space)
C2: What are the problems you encounter with education services in your residential area? (Basic Services)
C3: Please evaluate the safety of your residential area for children. (Safety and Security)
C4: What would you like your residential area to be like in terms of play and activity spaces for children? (Urban and Environmental Qualities)
C5: What would you like your residential area to be like in terms of financial/economic support for children? (Provision of Economic Support)
C6: What would you like your residential area to be like in terms of green spaces and recycling? (Ecology)
C7: What features of your residential area cause you to have positive/negative emotions? (Emotional Bond Formation)

C8: How would you like your residential area to support children's participation in decision-making processes? (posed to Male, 14 years old; Participation)

Responses to the questions were audio-recorded and transcribed. Subsequently, content analysis was conducted on these data. Based on the results of the analysis, an item pool was created for each of the eight dimensions of the scale being developed. These items were reviewed by three experts with doctorates in the field of measurement and evaluation regarding their suitability for the dimension, comprehensibility, and accurate linguistic construction. The expressions deemed appropriate by all three experts formed the trial form of the scale, which comprised a total of 35 items. After administration of the scale to groups involved in the research, item analysis, exploratory factor analysis, confirmatory factor analysis, and validity and reliability analyses were conducted.

2.1. Measurement Tools Used to Assess the Scale's Validity

School Attachment Scale: The School Attachment Scale for Children and Adolescents developed by Savi [52] has a three-factor structure consisting of 13 items with a 5-point Likert scale. The Cronbach's alpha internal consistency coefficient for the scale is 0.84, and the test-retest reliability coefficient is 0.85. The scale can be used to examine factors related to the level of school attachment of children and adolescents.

Child and Adolescent Psychological Resilience Scale: Developed by Arslan [53], the Child and Adolescent Psychological Resilience Scale has a single-factor structure consisting of 12 items with a 5-point Likert scale. The internal consistency of the measure was assessed using Cronbach's alpha coefficient, and the Cronbach alpha coefficient of CYRM was 0.91.

2.2. Participants

The research was conducted with two different study groups. Participant information is shown in Table 1. The first study was carried out with 204 participants, aged 10–14, of whom 79 (38.7%) were males and 125 (61.3%) were females. There were 99 sixth graders (48.5%), 49 seventh graders (24%), and 56 eighth graders (27.5%). Mothers' education levels included secondary school graduation (134; 65.7%), high school (61; 29.9%), and university (9; 4.4%). Fathers' education levels are junior high school graduation (119; 58.3%), high school (68; 33.3%), and university (17; 8.4%).

Table 1. Information of participants.

Study	Variables		f	%
Study I	Gender	Male	79	38.7
		Female	125	61.3
	Age	10	34	16.7
		11	31	15.2
		12	71	34.8
		13	39	19.1
		14	29	14.2
	The class in which he/she is enrolled	6th grade	99	48.5
		7th grade	49	24
		8th grade	56	27.5
	Mother Education Levels	Secondary School	134	65.7
		High School	61	29.9
		University	9	4.4
	Father Education Levels	Secondary School	119	58.3
		High School	68	33.3
		University	17	8.4

Table 1. *Cont.*

Study	Variables		f	%
Study II	Gender	Male	167	51.7
		Female	156	48.3
	Age	10	26	8
		11	49	15.2
		12	118	36.5
		13	87	27
		14	43	13.3
	The class in which he/she is enrolled	6th grade	156	48.3
		7th grade	98	30.3
		8th grade	69	21.4
	Mother Education Levels	Secondary School	209	64.7
		High School	100	31
		University	14	4.3
	Father Education Levels	Secondary School	184	57
		High School	111	34.4
		University	28	8.6

The second study was carried out with 323 participants aged 10–14, including 167 (51.7%) males and 156 (48.3%) females. There were 156 sixth graders (48.3%), 98 seventh graders (30.3%), and 69 eighth graders (21.4%). Mothers' education levels were junior high school graduation (209; 64.7%), high school (100; 31%), and university (14; 4.3%). Fathers' education levels were junior high school graduation (184; 57%), high school (111; 34.4%), and university (28; 8.6%).

3. Results

3.1. Findings of the Item Analysis

Before the EFA was performed, an item analysis was conducted using the upper and lower 27% group method. In this analysis, a t-test was carried out to compare the scale items between the two groups. The results indicated that all scale items could be significantly differentiated between the upper and lower groups. Additionally, it was found that all items in the scale's trial form had significant ($p < 0.01$) discriminative power.

3.2. Findings for Exploratory Factor Analysis

Also, before the EFA was conducted, a Principal Component Analysis was performed. Barlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) values were considered. The Barlett's Test of Sphericity value was 4379.411, and the KMO value was 0.881 ($p < 0.00$). As these values were greater than 0.800, it was concluded that the sample group was sufficient for the analysis [54]. As a result of the exploratory factor analysis (Table 2), an 8-sub-dimension scale (Figure 1) was obtained. Items excluded from this analysis were those that did not meet the condition of having a 0.10 difference for items included in more than one factor. According to the rotation results, five items were excluded from the analysis.

The Barlett's Test of Sphericity value was found to be 2960.203, and the KMO value was 0.875. As both values were greater than 0.800, the sample size was deemed to be sufficient for the analysis [54]. The 8-factor measurement tool that was obtained explained 61.145% of the variance. The tool comprised the following factors: "Housing and Living Area", "Basic Services", "Safety and Security", "Governance and Participation", "Urban and Environmental Characteristics", "Providing Financial and Economic Support", "Ecology and Recycling", and "Emotional Commitment".

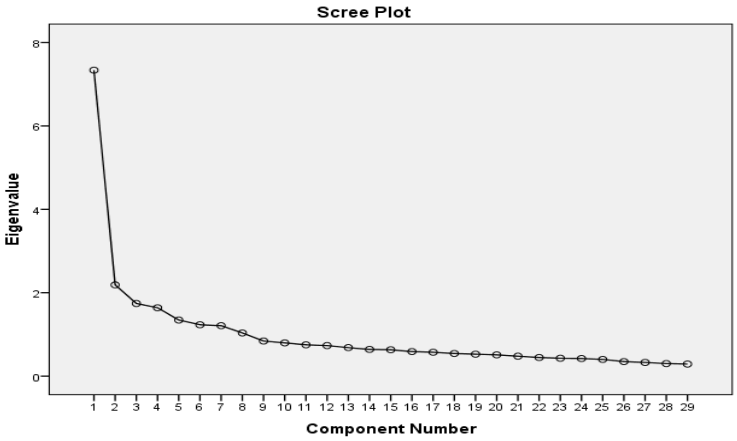

Figure 1. Scatter diagram related to the child-friendly city scale.

Table 2. Results of the exploratory factor analysis.

	Sub-Dimensions							
Items	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	0.802							
2	0.750							
3	0.748							
4	0.622							
5		0.719						
6		0.665						
7		0.638						
8		0.637						
9			0.758					
10			0.734					
11			0.676					
12			0.658					
13				0.805				
14				0.718				
15				0.692				
16					0.758			
17					0.740			
18					0.708			
19						0.766		
20						0.708		
21	0.329					0.513	0.311	
22				0.308		0.485		
23							0.750	
24							0.589	
25				0.337			0.536	0.306
26		0.315					0.534	
27								0.756
28								0.730
29								0.652
Explained Variance	9.446; 8.274; 9.446; 8.274; 8.257; 7.506; 7.423; 6.845; 6.725; 6.671							

Note: 1. Housing and Living Area 2. Basic Services 3. Safety and Security 4. Governance and Participation 5. Urban and Environmental Characteristics 6. Providing Financial and Economic Support 7. Ecology and Recycling 8. Emotional Commitment.

3.3. Findings on the Validity of the Scale

The relationships between the sub-dimension and total scores of the developed Child-Friendly City Scale and psychological resilience and school satisfaction were examined using the Pearson Correlation technique. According to the analysis of the scale's total scores, as children's environments deviated from the child-friendly city characteristics, both their psychological resilience (r = −0.294; $p < 0.01$) and their school satisfaction (r = −0.305; $p < 0.01$) decreased significantly. The correlation analysis results are shown in Table 3 below.

Table 3. Results of the correlation analysis.

	1	2	3	4	5	6	7	8	9	10
1. Pr	1	0.655 **	−0.206 **	−0.283 **	−0.265 **	−0.149 **	−0.108	−0.024	−0.349 **	−0.179 **
2. Ss		1	−0.187 **	−0.274 **	−0.272 **	−0.182 **	−0.142 *	−0.074	−0.302 **	−0.179 **
3. HLA			1	0.307 **	0.329 **	0.286 **	0.164 **	0.228 **	0.356 **	0.227 **
4. BS				1	0.438 **	0.303 **	0.287 **	0.248 **	0.306 **	0.336 **
5. SS					1	0.413 **	0.306 **	0.274 **	0.464 **	0.376 **
6. GP						1	0.471 **	0.285 **	0.355 **	0.432 **
7. PFES							1	0.428 **	0.412 **	0.457 **
8. ER								1	0.311 **	0.413 **
9. EC									1	0.382 **
10. UEC										1

** $p < 0.01$; * $p < 0.05$; 1. PR: Psychological Resilience; 2. SS: School Satisfaction; 3. HLA: Housing and Living Area; 4. BS: Basic Services; 5. SS: Safety and Security; 6. GP: Governance and Participation; 7. PFES: Providing Financial and Economic Support; 8. ER: Ecology and Recycling; 9. EC: Emotional Commitment; 10. UEC: Urban and Environmental Characteristics.

3.4. Findings on the Reliability of the Scale

The reliability values of the sub-dimensions and the entire scale were examined using the internal consistency method. Accordingly, it was found that the sub-dimensions of the scale reach acceptable levels of reliability. The Cronbach's Alpha value of the scale's total score was found to be 0.925, confirming that the scale has a very high-reliability value. The Cronbach's Alpha values of the measurement tool shown in Table 4 below.

Table 4. Cronbach's Alpha values of the measurement tool.

Dimensions	Cronbach's Alpha
HLA	0.670
BS	0.780
SS	0.786
GP	0.761
PFES	0.777
ER	0.762
EC	0.849
UEC	0.769

3.5. Child-Friendly City Scale Confirmatory Factor Results

Using confirmatory factor analysis (CFA) to examine the values obtained with exploratory factor analysis strengthens scale studies (Kline, 1998). Therefore, in this study, the factor structure of the scale was examined by performing CFA on a sample group different from the EFA sample group (Figure 2). The results of the CFA analysis confirmed the 8-dimensional structure obtained by the EFA.

The fit indices values are shown in Table 5. According to the representation of confirmatory factor analysis, it was concluded that the resulting performance was within acceptable goodness of fit values.

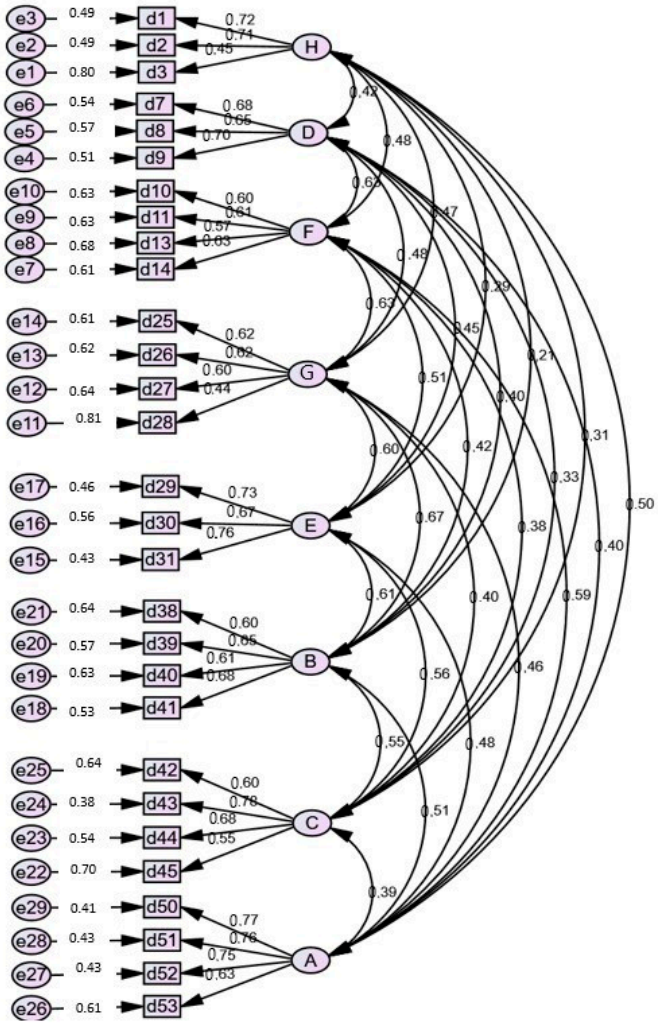

Figure 2. The results of confirmatory factor analysis. Note: A: HLA (Housing and Living Area); B: BS (Basic Services); C: SS (Safety and Security); D: GP (Governance and Participation); E: PFES (Providing Financial and Economic Support); F: ER (Ecology and Recycling); G: EC (Emotional Commitment); H: UEC (Urban and Environmental Characteristics).

Table 5. Fit indexes.

Indexes	Values
NFI	0.93
NNFI	0.98
CFI	0.98
IFI	0.98
RFI	0.92
GFI	0.91
AGFI	0.88
RMSEA	0.035
X^2	488.19
Df	349

4. Discussion

The overall aim of this study was to develop the Child-Friendly City Scale and to investigate its relationships with selected mental health variables. In line with this aim, the first objective of this study was to develop the Child-Friendly City Scale and examine its factor structure through exploratory factor analysis. The second objective of the study was

to examine the factor structure of the developed scale using confirmatory factor analysis. According to the findings of the study, the factor structure of the eight-dimensional Child-Friendly City Scale has been confirmed through both exploratory and confirmatory factor analyses, demonstrating that the Child-Friendly City Scale (Appendix A) is a reliable and valid measurement tool.

Since the beginning of the 21st century, the concept of a Child-Friendly City has emerged as an important notion and gained significance in recent years with increasing awareness of children's rights. However, the majority of scientific research on the concept of a child-friendly city has focused on its historical and theoretical dimensions [26,34,55], child-friendly city practices in different countries [43,51,56], and opinions on the nature of child-friendly cities [25,48,57]. A review of the existing research on child-friendly city characteristics and related literature revealed that research on measurement tools for assessing these characteristics is quite limited. Therefore, the development of psychometric measurement tools to determine the qualities of child-friendly cities is urgently needed, and research in this area can make significant contributions to the understanding, dissemination, and accurate measurement of the "child-friendly city" concept.

To meet this need, this study was based on the 10 dimensions of a child-friendly city proposed by Horelli [37]. Eight of Horelli's ten dimensions (housing and living area, basic services (health, education, and transportation), participation, safety and security, urban and environmental characteristics, ecology, sense of belonging and continuity, resource provision and distribution) are included in the scale developed in the present study. However, this research did not confirm the inclusion of the dimensions of good governance and family and relatives in the scale. One reason for this exclusion may be the cognitive characteristics of children, who reach abstract thinking abilities towards the end of adolescence [2]. The children participating in this study were in the pre- or early-adolescent period, prior to the full development of abstract thinking, which may have prevented them from addressing child-friendly city characteristics in dimensions such as governance and family and relatives. Another reason may be that these features are not associated with child-friendliness in the cities where these children were living.

In addition, in this study, the dimension of resource provision and distribution and poverty reduction has been re-titled as providing financial and economic support. As children evaluate being a child-friendly city through the concrete support they receive, and the concept of reducing poverty may be related to higher-level thinking processes, from the perspective of 10- to 14-year-olds, this dimension may be associated with monetary support. Secondly, the dimension of belonging and continuity has been titled emotional attachment, which is consistent with the essence of Horelli's [37] related dimension. These linguistic adjustments remind researchers that when developing a child-friendly city scale, it is necessary to consider the developmental characteristics of the children responding to the scale as well as the content of child-friendly services offered by cities.

Humans, and particularly children, are deeply influenced by the environments in which they grow up. This understanding, echoed by philosophers like Aristotle and Ibn Khaldun, underlines the profound effect that one's surroundings can have on their development. Aristotle once stated that people are essentially molded by the cities they inhabit, implying that the urban environment plays a critical role in shaping an individual's character and worldview. Similarly, Ibn Khaldun believed that individuals are a product of their environment, emphasizing that the context in which one grows up leaves a lasting imprint on their identity. This concept becomes even more significant when we consider the idea of a 'child-friendly city.' Such cities are thoughtfully designed to cater to the various needs of children, taking into account not just the physical aspects like safe play areas and accessible educational facilities but also the cultural, biological, and psychological factors that contribute to a child's overall development. In a child-friendly city, every element of the urban landscape, from parks and schools to community centers and transportation, is planned with the goal of fostering a nurturing environment for children. By doing so, these cities aim to offer a holistic growth environment, enriching children's experiences

and supporting their development into well-rounded individuals. The essence of a child-friendly city lies in its ability to positively influence its youngest residents, guiding them towards a healthy, productive, and fulfilling life. According to the Stress Reduction Theory proposed by Ulrich et al. [58], being in natural environments such as forests, water, and green landscapes enables people to experience positive emotions and reduce their stress levels. In this research, significant relationships were found between child-friendly city characteristics, children's school satisfaction, and their psychological resilience. Other studies have also shown a relationship between the environment and mental health indicators in children. For example, Kerret et al. [59] found that green schools have positive effects on children's subjective well-being and cognitive skills. In a study involving 3394 children from three different countries, Savahl et al. [60] concluded that socioeconomic conditions have significant effects on children's life satisfaction.

This study is subject to certain limitations. The study's sample is limited to children within a specific age range, potentially affecting the generalizability of the findings. The cognitive abilities and perceptions of children in different age groups might vary significantly, influencing their understanding of what constitutes a child-friendly city. The characteristics of child-friendly cities might vary greatly across different cultures and geographic locations. This study may not fully capture these variations, limiting its applicability in diverse contexts. Cities and the needs of children are constantly evolving. The study's findings may not fully account for these dynamic changes, potentially reducing the relevance of the scale over time.

In conclusion, this study has found that the Child-Friendly City Scale is a reliable and valid measurement tool. Based on the research results, the following recommendations are made:

- Future research can investigate the relationships between Child-Friendly City characteristics and multiple variables.
- Studies can be conducted to evaluate the reliability and validity of the scale in different cultures.
- In addition to the child form developed in this study, forms of the scale for other groups (e.g., parents, teachers, etc.) can be developed.

Municipalities can assess their child-friendly city features through the regulations developed in this study, based on children's perceptions.

Additionally, municipalities and local governments can utilize the scale presented in this study as a monitoring tool when enhancing child-friendly city features.

Author Contributions: The author Ö.S. made significant contributions to the conceptualization, acquisition, interpretation, writing, original draft preparation, writing, review, and editing. A.E. made significant contributions to the methodology, analysis, interpretation, writing, review, and editing. All authors have read and agreed to the published version of the manuscript.

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Institutional Review Board Statement: The study protocol has been approved by the Yildiz Technical University unit of Scientific Research and Ethical Review Board (Report Number: 01.11.2022/2022.11).

Informed Consent Statement: The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its following updates.

Data Availability Statement: The data presented in this study could be available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Child-friendly city scale-child form.

Item No	Items	Strongly Disagree	Disagree	Agree	Strongly Agree
1	Living in an old house bothers me.				
2	My house/apartment is not spacious.				
3	I do not have my own room in my house/apartment.				
4	The education events organized by the municipality in our residential area are insufficient.				
5	The health services provided by the municipality in our residential area are insufficient.				
6	The transportation services provided by the municipality in our residential area are insufficient.				
7	I do not feel safe in my residential area.				
8	There are theft incidents in our residential area.				
9	There are street gangs in our residential area.				
10	The roads in our residential area are unsafe for children.				
11	The municipality does not ask for my opinions in decision-making processes in our residential area.				
12	I am not informed about the services provided by the municipality in our residential area.				
13	The municipality in our residential area does not do what we request				
14	I would like to have a say in the management of the municipality in our residential area.				
15	The variety of programs offered by the municipality in our residential area to develop the interests and talents of children is insufficient.				
16	The duration (number of days) of programs offered by the municipality in our residential area to develop the interests and talents of children is insufficient.				
17	The capacity (number of participants accommodated) of the programs offered by the municipality in our residential area to develop the interests and talents of children is insufficient.				
18	The municipality in our residential area does not provide food/nutrition aid to those in need.				
19	The municipality in our residential area does not provide sports equipment to children.				
20	People in need cannot get financial aid from the municipality in our residential area.				
21	The municipality in our area does not help children obtain needed school supplies and meet other school expenses				
22	The green areas in our residential area are insufficient				
23	The recycling bins in our residential area are insufficient				
24	The trash bins in our residential area are insufficient				
25	People in our residential area are not knowledgeable about recycling				
26	I am unhappy in my residential area				
27	I am angry in my residential area				
28	I am anxious in my residential area				
29	I feel scared in my residential area				

References

1. Vygotsky, L.S. *Thought and Language*; MIT Press: Cambridge, MA, USA, 1934.
2. Piaget, J. The stages of the intellectual development of the child. In *Educational Psychology in Context: Readings for Future Teachers*; Sage Publications: Thousand Oaks, CA, USA, 1965; pp. 98–106.
3. Bandura, A. *Social Learning Theory*; Prentice-Hall: Hoboken, NJ, USA, 1977.
4. Bronfenbrenner, U. *The Ecology of Human Development: Experiments by Nature and Design*; Harvard University Press: Cambridge, UK, 1977.
5. Erikson, E.H. *Identity and the Life Cycle*; WW Norton & Company: New York, NY, USA, 1994.
6. World Bank. Demographic Trends and Urbanization. Available online: https://www.worldbank.org/en/topic/urbandevelopment/overview#3 (accessed on 24 February 2023).
7. United Nations Children's Fund. Child Poverty. Available online: https://www.unicef.org/social-policy/child-poverty (accessed on 25 February 2023).
8. Sapsağlam, Ö. *Mutlu Çocuklar Çağının Sonu [The End of the Age of Happy Children]*; Pegem Akademi: Ankara, Turkey, 2021.
9. Global Humanitarian Forum. *The Anatomy of a Silent Crisis (Global Impact Report)*; Global Humanitarian Forum: Geneva, Switzerland, 2009. Available online: https://books.google.com.tr/books?hl=tr&lr=&id=4XjGa2E51G8C&oi=fnd&pg=PA1&dq=Global+Humanitarian+Forum.+(2009).+The+anatomy+of+a+silent+crisis+(Global+Impact+Report).+Global+Humanitarian+Forum.+&ots=qgs2fGaHC9&sig=MhvBJZGbDhexjf57T8CYQFJWhKc&redir_esc=y#v=onepage&q=Global%20Humanitarian%20Forum.%20(2009).%20The%20anatomy%20of%20a%20silent%20crisis%20(Global%20Impact%20Report).%20Global%20Humanitarian%20Forum.&f=falseAuthor (accessed on 24 September 2023).
10. International Organization for Migration. *Dictionary of Migration Terms*, 2nd ed.; Perruchoud, R., Cross, J.R., Eds.; IOM: Ankara, Turkey, 2011. Available online: https://publications.iom.int/system/files/pdf/iml31_turkish_2ndedition.pdf (accessed on 10 February 2022).
11. Kabisch, N.; van den Bosch, M.; Lafortezza, R. The health benefits of nature-based solutions to urbanization challenges for children and the elderly–A systematic review. *Environ. Res.* **2017**, *159*, 362–373. [CrossRef]
12. Lazariou, G.C.; Roscia, M. Definition methodology for the smart cities model. *Energy* **2012**, *45*, 326–332. [CrossRef]
13. Lelieveld, J.; Evans, J.S.; Fnais, M.; Giannadaki, D.; Pozzer, A. The contribution of outdoor air pollution sources to premature mortality on a global scale. *Nature* **2015**, *525*, 367–371. [CrossRef]
14. Onywera, V.O.; Adamo, K.B.; Sheel, A.W.; Waudo, J.N.; Boit, M.K.; Tremblay, M. Emerging evidence of the physical activity transition in Kenya. *J. Phys. Act. Health* **2012**, *9*, 554–562. [CrossRef]
15. Evans, G.W. Child development and the physical environment. *Annu. Rev. Psychol.* **2006**, *57*, 423–451. [CrossRef]
16. Myers, M.J.; Thurston, S.V.; Pearson, A.T.; Davidson, P.W.; Cox, C.; Shamlyae, C.F.; Cernichiari, E.; Clarkson, T.W. Postnatal exposure to methyl mercury from fish consumption: A review and new data from the Seychelles Child Development Study. *NeuroToxicology* **2009**, *30*, 338–349. [CrossRef]
17. Wang, S.; Zhang, J.; Zeng, X.; Zeng, Y.; Wang, S.; Chen, S. Association of traffic-related air pollution with children's neurobehavioral functions in Quanzhou, China. *Environ. Health Perspect.* **2009**, *117*, 1612–1618. [CrossRef]
18. Ferguson, K.T.; Cassells, R.C.; MacAllister, J.W.; Evans, G.W. The physical environment and child development: An international review. *Int. J. Psychol.* **2013**, *48*, 437–468. [CrossRef]
19. Gilchrist, K.; Brown, C.; Montarzino, A. Workplace settings and wellbeing: Greenspace use and views contribute to employee wellbeing at peri-urban business sites. *Landsc. Urban Plan.* **2015**, *138*, 32–40. [CrossRef]
20. Bratman, G.N.; Daily, G.C.; Levy, B.J.; Gross, J.J. The benefits of natüre experience: Improved affect and cognition. *Landsc. Urban Plan.* **2015**, *138*, 41–50. [CrossRef]
21. Bradley, R.H.; Putnick, D.L. Housing quality and access to material and learning resources within the home environment in developing countries. *Child Dev.* **2012**, *83*, 76–91. [CrossRef] [PubMed]
22. Berman, M.G.; Jonides, J.; Kaplan, S. The cognitive benefits of interacting with nature. *Psychol. Sci.* **2008**, *19*, 1207–1212. [CrossRef] [PubMed]
23. Glewwe, P.W.; Hanushek, E.A.; Humpage, S.D.; Ravina, R. *School Resources and Educational Outcomes in Developing Countries: A Review of the Literature from 1990 to 2011*; Working Paper No. 17554; National Bureau of Economic Research: Cambridge, MA, USA, 2011. Available online: https://www.nber.org/papers/w17554 (accessed on 30 November 2023).
24. Adams, S.; Savahl, S.; Florence, M.; Jackson, K. Considering the natural environment in the creation of child-friendly cities: Implications for children's subjective well-being. *Child Indic. Res.* **2019**, *12*, 545–567. [CrossRef]
25. Agarwal, M.K.; Sehgal, V.; Ogra, A. Creating a child-friendly environment: An ınterpretation of children's drawings from planned neighborhood parks of Lucknow City. *Societies* **2021**, *11*, 80. [CrossRef]
26. Brown, C.; de Lannoy, A.; McCracken, D.; Gill, T.; Grant, M.; Wright, H.; Williams, S. Child-friendly cities. *Cities Health* **2019**, *3*, 1–7. [CrossRef]
27. McAllister, C. Child friendly cities and land use planning: Implications for children's health. *Environments* **2008**, *35*, 45–61. Available online: https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=bc2c0b78c0aed58702b46e5e29cb915d4938847f (accessed on 30 November 2023).

28. Vinueza, V.A.C.; Niekerk, F.F.; van Dijk, T.T. Making child-friendly cities: A socio-spatial literature review. *Cities* **2023**, *137*, 104248. [CrossRef]
29. Elshater, A. What can the urban designer do for children? Normative principles of child–friendly communities for responsive third places. *J. Urban Des.* **2018**, *23*, 432–455. [CrossRef]
30. Nan, F. Policy innovation on building child friendly cities in China: Evidence from four Chinese cities. *Child. Youth Serv. Rev.* **2020**, *118*, 105491. [CrossRef]
31. Wilks, J. Child-friendly cities: A place for active citizenship in geographical and environmental education. *Int. Res. Geogr. Environ. Educ.* **2010**, *19*, 25–38. [CrossRef]
32. Basiago, A.D. Economic, social, and environmental sustainability in development theory and urban planning practice. *Environmentalist* **1999**, *19*, 145–161. [CrossRef]
33. Veisson, M.; Kabadayi, A. Exploring the preschool teachers' views on professionalism, quality of education and sustainability: International Study in Estonia and Turkey. *J. Teach. Educ. Sustain.* **2018**, *20*, 5–18. [CrossRef]
34. Corsi, M. The child friendly cities initiative in Italy. *Environ. Urban.* **2002**, *14*, 169–179. [CrossRef]
35. Riggio, E. Child friendly cities: Good governance in the best interests of the child. *Environ. Urban.* **2002**, *14*, 45–58. [CrossRef]
36. Chatterjee, S. Children's friendship with place: A conceptual inquiry. *Child. Youth Environ.* **2005**, *15*, 1–26. Available online: https://www.jstor.org/stable/10.7721/chilyoutenvi.15.1.0001 (accessed on 1 September 2023). [CrossRef]
37. Horelli, L. Constructing a theoretical framework for environmental child-friendliness. *Child. Youth Environ.* **2007**, *17*, 267–292. [CrossRef]
38. Topsümer, F.; Babacan, E.; Baytekin, E.P. City and child: Contribution of child friendly city ınitiative to city ımage. *Istanb. Univ. Fac. Commun. J.* **2009**, *35*, 5–20.
39. Koç, N.; Tavşancıl, E.; Demir, E. Initiative for child friendly cities' and 'Ankara through the eyes of children. *İdealkent* **2015**, *6*, 106–139. Available online: https://dergipark.org.tr/en/download/article-file/464436 (accessed on 10 October 2023).
40. Berkün, S. Evaluation of the child friendly urban managements by the children: Bursa case. *Bus. Manag. Stud. Int. J.* **2019**, *7*, 135–152. [CrossRef]
41. Akbay, M.K. Child friendly cities, rights of the child and pandemic. *Toplum Ve Sos. Hizmet* **2022**, *33*, 245–266. [CrossRef]
42. Memiş, L. From the children of the cities to the cities of the children: Child-friendly smart cities. *Pamukkale Üniversitesi Sos. Bilim. Enstitüsü Derg.* **2022**, *50*, 379–397. [CrossRef]
43. Nam, H.; Nam, S.I. Child-friendly city policies in the Republic of Korea. *Child. Youth Serv. Rev.* **2018**, *94*, 545–556. [CrossRef]
44. Tayefi Nasrabadi, M.; García, E.H.; Pourzakarya, M. Let children plan neighborhoods for a sustainable future: A sustainable child-friendly city approach. *Local Environ.* **2021**, *26*, 198–215. [CrossRef]
45. Tucker, R.; Andrews, F.; Johnson, L.; Palmer, J. Architects' professional perspectives on child-and family-friendly apartment design in Australia. *J. Asian Archit. Build. Eng.* **2023**, *21*, 2262–2276. [CrossRef]
46. Andal, A.G. Children's spaces in coastal cities: Challenges to conventional urban understandings and prospects for child-friendly blue urbanism. *Child. Geogr.* **2022**, *20*, 688–700. [CrossRef]
47. Derr, V.; Tarantini, E. "Because we are all people": Outcomes and reflections from young people's participation in the planning and design of child-friendly public spaces. *Local Environ.* **2016**, *21*, 1534–1556. [CrossRef]
48. Gökmen, H.; Tasci, B. Children's views about child friendly city: A case study from Izmir. *Megaron* **2016**, *11*, 469–482. [CrossRef]
49. Nordström, M. Children's views on child-friendly environments in different geographical, cultural and social neighborhoods. *Urban Stud.* **2010**, *47*, 514–528. [CrossRef]
50. Bridgman, R. Child-friendly cities: Canadian perspectives. *Child. Youth Environ.* **2004**, *14*, 178–200. Available online: https://www.jstor.org/stable/10.7721/chilyoutenvi.14.2.0178 (accessed on 10 September 2023). [CrossRef]
51. Woolcock, G.; Gleeson, B.; Randolph, B. Urban research and child-friendly cities: A new Australian outline. *Child. Geogr.* **2010**, *8*, 177–192. [CrossRef]
52. Savi, F. School attachment scale for children and adolescents: The study of validity and reliability. *Elem. Educ. Online* **2011**, *10*, 80–90.
53. Arslan, G. Psychometric properties of child and youth resilience measure (CYRM-12): The study of reliability and validity. *Ege J. Educ.* **2015**, *16*, 1–12. [CrossRef]
54. Çokluk, Ö.; Şekercioğlu, G.; Büyüköztürk, Ş. *Multi-Variable Statistical SPSS and Lisrel Practices for Social Sciences*; Pegem Akademi Yayınevi: Ankara, Turkey, 2010.
55. Van Vliet, W.; Karsten, L. Child-friendly cities in a globalizing world: Different approaches and a typology of children's roles. *Child. Youth Environ.* **2015**, *25*, 1–15. [CrossRef]
56. Yao, S.; Xiaoyan, L. Exploration on ways of research and construction of Chinese child-friendly city—A case study of Changsha. *Procedia Eng.* **2017**, *198*, 699–706. [CrossRef]
57. Racelis, M.; Aguirre, A.D.M. Child rights for urban poor children in child friendly Philippine cities: Views from the community. *Environ. Urban.* **2002**, *14*, 97–113. [CrossRef]
58. Ulrich, R.S.; Simons, R.F.; Losito, B.D.; Fiorito, E.; Miles, M.A.; Zelson, M. Stress recovery during exposure to natural and urban environments. *J. Environ. Psychol.* **1991**, *11*, 201–230. [CrossRef]

59. Kerret, D.; Orkibi, H.; Ronen, T. Green perspective for a hopeful future: Explaining green schools' contribution to environmental subjective well-being. *Rev. Gen. Psychol.* **2014**, *18*, 82–88. [CrossRef]
60. Savahl, S.; Tiliouine, H.; Casas, F.; Adams, S.; Mekonen, Y.; Dejene, N.; Benninger, E.; Witten, H. Children's subjective well-being in Africa: A comparative analysis across three countries. *Child. Youth Serv. Rev.* **2017**, *80*, 31–40. [CrossRef]