Understanding children's perceptions and activities in urban public spaces: The case study of Zrêbar Lake Waterfront in Kurdistan

Urban Studies

1–17

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DOI: 10.1177/0042098020903008

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Abstract

As public spaces are often designed based on adults' behavioural patterns and perceptions, children's perceptions and physical needs based on their body size have received less attention in both the design of urban spaces and urban studies. Focusing on the interpretive reproduction theory, this study aims to investigate children's perceptions of urban spaces. Using behaviour and mental mapping, this paper examines children's activities in public spaces as well as their mental images of such spaces. Behaviour mapping was conducted over 37 days on the Zrêbar Lake Waterfront in Kurdistan. Sketches drawn by 36 children were then analysed to identify children's perceptions of the Waterfront. Unlike conventional methods in which children's demands are determined through caregivers, this study focuses on engagement with children. Results indicate that two main factors of actualised environmental affordances (AEA) and safety-conscious parenting practices (SPP) have a significant influence on children's freedom of movement (CFM) and consequently children's activities in public spaces.

Keywords

child-friendly urban spaces, childhood studies, children's freedom of movement, environmental affordances, safety-conscious parenting practices

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摘要

由于公共空间的设计通常基于成人的行为模式和感知，因此儿童基于其身量的感知和身体需要在城市空间设计和城市研究中受到的关注较少。本研究以解释性再生产理论为核心，旨在研究儿童对城市空间的感知。本文运用行为和心理测绘，考察了儿童在公共空间的活动以及他们对这些空间的心理形象。我们在库尔德斯坦的择布里巴（Zrêbar）湖滨水区进行了37天的行为测绘。然后，我们分析了36名儿童的绘画，以确定这些儿童对该滨水区的看法。我们的方法与传统方法不同。在传统方法中，儿童的需要是通过照顾者来确定的，本研究则侧重于与儿童的互动。结果表明，实际环境提供（AEA）和安全意识育儿做法（SPP）这两大主要因素对儿童的行动自由（CFM）、进而对儿童在公共空间内的活动有重大影响。

关键词

关爱儿童的城市空间、儿童研究、儿童的行动自由、环境提供、安全意识育儿做法

Received June 2018; accepted December 2019

Introduction

How do researchers understand children's perceptions of and attitudes towards urban spaces? How do they assess the validity of their research? Answering these questions seems difficult since understanding children's perceptions and desires is a time-consuming process, and childhood studies are not generally valued if they are merely based on parents' opinion (Corsaro, 2012). On the other hand, because of growing urbanisation trends and the rising number of children residing in urban environments (Kytä et al., 2018), more attention should be paid to research on children focusing on understanding their perceptions and interests as urbanites. Public spaces can only be inclusive when they can afford a wide range of activities such as chatting, running, eating and watching (Gehl, 2010), and accommodate a diversity of ages and groups (Aram et al., 2019a).

Child-friendly cities are shown to be more resilient, better able to deal with climate change and economic instability and offer benefits to their residents regardless of their age (Freeman and Tranter, 2011). Nevertheless, little attention is paid to children's perceptions and use of urban spaces (Oliver et al., 2011).

Children's unsupervised use of public spaces is increasingly considered unacceptable because of social norms, leading to a decrease in their use of public spaces, which can be considered an 'environmental injustice' against them (Freeman and Tranter, 2011). Therefore, this study aims to explore children's desires and uses of an urban public space.

Environmental affordances of public spaces for children and their freedom of movement

Studies on children have shown that their physical activities in public spaces play a crucial role in their physical and psychological health (Oliver et al., 2016). According to Oliver et al. (2016), designing public spaces based on the size of children and their physical needs is essential for improving their spatial cognition. Autonomous relationships with their peers and surrounding environments are shown to be instructive for children (Freeman and Tranter, 2011). Children's activities in public spaces can improve their sense of place (Weller and Bruegel, 2009), social cohesion (Whyte, 1980), sense of community (Gehl, 2010), place attachment (Freeman and Tranter, 2011), and

are shown to have a positive effect on the livability of public spaces (Oliver et al., 2010).

Although the importance of children's independent mobility (CIM) – which refers to children's unsupervised travel to destinations such as schools, shops or to meet their friends – has been highlighted in previous studies (e.g. Kytä et al., 2018), little attention has been paid to children's freedom of movement (CFM). CFM refers to children's unsupervised interaction with others, their immediate surroundings, environmental affordances and physical activities in urban spaces. Freeman and Tranter (2011), Oliver et al. (2016) and Lin and Chang (2010) have emphasised the importance of children's unsupervised interactions with their surroundings and unsupervised physical activities in urban spaces, but they have not used a specific term such as CFM.

Most studies exploring the effects of environmental affordances on children's activities have focused on playgrounds, kindergartens and school yards (e.g. Cosco et al., 2010; Fjortoft et al., 2009). The few studies exploring CFM in urban public spaces have investigated children–environment interactions and their environmental affordances for children. Safety-conscious parenting practices (SPP), referring to strong parental control over children's activities because of the unsuitable design of urban spaces for children's play and movement, are also a gap in the extant literature.

The term 'affordance' refers to the perceived functional and behavioural opportunities and limitations in built environments (Prieske et al., 2015). However, it can be expanded to include emotional and social opportunities and restrictions that an environment offers to users (Kytä et al., 2018). This term breaks the subject–object dichotomy, meaning that an affordance is not a characteristic of a public space nor a characteristic of the individual, rather something between them (Hume et al., 2004).

Affordances do not cause certain behaviours but possibilities for the occurrence of them (Gehl, 2010). According to Prieske et al. (2015), there are two types of environmental affordances. First, actualised environmental affordances (AEA), which are understood by users, and where the environmental conditions support such behaviours and activities; and the second is potential environmental affordances (PEA), referring to the full range of affordances available to users, but where the environmental conditions do not support all types of activities or behaviours. Hume et al. (2004) have shown that children's perceptions are significantly associated with actualised environmental affordances (AEA) and their interactions with outdoor settings.

Pioneers of environmental studies have offered insights into child–environment interactions. Whyte (1980) stated that children are not attracted to homogeneous spaces. Gehl (2010) highlighted that children prefer to use secondary seating in public spaces. Primary or formal seating refers to benches and chairs whilst secondary or informal seating is provided by building walls, stairways, pedestals and steps. Recent studies have mostly concentrated on playscapes. Fjortoft and Sageie (2000) found that natural landscapes have unique qualities to meet children's needs, providing a stimulating play environment. By analysing children's heart rate in two primary schools, Fjortoft et al. (2009) showed that environmental affordances do not have a significant impact on children's activity level but on the types of behaviours they conduct. On the other hand, Cosco et al.'s study (2010) found that there is a direct relationship between environmental affordances, behaviour settings and layout of spaces with the level of children's activities in playgrounds. The study by Oliver et al. (2016) revealed that the invitational character of affordances is the primary factor in child-friendly urban spaces. They argued that designers should consider

affordances of children's environments as a priority above their form because, for a playing child, functional significance of a space and behaviours it affords are more important than its form.

According to the interpretive reproduction theory, children learn rules from the world of adults (Corsaro, 2012). They adopt and reproduce them in creative ways through a process that challenges adults' rules. In this process, children do not simply internalise society and culture, but they actively contribute to cultural production and change, and address their unique peers' concerns (Corsaro, 2011). Children's role-playing, therefore, is not merely a physical activity; rather it includes subjective evaluations that are valuable in understanding children's perceptions and understandings. According to this theory, mental images of children are formed based on their activities, behaviours and lived experiences. Therefore, decoding and interpretation of their mental images can help in understanding their environmental desires and needs. In the interpretive reproduction theory, focus-group interviews with children are considered to be a helpful method in encouraging children to engage in discussions with their peers and to demonstrate their concerns and desires. Focus groups provide a friendly atmosphere between researchers and children in which they are encouraged to talk about their perceptions (Corsaro, 2012).

Methodology

Drawing on interpretive reproduction theory (Corsaro, 2012), a mixed-method approach was employed to understand children's use and perceptions of Zrêbar Lake Waterfront:

- observations and behaviour mapping to investigate children's activities and behaviours;
- mental mapping and focus-group interviews to evaluate children's insights

regarding the Zrêbar Lake Waterfront; and

- tracking to explore children's activities and behaviours and their link to environmental affordances (Figure 1).

Study area

Zrêbar Lake Waterfront in Kurdistan was selected as a case study (Figure 2). Kurdistan is a historic region which is known as the land of mountains in the Middle East. Contemporary use of the term refers to the following areas: south-eastern Turkey (Bakûr or Northern Kurdistan), northern Syria (Rojava or Western Kurdistan), northern Iraq (Başûr or Southern Kurdistan), and north-western Iran (Rojhilat or Eastern Kurdistan). The Zrêbar Lake Waterfront has been selected since it is one of the main public spaces for locals to visit (Mansournia et al., 2016) and is also one of the main tourist destinations of the Rojhilat Kurdistan (Mansournia et al., 2016). Therefore, there are usually many people of different ages using this space. This public space is surrounded by pristine nature and has spectacular landscapes combining the mountains and forest scenery of the Zagros Mountain Ranges.¹ The recreational zone of this waterfront has a linear shape with an area of 12,000 m², a length of 515 m and variable width.

Observation and behaviour mapping

Mapping behaviours and activities through observation is an unobtrusive approach for registering activities and behaviours occurring in public spaces and helps researchers to comprehend patterns of behaviours and activities, as well as their underlying environmental affordances (Cosco et al., 2010). There are three observation techniques: stationary behavioural mapping, tracking (recording pedestrians' movements by

Figure 1. Study process.

drawing lines that illustrate routes, behaviours and activities on a base map) and physical traces (Gehl and Svarre, 2013). This study utilises systematic observations and behaviour mapping to identify children's activities and the underlying environmental affordances in a public space.

Urban designers' and architects' blueprints are usually used as a base map for behavioural mapping. However, they usually do not include environmental affordances such as portable features of space (e.g. chairs and signages). Therefore, a week prior to the observational study, the research team were briefed on the mapping methods and observations process. A one-day trial was also conducted prior to the study and the

research team spent considerable time on site to become familiar with users' activities (Level 1 in Figure 1). As observations were unobtrusive, the research team avoided direct involvement in the activities of users, registering all observed activities and behaviours on behaviour maps. Because of the wide and linear configuration, the area was divided into three sections of eastern, middle and western wings for behaviour mapping, and three researchers – one person in each section – simultaneously conducted the observations and behaviour mapping (Figure 2). The site was divided into three sections in a way that the three observers could clearly see and register all activities and behaviours (Level 1 in Figure 1).

Figure 2. The study area and the observer’s location.

Figure 3. The number of days and hours of place-based studies.

Behavioural patterns and environmental affordances were recorded on data sheets from May 2015 to February 2016 for 120.5 hours, which formed the behavioural mappings (Level 2 in Figure 1). Observations continued until no new activity was observed. Overall, the process of behaviour mapping took 37 days (Figure 3). Observations were conducted both on weekdays and weekend

days to ensure most types of activities were recorded.

Owing to maintenance work conducted by the local council, the number of observation days in spring was less than in other seasons. During summer, the 90-day school holiday triggered several uses and activities both by the locals as well as by tourists. Therefore, the behavioural patterns varied

Figure 4. Observed activities during 6 September 2015 in the middle section.

richly (Figure 4). The number of observation days in summer was considerably more than other seasons. During the observations, 4232 stationary activities were mapped. The findings showed that after teenagers, children were the biggest group of users of the Zrêbar Waterfront. The research team recorded each user and a series of their attributes (whether they were alone or in a group, sex, age and posture). These data were then mapped through a multilayer method using GIS.

Tracking was conducted over 15 days for a total of 75 hours (Level 2 in Figure 1). The movements through space of 82 children were registered on a base map and redrawn in AutoCAD. Although in some cases children were accompanied by their families, tracking was only conducted according to children's movements. For more reliable interpretation of children's movements through space, photographs of their activities were also taken during tracking (Figure 5).

Mental mapping and focus-group interviews

Many researchers have stressed the importance of understanding children's perceptions of public spaces (e.g. Fang and Lin, 2016). Such perceptions can be understood

through mental maps concerning activities, meanings and values of spaces (Corsaro, 2012). There are multiple definitions for the term. A 'mental map' is a mental structure that individuals use to understand their environments (Mondschein et al., 2010), which allows them to bridge between different times and use past experiences in order to understand present and future conditions (Tversky, 2003). Some researchers believe that a mental map goes beyond cognition and it has been regarded as a process involving several layers such as awareness, impression, information, feelings, images and beliefs by which individuals can interact with their environment (Mondschein et al., 2010).

Following observations over summer, researchers recruited primary school aged children through the Institute of the Intellectual Development of Children and Young Adults (IIDCYA). IIDCYA is a semi-governmental centre that aims to discover children's aptitudes and enhance their skills and abilities. The centre is open all year round and, for a small and affordable registration fee, it is accessible to a variety of families with different financial circumstances. Recruitment through this centre was preferred to schools since it has better facilities and a more child-friendly environment (Figure 6).

Figure 5. Children’s tracking map and their stationary activities in the three parts.

Figure 6. Mental mapping and focus-group interviews in August 2015 (permission for publishing these pictures has been received from children, educators and parents).

Based on the interpretive reproduction theory (Corsaro, 2012), the process of developing mental maps was designed to include three stages. In the first stage, researchers and tutors initiated the focus-group discussions about observed activities. Focus-group

Behaviors	Shopping	Climbing	Cycling	Eating and drinking	Feeding fish	Running	Watching people	Watching photographs	Taking a ball	Playing with a ball	Roaming	Watching the landscape	Chasing water	Touching statues	Touching cars	Driving toy cars	Playing with balloons
No. of children	67	52	55	148	129	326	193	229	51	30	183	210	112	186	45	103	
Percent	4.9%	3.7%	4%	10.7%	9.3%	23.7%	14%	16.6%	3.7%	2.1%	13.3%	15.2%	8.1%	13.5%	3.2%	7.4%

Figure 7. The number and percentage of children's activities in the Zrêbar Waterfront; several children climbed the waterfront edge to see the water.

discussions are used as a complementary method to mental maps to ensure a better interpretation of children's drawings.

Although IIDCYA's tutors were not involved in the research process, they were asked to start the early discussions with children to make sure children felt comfortable. During this time, researchers focused on creating a friendly atmosphere and gaining children's trust by sitting close to them and listening to their discussions. Children were encouraged to think about the environment and imagine the Zrêbar Lake Waterfront. Researchers encouraged children to discuss their favourite elements of and activities on the Waterfront. Gradually, researchers talked to a lesser extent and gave more opportunities to children to talk about their favourite activities. In the second stage, children discussed their favourite parts of and activities on the Zrêbar Lake Waterfront and researchers were not directly involved in the discussions. The peer-discussion stage was important since it could help researchers to better understand children's perceptions

and desires. In the third stage and based on the observed activities, children were provided with simple instructions and were encouraged to draw their perceptions of the Waterfront (e.g. what do you like to do when you go to the Zrêbar Lake Waterfront?). Drawing instructions were designed according to children's education level and their cognitive development (Corsaro, 2012). This process took place on four days and lasted a total of 12 hours (Level 2 in Figure 1).

Piaget (1950) proposed that cognitive development in humans occurs in four stages: sensorimotor stage, pre-operational stage, concrete operational stage and formal operational stage. Children aged 7–11 years are typically in the concrete operational stage where they begin to increase their awareness of external environments (Fang and Lin, 2016). Therefore, mental maps and focus-group interviews were conducted in IIDCYA with children of 7 to 12 years of age. Each cohort included 30 students. Because of gender segregation, 60 children

(30 boys and 30 girls) attended the focus-group interviews (Level 2 in Figure 1). Overall, 36 children (29 girls and seven boys) drew a painting showcasing their favourite activities at the Waterfront. The number of boys dropped significantly as many did not participate in the drawing activity. However, all children shared their thoughts and views with peers who were actively drawing. Content analysis was used for the qualitative analysis of both focus-group discussions and mental maps. The text from discussions and the elements of children's drawings were coded into different categories. The two major codes were 'the environmental affordances' and 'activities and behaviours', each including several subcategories. These codes were then counted and important themes were identified.

Findings

Behaviour mapping

Overall, 16 types of activities were recorded during observations (Level 3 in Figure 1). Running was the most frequent activity (Figure 7 and Figure 10). Other frequent activities included water-related activities, interacting with sculptures and climbing. It is worth mentioning that children who were seen running conducted more of these activities (play with the water, interact with sculptures, feed the fishes and climbing) compared with other children. The middle section provided the highest number of opportunities for these activities (Figure 8).

On the waterfront, there are PEAs for playing with water, fish feeding and other water-related activities. In most parts, because of the impermeable edge along the waterfront, the water-related activities are considered as PEA (Figure 7) and they have not been perceived as AEA. However, there is an area of deterioration in the edge of the middle section (the left photo in Figure 8) which is one of the most popular spots for

children as it gives them an opportunity to play in water. In fact, some PEA of water-related activities, such as fish feeding and feet dangling in water, are considered as AEA in this section. Besides, there are two sculptures in the middle section which are considered as AEA as children can touch, climb up and play with them (Figure 8). Therefore, the middle section offers a greater number of AEA for children to engage with the environment and conduct more physical activities.

Observations showed that children prefer standing to sitting (Figure 8). Secondary seating opportunities such as edges and pedestals were more interesting to children, compared with primary seating opportunities such as benches and chairs. Tracking analysis demonstrated that the average duration of stay at the Waterfront was about 35 minutes and most of the families' time was spent in the middle section (Figure 5).

Findings of focus groups and mental mapping

The focus-group discussions showed that children were very interested in water-related activities, natural elements and freedom of movement in the environment. None of the children talked about their parents when discussing their activities at the Waterfront.

After focus-group discussions, children drew their favourite activities to engage in at the Zrêbar Lake Waterfront. Qualitative content analysis revealed that 23 elements appeared in children's drawings (Level 3 in Figure 1). Children paid more attention to natural elements compared with the built environment (Figure 9). Playing with water was the most popular activity in the drawings. Most children painted direct physical contact with the water in the form of risky or exciting activities such as diving, feet dangling into the water and a water slide.

Figure 8. Children's postures and behaviours, actualised environmental affordances (AEA) in the middle section.

Discussion

This study focused on both children's activities as well as their perceptions of public spaces. The first section of the discussion explores findings from observed activities and the second section focuses on their perceptions, and by integrating these discussions, the key findings will be drawn (Level 4 in Figure 1).

Behaviours discussion

The findings showed that the layout of the Zrêbar Lake Waterfront is not designed with children in mind and therefore most of the environmental affordances are not actualised

and identified as PEA. The environment was not very accommodating for some of the activities children were interested in such as fish feeding/watching, feet dangling in water and climbing. Parents generally did not allow their children to engage in these activities unless they perceived them to be safe. The observations showed that parents allowed children to touch the sculptures, play with a ball, drive toy cars, roam around and take photographs, as the risk of injury for these activities was perceived to be low. Parents' preventive reactions to activities such as water-related activities and climbing showed that these activities are perceived to be risky. Some children negotiated with their parents to safely engage in these activities (Figure 7).

	Object	number
Natural	Water	36
	People	28
	Mountain	14
	Sun	19
	Fish	15
	Duck	5
	Tree	14
	Canebrake	6
	Meadow	11
	Flower	6
	Sky	8
Artificial	Pavement	8
	Boat	11
	Furniture	10
	Sitting edges	11
	Play equipment	11
	Villages around Zrebar Lake	4
	Water elements	6
	Car	6
	Playground	2
	Trash bin	3
	Flag	2
	Paraglider	3

Figure 9. The number of times different elements appeared in the children's drawings.

Figure 10. Running was the most frequent observed activity among children.

Therefore, the environment does not provide safe AEA for children to conduct such physical activities without potential risks. In fact, lack of attention to younger users in the design of the Waterfront engenders a high level of SPP for many of the children's activities. The lack of such safety measures in the design has led to a high level of SPP

concerned with children's health, which has negatively influenced CFM. Therefore, it is recommended that these activities be considered in the transformation of the Waterfront and to provide appropriate opportunities for children to interact with water. Through such measures, water-related activities will be transformed from PEA to AEA and these

activities may not be considered risky. It seems that a larger number of AEA and a smaller number of PEA at the Zrêbar Lake Waterfront can increase CFM and decrease restrictions on children's activities through SPP.

Running was the most frequently observed activity among both boys and girls (Figure 7). The flat surfaces at the Waterfront provided an opportunity for children to run with a low risk of injury compared with the above-mentioned risky behaviours. Parents allowed their children to run with minimum preventive reactions. This result reflects those of Gehl and Svarre (2013) and Cosco et al. (2010) who also found that running is the most popular activity in children.

Our observations showed that running as the most frequent activity in the environment (Figure 10) is related to CFM, which is restricted through SPP. It seemed that children ran to increase their distance from parents and moderate SPP. In these circumstances, children had the chance to climb up sculptures and even engage in water-related activities before their families got closer and stopped them. Parents watching their children engaging in these activities usually allowed them to continue their play and spent more time in the space. However, these activities were closely monitored by parents, which may be an indicator of their anxiety concerning their children's health. Findings of this research show that engagement with the environment among children who ran and got distance from their families was considerably more than among children who did not run; 95% of children who ran had direct interactions with sculptures or engaged in water-related activities, whilst only 15% of children who did not run had opportunities for these activities. These findings are confirmed by the tracking observations. Tracking showed that children who ran and increased their distance from their parents spent more time in the environment.

The analysis revealed that there is a correlation between the number of AEA and the length of stay of families whose children were running to keep distance from their families. These families usually spent more time in the middle section where there are a few sculptures and opportunities to climb and play with water (Figure 8). Therefore, running seems to be the children's approach to temporarily reduce the level of SPP and so it can be said that running is the marker of children's desire to interact with the environment and do exciting activities.

The findings of this study suggest that public spaces designed considering younger users including children can afford more AEA, moderate the level of SPP and thus can provide a high degree of CFM. As CFM is one of the key needs of children in outdoor environments (Oliver et al., 2016), urban designers should focus on transforming PEA to AEA to make cities more child friendly. In spite of its significance, CFM has received little attention so far in the literature.

Our observations indicate that standing and secondary seating are the most popular postures for children (Figure 8) whereas families usually use formal (primary) seating such as benches. It seems that there is a correlation between AEA and these postures. These postures suggest that children tend to engage in active behaviours; 80% of children who stopped in the middle section had these postures, whilst this number for the eastern and western sections that accommodate more PEA than AEA were 40% and 25%, respectively.

Mental maps discussion

As mentioned before, focus-group discussions were used to provide a friendly atmosphere, gain children's trust and encourage them to think and discuss their concerns about the Zrêbar Lake Waterfront as well as

Figure 11. One of the drawings which did not include parents; a child playing on a slide by the water.

drawing them. In these meetings, children were encouraged to talk about their favourite activities, discuss the activities they conduct and draw them in their paintings. Because of the limitations in managing a large number of children, the number of mental maps in childhood studies are usually low (Corsaro, 2012). The number of children in focus-group discussions is also important for creating a friendly atmosphere for them to feel comfortable to discuss their perceptions and desires.

In spite of the similarities between children's observed activities and the ones they drew, mental maps mostly included PEA rather than AEA. Children showed a strong desire for engaging with the environment and mainly water-related activities (Figure 11). Another interesting finding was that 84% of the children who drew PEA in their drawings did not draw their parents, although during the observations all children were accompanied by their parents. Only 16% of children drew a parent in their paintings (Figure 12) in which children did not draw any PEA.

Comparing behaviour mapping findings and mental maps

As discussed above, most children drew PEA of the Zrêbar Lake Waterfront and their interactions with the environment in their paintings. However, many of these activities in the built environment could not become actualised in a safe manner.

Parents usually supervised their children engaging in these activities, showing that they were considered to be risky. Therefore, two key factors had a decisive role in CFM for these activities: SPP and AEA. The findings of this research indicated that the number of AEA can have a significant influence on SPP and consequently the level of CFM. In settings where the number of safe AEA is small, SPP increases, which leads to a lower degree of CFM. At the Zrêbar Lake Waterfront, several children chose to run to creatively bypass or moderate SPP and actualise various PEA.

This study has found that although social behaviours are an indicator of human comfort in public spaces (Aram et al., 2019b; Gehl, 2010; Mansournia et al., 2016), if they

Figure 12. There are no risky behaviours shown in drawings including parents.

are not child-friendly and do not accommodate several AEA, they can lead to a high level of SPP and a decrease in CFM (Freeman and Tranter, 2011). Therefore, observational studies of children's activities and behaviours in public spaces cannot depict a full understanding of children's desires. In this study, alongside behaviour mapping, mental maps have been used to better comprehend how children wish to behave in public spaces (Level 4 in Figure 1).

This study contributes to the literature in several ways. The observations and behaviour mapping over 37 days were more intensive compared with previous studies (e.g. Cosco et al., 2010; Fjortoft et al., 2009). Patterns of observed activities confirmed that the environment provides opportunities for their occurrence and they were not accidental, making the recommendations of this study a reliable resource for design of public spaces. Previous studies concerning children–environment interactions are mostly focused on home–school routes (e.g. Oliver et al., 2016) or children's activities in playgrounds (e.g. Cosco et al., 2010; Fjortoft and Sageie, 2000; Fjortoft et al., 2009) and public spaces

are yet to be understood. Most studies concerning mental maps of children have also been concerned with home–school routes (e.g. Mondschein et al., 2010) and they have not focused on a specific public space.

Conclusion

Drawing on the interpretive reproduction theory, this study showed that studying CFM, PEA, AEA and SPP is an appropriate approach for more in-depth understanding of children's mental maps and activities in urban public spaces. Further research on these parameters can help architects and urban designers to design more child-friendly public spaces. Moreover, with emphasising CFM as one of the key parameters of child-friendly public spaces, this study recommends considering safe and suitable environmental affordances in the design of future public spaces. Public spaces that afford more AEA can moderate the level of SPP and can provide a high degree of CFM. Urban designers, landscape architects, play-scape designers and environmental designers, therefore, should focus on children's needs

and desires as well as those of adults in order to improve outdoor environments as play habitats for children.

Acknowledgements

We wish to acknowledge Mohsen Alimoradi, Behrouz Bigharaz, Asrin Hamed, Alireza Garavand, Borhan Amjadinia, Faeze Behnamifard, Shahab Tar, Hussein Tarhani and Borhan Mansournia, who helped us in the behaviour mapping process; Edris Jahangir and Omid Vakili-Chenaran for guiding us in the use of GIS; and Professor Marketta Kyttä for helping in the interpretation of the findings.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Note

1. Çiyayên Zagros.

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