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STREET SPACE AS PLAYGROUND: INVESTIGATING CHILDREN'S CHOICES

A. GOSPODINI & V. GALANI
Department of Planning and Regional Development, University of Thessaly, Greece.

ABSTRACT

Streets represent the most common, extensive and thereby important element of public open space in cities. However, during the last four decades children have had decreasing presence in the streets; also, fewer streets are serving as unspecialised playgrounds for children. This paper attempts to describe and interpret this phenomenon from the point of view of spatial structure and morphology; it investigates the syntactic and morphological properties of streets that may have an impact on children's choices. For surveying children's preferences, empirical fieldwork has been carried out in Igoumenitsa, a small town in northwest Greece. The fieldwork is now expanding to Thessaloniki, the second largest city in Greece. For the analysis of the syntactic properties of street space, the research has applied 'syntactic analysis of spatial configuration' as introduced by Bill Hillier (UCL). For the analysis of the morphological properties of street space, the research introduces a methodology based on the form and meaning of the boundaries shaping the street space. The research outcome points that the syntactic and morphological properties of streets are critical factors controlling children's choices.
Keywords: children, city, patterns of use, public open spaces.

1 INTRODUCTION

It is well known that in pre-modern European and American cities, streets constituted densely used and multifunctional spaces apart from being playgrounds for children. In the course of the last four decades or so, there has been a gradual reduction in the outdoor play of children. Public open spaces, such as streets, squares, alleyways, walkways and the like, tend to be more a part of the adult world [1, 2].

Many studies have been concerned with this shift from different perspectives – spatial, social, anthropological, psychological – and the decreasing presence of children in public open spaces has been regarded as relating to other major changes in contemporary cities and societies. A number of studies [1–6] associate the phenomenon to the increased car traffic and criminality in our cities that have made public open spaces an unsafe environment for children. Parents appear to be increasingly concerned with outdoor play since children may easily become victims. In addition to this, other studies [6–8] develop the argument that the mobility patterns of children in the city have themselves changed; their everyday journeys in the neighbourhood or/and the city have been mostly 'motorised' in the last three to four decades. This has had a negative impact on the presence of children in the streets, squares, alleyways, walkways, etc. since it eliminates their accidental presence in these places and also reduces their independent mobility.

Despite such convincing arguments and interpretations, streets that are used as playgrounds seem to still have great advantages for children. Jane Jacobs was first to point out as early as 1961 that children need space for informal play – 'an unspecialised outdoor home base from which to play, to hang around in, and to help form their notion of the world'. And streets are exactly this kind of space ([9], p. 81). Since then, similar arguments have been repeatedly supported by many studies. Streets are still acknowledged as places where children and young people can spend their time with peers and encounter adults too [10–12]; streets are places where children can explore their social relations and positions, develop social competencies and achieve maturity and independence [10, 13]. Also, in streets, children have many play choices (ball games, wheeled toys, equipments

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from home, etc.), as streets are linear, hard and flat surfaces [12, 14]. On the basis of these virtues of streets, one may understand children's persistent preference to use streets as playgrounds rather than other places 'created' for them by adults [1, 10, 15].

In the above framework, the question of 'how to make the streets of our cities as friendly as possible to children' is still a topical subject. This paper, aiming at the improvement of the physical planning and design of streets in order to make them as friendly as possible to children, attempts to investigate the syntactic and morphological properties of street space that may have an impact on children's choices whether to use a street as playground or not.

2 DESCRIBING USE-DENSITIES OF STREETS AND OPEN SPACES IN TERMS OF FORM AND SPATIAL CONFIGURATION: THE CONCEPTUAL CONTEXT FOR INVESTIGATING CHILDREN'S CHOICES

Following the 1960s and 1970s and the failure of many modern housing schemes in European and North American cities to provide lively streets, popular squares and open spaces, there has been a consensus among planners and architects that (1) the resident density of areas, (2) the land use mix and (3) the pedestrian/vehicular interaction are critical parameters for the creation of densely used public open spaces. A number of studies [9, 16–23] have also pointed to form and spatial configuration as critical parameters of the liveliness of the streets and spaces.

According to Schumacher [17], the capability of users to perceive the street as a figure, promotes a sense of enclosure and orientation and at the same time 'delimits the territory of the public realm as including its vertical binding surfaces, the facades of buildings' ([17], p. 139). The properties of a street or an open space to create a sense of 'enclosure' (Fig. 1a) and allow its figural reading by the user are considered preconditions for the dense use of space [16, 17]. Anderson [18] proposed an analysis of the plan according to the *boundary articulation* of space. The street is not considered uniquely bound – operationally, socially, conceptually or physically – by a curb line or a property line or a building line. Each of these lines may mark the boundary of the intersubjective influential space of the street. That boundary is redrawn at various times and by various users. For instance, for some users in some locales, the street space may extend into the shops, onto the stoops or into a church ([18], p. 277). In this respect, his analytic disaggregation of the city has employed distinctions for spatial zones such as 'spaces of public claim', 'spaces of dwelling' and 'spaces of occupational claim'. Building on Anderson's theory, Caliandro [19] states that, 'control over the form of public-use boundaries can be a direct means of establishing intimate relationships of use and form between activities and the right-of-way, and therefore a renewed concept of the street may emerge – one that is capable of accommodating an urban lifestyle dependent on contact and interchange and of fostering an urban structure amenable to intense pedestrian life' ([19], p. 83) (Fig. 1b).

Other approaches predominantly focus on the 'spatial configuration' of the urban grid on a large scale. Hillier [20, 24] was the first to develop the argument that the spatial configuration of streets within the larger urban grid is a critical generator of pedestrian movement patterns. He introduced the term *natural movement* [24] that is 'the proportion of urban pedestrian movement determined by the grid configuration itself' ([24], p. 32). This term, 'has come to light as a formal and empirical phenomenon through the implication of new techniques of 'configurational analysis' known as 'space syntax' to the analysis of the local and global structure of the urban grid, and their coupling to simple techniques for observing space use and movement' ([24], p. 32). Multiple case studies conducted in different urban grids confirmed the strong correlation between the spatial parameters, especially integration and observed movement ([24], pp. 44–61). On the same line, Jane Jacobs in her book 'The Death and Life of Great American Cities' had earlier supported that the main factor that influences

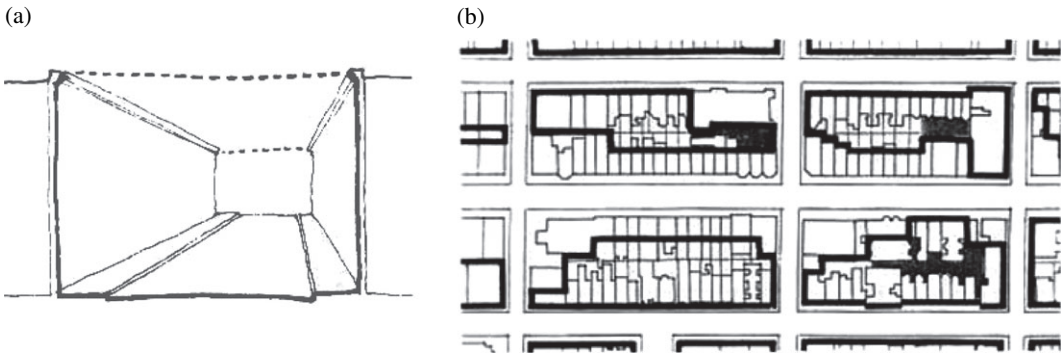

Figure 1: Diagrams of the street as (a) figure ([17], p. 138) and (b) Public-use boundaries, ([19], p. 162).

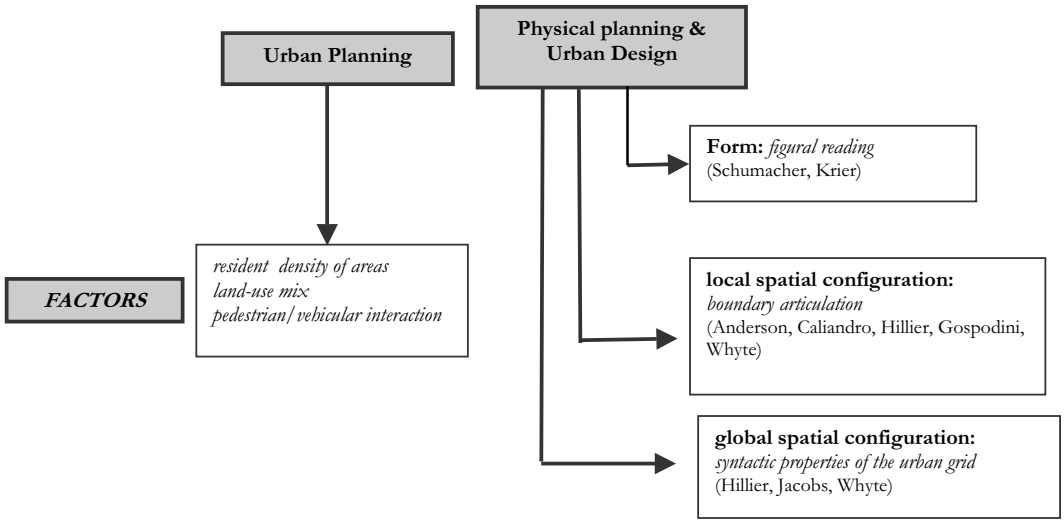

Figure 2: The main factors influencing the use of streets and open spaces.

the use of a square, a park and the like is their location within the grid. 'The worst problem is that parks are often located precisely where people do not pass by and likely never will. A city park in this fix, afflicted with a good size terrain, is figuratively in the same position as a large store in a bad economic position' ([9], p. 117). Also Whyte [23], following a three-year field study about the use of squares in New York, concluded that the most critical factors of the use-density of public open spaces are: (1) the density of moving people in the surrounding streets of the square and (2) the degree of easy access of the square from the surrounding streets. 'The key factor for a plaza is not in the plaza. It is the surrounding streets. A good plaza starts at the street corner. If it is a busy corner, it has a brisk social life of its own' ([23], p. 57). This argument has been also supported by research in 79 London squares [25] using Hillier's analysis of spatial configuration and systematic observations of the use patterns. Figure 2 summarises the main factors influencing the use-density of streets and public open spaces.

3 THE CASE STUDY

In order to investigate children's choices: (1) whether to use a street as a playground or not and (2) which streets tend to be more attractive, we took into consideration all the above parameters. In the case study on the town of Igoumenitsa, research was based on the analysis of both the properties of streets and the use patterns of streets by children. The analysis of the properties of streets took into account: (1) the resident density, (2) the land uses, (3) the car traffic, (4) the global spatial configuration of streets within the urban grid of the town as a whole and (5) the form and local spatial configuration of streets in terms of figural reading and boundary articulation. The use patterns of streets by children were analysed by means of fieldwork and systematic observations.

3.1 The syntax of the urban grid

For the purposes of investigating the global spatial configuration of streets, the urban grid of the town of Igoumenitsa was first analysed using Hillier's methodology of syntactic analysis of spatial configuration and the Wizzy Axman 5 software (UAS, University College London). The axial map of Igoumenitsa, presented in Fig. 3a, consists of 116 axial lines, which are the longest and the fewest lines that can be drawn through the spaces of the grid. Figure 3b shows the integration values of the lines in a range of colours from red, representing the most integrated lines, to indigo, representing the most segregated lines. As evident, the line with the highest integration value is the Kyprou Street, the main commercial street of the town. The second most integrated street is Eth. Antistaseos Street – the coastal avenue. One notices that the more integrated lines correspond to the streets running parallel to the coast. In the everyday life of the town, these streets exhibit the highest densities of people and vehicles; and the main commercial functions of the town have also been developed in these streets. On the contrary, exclusively residential districts of the town appear on the map as areas with the most segregated lines (Fig. 3c).

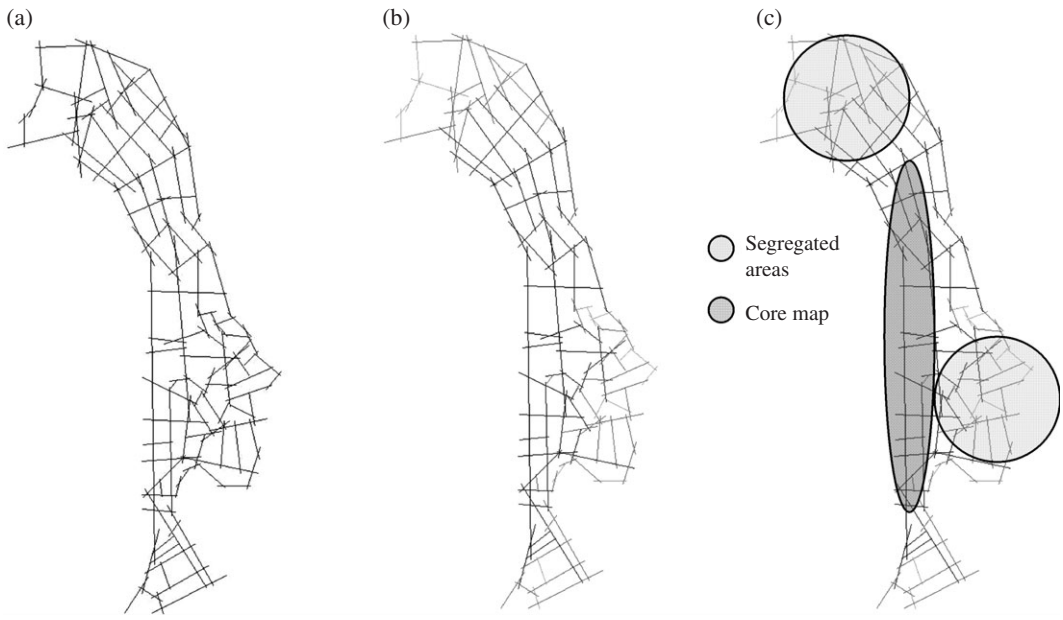

Figure 3: (a) Axial map, (b) Pattern of integration and (c) Core map and segregated areas.

Of the most integrated lines, 10% consist the integration core (see map in Fig. 3c), which, in the case of Igoumenitsa, has a linear shape running parallel to the coastline and at the same time penetrating the commercial centre of the town and the geographical heart of the grid. The core also penetrates the coastal avenue, supporting the argument that the waterfront is usually the syntactic 'heart' of Greek coastal cities [26]. As mentioned before, the natural movement has been shown to have a strong correlation with integration. The higher the integration value of a street, the bigger is the density of its users [24, 25]. So streets with high or medium integration values tend to attract the largest proportion of people's movements.

3.2 Sample of streets

In the urban grid of Igoumenitsa, a sample of 10 streets was chosen. The criteria of the selection of the sample were the following: (1) the global spatial configuration and especially the integration value of the streets – streets with low, medium and high integration values were included in the sample; (2) the land uses of the streets – commercial and residential streets and streets with land use mix were included in the sample; (3) the form and local spatial configuration of the streets in terms of topography (sloped and flat streets were included), figural reading (streets with a strong sense and with no sense of enclosure were included), articulation of boundaries by the building facades and other elements (streets strongly bounded and weakly bounded were included). The sample of streets and their characteristics are represented in Table 1.

3.3 The fieldwork on children's choices

For analysing the use patterns of streets by children, we carried our systematic observations in the sample streets. The fieldwork took place in July, when the weather in Greece is good and schools are closed for the summer. The observations were carried out during both weekdays and weekends for a period of four weeks; they were carried out during two periods of the day (10:00–12.30 and

Table 1: The sample streets and their characteristics.

	Urban planning variables			Global spatial configuration	Form and local spatial configuration	
Sample street	Resident density	Land use	Car traffic	Integration value	Figural reading well-bound space, sense of enclosure	Slope
1. Lampraki	High	Commercial	Low	Low	Yes	No
2. Antistaseos	Low	Mixed	Dense	High	No	No
3. M. Alexandrou	High	Residential	Low	Low	Yes	No
4. Kougiou-Kiafas	Low	Residential	Low	Low	No	No
5. Kyprou	High	Commercial	Dense	High	No	No
6. Bizaniou	Low	Residential	Low	Low	No	Yes
7. Sellon	Low	Mixed	Dense	Low	No	No
8. Skilosofou	High	Residential	Low	High	No	Yes
9. Tzavelenas	High	Residential	Dense	High	Yes	Yes
10. 23rd Februariou	High	Mixed	Dense	High	Yes	Yes

18:00–20:30) taking into account the climatic and natural light conditions in Greece. In each street, the period of observations lasted for 15 minutes in the morning and 15 minutes in the evening. The main target group of children were those between 5 and 12 years old.

The following observations were recorded:

- The number of children in the street;
- The types of activities the children were engaged in. As such, we distinguished informal/unorganised play, ball games, wheeled toys (e.g. skates and bicycles), playground equipment and other toys brought from home.

3.4 Data analysis

The data of the fieldwork was then analysed and correlated to the spatial and formal properties of the streets. The first to be noticed is that the presence of children in the streets of Igoumenitsa is limited. According to the fieldwork data, the number of children playing in, for example, schoolyards or squares, is larger than the number of children using streets as playground. Only 28% of the total numbers of children observed were found playing in the sample streets whilst 72% played in open places other than streets.

In Fig. 4, the diagram shows the density of children in each sample street. As it can be easily noticed, there are some streets that have almost zero use-density since the presence of children was very small and statistically insignificant. The larger use-densities were observed in Grigoriou Lambraki Street (a commercial pedestrian street) and Ethnikis Antistaseos Street (the main coastal avenue). The next two streets that were found attractive to children were Megalou. Alexandrou Street (a residential street) and Kyprou Street (the main commercial street of the town).

A significant factor that influences the presence of children in the streets is the integration value of space. Streets with low integration value (such as Sellon Street and Kougiou-Kiafas Street) appear to have almost zero use-density by children. This is in line with the Space Syntax theory arguing that streets with low integration value are not preferred by people in their everyday journeys on foot in the area. The coastal avenue – the street with the highest integration value in the urban grid – appears to also have the highest use-density by children. However, it should be noted that the coastal avenue

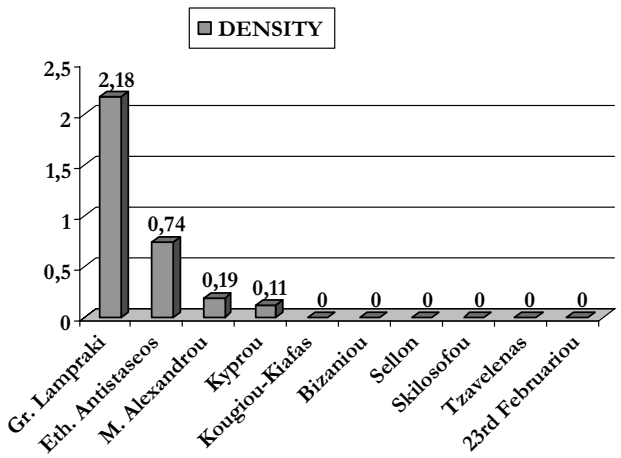

Figure 4: Use-densities of streets by children.

(Eth. Antistaseos Street) has also other encouraging properties in terms of form and design. It may be said that streets with high integration values are attractive to children on the condition they also have attractive form and design of space, for instance, large open spaces with playgrounds directly close to the street, sitting places, courts, etc. (Fig. 5). Kyprou Street is also characterised by a high integration value and also by a high use-density by children. Although it has less spatial virtues than the coastal avenue, the land use mix and the wide sidewalks of Kyprou Street encourage children to use the space as a playground (see Fig. 6a). The rest of the integrated sample streets do not seem to attract children due to their lack of other positive spatial or formal properties – they do not create a sense of enclosure; they have narrow sidewalks; they are busy with car traffic; they have high slopes, etc.

Considering the sample streets with average integration values, children seem to use them as playgrounds only on the condition they also have other spatial and formal virtues. For instance, Gr. Lambraki Street was found to have high densities of children playing in it. This street has an average integration value but also has mixed land uses, no car traffic and a strong sense of enclosure (Fig. 6c). The situation is similar in the case of M. Alexandrou Street. This street has an average integration value, but it creates a strong sense of enclosure, since the space is bounded by buildings of the same height (Fig. 6b) and gives the impression of an urban room. This impression seems to attract children as they feel secure. Besides, the presence of two commercial shops in the street reinforces a sense of security. Regarding these two cases of streets, we may say that the sense of enclosure created

Figure 5: The linear park in the coastal avenue (a), (b), (c).

Figure 6: (a) Kyprou Street, (b) Megalou Alexandrou Street and (c) Grigoriou Lambraki Street.

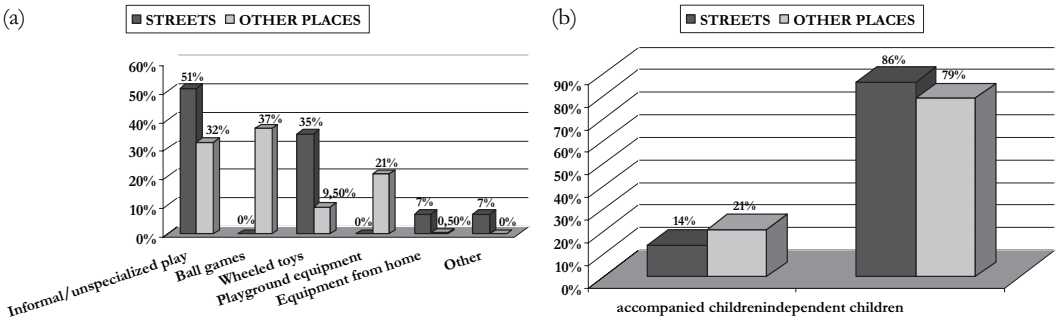

Figure 7: (a) Children's activities in streets and other places. (b) Independent and accompanied children in streets and other places.

by vertical planes (boundaries) and land use mix are very important factors encouraging children's use of streets as playgrounds.

The slope of streets also seems to be a critical factor. We found no children in the streets with high slopes. This is in line with Rapoport's [27] statement that the topography of the street is an important factor pertaining to the use of streets.

Mixed land uses, as already mentioned, seem to be an important parameter. In all streets, where children were encountered, for example Gr. Lambraki Street, Eth. Antistaseos Street, Kyprou Street, M. Alexandrou Street, there was land use mix. On the contrary, streets with exclusively residential character do not seem to attract children. This research outcome justifies earlier arguments by Jacobs [9] and Schumacher [17] in favour of mixed land uses.

The most popular type of children's activities in the street is the informal/unspecialised play (Fig. 7a). The second most popular type of children's activity observed is playing with wheeled toys and toy equipments brought from home. These results reinforce arguments that streets may serve as spaces for unspecialised play – an important factor for children's development. Streets also represent a playground in proximity to home – something convenient for both children and parents. The observations of all other public open spaces have pointed out that children were mostly preoccupied with unspecialised play. This supports Moore's statement that parks are places where children tend to meet with their friends and socialise and that playground equipment is a pretext or a backdrop ([11], p. 108; [12], p. 52]).

The percentage of children accompanied by adults was also investigated. According to the data, 14% of the children encountered in streets and 21% of the children recorded in other public open spaces were accompanied by adults (Fig. 7b). Referring to children recorded in open spaces other than streets, most of them were observed in parks and playgrounds and not in squares and schoolyards. Referring to children encountered in streets, the largest proportion of children accompanied by adults was recorded in the coastal avenue. The exact percentages do not seem to be statistically significant. But it should be noted that the coastal avenue is in close proximity to a park as mentioned before (Fig. 5) and therefore serves as a recreational space for both adults and children. In this place, parents may simultaneously monitor their children and enjoy themselves as well.

4 CONCLUSIONS

The study of children's choices in the town of Igoumenitsa has shown that the global spatial configuration of streets, especially the syntactic property of *integration*, is a key factor in the use patterns of streets by children. Segregated streets do not attract children. Streets with high and average integrated

values attract children on the condition they also have other spatial and formal virtues – such as land use mix, a strong sense of enclosure, lack of slope and wide sidewalks.

Regarding planning variables of streets, *car traffic* plays an important role. As a general trend, streets with dense car traffic do not attract children. However, as opposed to arguments accusing cars for the decreased presence of children in the streets, streets with low car traffic or no traffic at all are also not attractive to children. In cases of streets with positive spatial and formal properties, car traffic does not seem to count much in children's choices. This research outcome reinforces the arguments in favour of car and pedestrian interaction [9, 17]. Mixed land use is also a positive factor. Streets with exclusively residential character do not seem to attract children. This research outcome justifies earlier arguments by Jacobs [9] and Schumacher [17] in favour of land use mix.

Regarding the formal characteristics of streets, their local spatial configuration and, in particular, their boundary articulation is an important variable for the use patterns by children. Streets creating a strong sense of enclosure are preferred more by children as playgrounds. Another factor is the slope of the street. A high slope always has a negative effect. This confirms Rapoport's argument that the topography of a street is an important factor [27].

In the light of the research outcome, one may conclude that the most popular streets for children are those that combine high or average integration values, mixed land uses, medium-to-low car traffic, a strong sense of enclosure and a flat ground. This conclusion may serve as guidelines for the design and planning of streets in our cities in order to make them as friendly as possible to children.

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