

Children's Interactions in the City: the interplay of mobility, affordances and urban space

Tese elaborada com vista à obtenção do Grau de Doutor em
Motricidade Humana na Especialidade de Comportamento Motor

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FREDERICO DUARTE LOPES

2017

**UNIVERSIDADE DE LISBOA
FACULDADE DE MOTRICIDADE HUMANA**

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ABSTRACT

The main goal of this dissertation was to discuss child-place relationships by exploring interplay of mobility, affordances and use of urban spaces. A cross-sectional exploratory and descriptive research was carried out, adopting *SoftGISchildren* methodology. Participants of this study were 145 children, sixth to ninth graders, from three schools located in different zones of Lisbon Metropolitan. Through a reliable child-friendly web-map survey, participants selected and marked meaningful places according a set of pre-established social, functional leisure and emotional affordances; and reported on actual and ideal mobility to these places and to school. Car transportation and non-independent travel was adopted by more participants in school-home journey. Active and independent travel was the most frequently used travel mode to meaningful places, namely within neighbourhood area. Children's territorial range varied from 1.3 -2.2 Km, and they would like to be more active and more autonomous on urban travelling. A total of 1632 multidimensional affordances were marked, with more categorical expression on social affordances, followed by leisure, functional and emotional ones. "Being with friends" was the most expressive affordance of all and neighborhood built environment was found to be socially meaningful. Generally, "green space", "housing space", "commercial space" and "school" were more often used to actualize affordances.

Key-Words

children; independent mobility; social affordances; neighbourhood area; green spaces; *softGISchildren* methodology;

RESUMO

O principal objetivo desta dissertação foi discutir a relação criança-lugar através da exploração da acção recíproca entre amobilidade, *affordances*, e uso de espaço público. Um estudo transversal de natureza exploratório-descritiva foi levado a cabo adotando metodologia SoftGIS*Children*. Os participantes desta investigação foram 145 crianças, do 6º ao 9º ano, de três escolas localizadas em zonas diferentes da área metropolitana de Lisboa. Através de um questionário-mapa-web fidedigno, amigo-da-criança, os participantes selecionaram e marcaram lugares significativos de acordo com um conjunto de *affordances* preestabelecidas; e reportaram a mobilidade real e ideal para esses lugares e para a escola. Transporte de automóvel e deslocação não-independente foi adotado pela maioria dos participantes no trajeto escola-casa. Deslocação ativa e independente foi mais frequentemente utilizada para lugares significativos, nomeadamente dentro da área de vizinhança. A extensão territorial independente das crianças variou entre 1.3-2.2 Km, e estas gostariam de ser mais ativas e autónomas nas deslocações urbanas. Um total de 1632 *affordances* multidimensionais foram marcadas, com maior expressividade categórica nas *affordances* sociais, seguidas pelas de lazer, funcionais e emocionais. “Estar com os amigos” foi a *affordance* mais expressiva. Globalmente, “espaço verde”, “espaço habitacional”, “espaço comercial” e a “escola” foram mais frequentemente usados para a realização de *affordances*.

Palavras-Chave

crianças; independência de mobilidade; *affordances* sociais; área de vizinhança; espaços verdes; metodologia softGIS*Children*;

Publications

Throughout the PhD, several research works were published or presented in conferences and seminars:

Reports

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Lopes, F., Cordovil, R., & Neto, C. (2014). Children's independent mobility in Portugal: effects of urbanization degree and motorized modes of travel. *Journal of Transport Geography*, 41, 210–219. doi:10.1016/j.jtrangeo.2014.10.002 (IF 2.090)

Communications in proceedings

Cordovil, R., Lopes, F., & Neto, C. (2012). Children's independent mobility in Portugal: a shift from walking to driving. *26th ICCP World Play Conference*. Tallin.

Cordovil, R., Lopes, F., & Neto, C. (2013). (In)dependent mobility of children in Portugal. *NASPSPA Annual Conference*. New Orleans.

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Lopes, F., Neto, C., & Madeira, R. (2014). SoftGIS Children: metodologia amiga da criança e instrumento de participação pública sobre a mobilidade e jogo no espaço urbano. *Paper presented at Congresso Nacional "Realidades e Desafios nos 25 Anos da Convenção sobre os Direitos da Criança: o caso Português"*, Braga.

Lopes, F., & Neto, C. (2014). Mapping children's geographies in the urban environment using a map-based questionnaire. *Abstract presented at 7th International Child in the City Conference*, Odense, Denmark.

Lopes, F., Neto, C., & Madeira, R. (2016). Espacialistas emocionais: a Criança na Cidade. *Paper presented at Colóquio Internacional "Crianças, Cidade e Cidadania"*, Guimarães.

Chapters in books

Moreno, D., Lopes, F. D., Cordovil, R., & Neto, C. (2011). Independência de mobilidade em contexto urbano nas crianças em idade escolar. In P. Mouroço, O. Vasconcelos, J.

- Barreiros, & R. Matos (Eds.), *Estudos em Desenvolvimento Motor da Criança IV* (pp. 261–268). Leiria: ESECS-IPL.
- Lopes, F., Cordovil, R., Moreno, D., Pires, C., Sardeira, M., & Neto, C. (2011). Independência de mobilidade em crianças de meios urbanos distintos. In P. Mouroço, O. Vasconcelos, J. Barreiros, & R. Matos (Eds.), *Estudos em Desenvolvimento Motor da Criança IV* (pp. 275–284). Leiria: ESECS-IPL. (*chapter and oral presentation*)
- Cordovil, R., Lopes, F., Arez, C., Tojo, A., Moreno, D., Shruballs, S., Henriques, F., et al. (2012). Independência de Mobilidade das crianças portuguesas. In R. Mendes, J. Barreiros, & O. Vasconcelos (Eds.), *Estudos em Desenvolvimento Motor da Criança V*. Coimbra: Escola Superior de Educação de Coimbra. (*chapter and oral presentation*)
- Lopes, F., & Neto, C. (2012a). O Risco e o Jogo de Atividade Física nas experiências da criança no envolvimento urbano. In R. Mendes, J. Barreiros, & O. Vasconcelos (Eds.), *Estudos em Desenvolvimento Motor da Criança V* (Escola Sup., pp. 200–205). Coimbra. (*chapter and oral presentation*)
- Lopes, F., & Neto, C. (2013). Independência de mobilidade das crianças nas cidades: a diversidade metodológica e as políticas públicas. In M. Carvalhal, E. Coelho, J. Barreiros, & O. Vasconcelos (Eds.), *Estudos em desenvolvimento motor da criança VI* (pp. 183–187). Vila Real: UTAD. (*chapter and oral presentation*)
- Lopes, F., & Neto, C. (2014). SoftGIS-Mapeador das mobilidades da criança: um estudo de caso. In C. Neto, J. Barreiros, R. Cordovil, & F. Melo (Eds.), *Estudos em Desenvolvimento Motor da Criança VII* (pp. 255–264). Cruz Quebrada: Faculdade de Motricidade Humana. (*chapter and oral presentation*)
- Lopes, F., & Neto, C. (2014). A criança e a cidade: a importância da (re)conciliação com a autonomia. In R. Cordovil & J. Barreiros (Eds.), *Desenvolvimento Motor na Infância* (Edições FM., pp. 265–292). Cruz Quebrada: Faculdade de Motricidade Humana. (*chapter and oral presentation*)
- Lopes, F., & Neto, C. (2015). Social affordances and mobility of children in the city: proposal of a child-place interactional model. In V. P. Lopes & C. Gonçalves (Eds.), *Estudos em Desenvolvimento Motor da Criança VIII* (ESE:IPB & , pp. 182–187). Bragança. (*chapter and oral presentation*)

Oral presentations

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- “Escolhas da Criança e do Jovem na Cidade”. Presented at “*Seminários de Investigação em Educação*” promoted by ISEIT-Almada in Almada (2016).
- “*Que Cidade temos e que Cidade desejamos?*”. Presented at “*II Jornadas da Educação*” promoted by Junta de Freguesia da Portela, Associação Luiz Pereira Mota and Laboratório de Pedagogia da Faculdade de Motricidade Humana in Moscavide (2016).
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- “*Jogo e Independência de Mobilidade*”. Presented at “*Seminário- Jogo e Motricidade no Desenvolvimento da Criança*” promoted by Laboratório de Comportamento Motor da Faculdade de Motricidade Humana in Lisbon (2016).

Future accepted communications

- “Friendly web-mapping of children’s social geographies in the city” at the “8th edition of the Child in the City Conference” in Ghent (Belgium), in November 2016.
- “Crianças-Espacialistas na Cidade Social” at “XI Seminário de Desenvolvimento Motor da Criança” in Castelo Branco (Portugal), in November 2016 (full paper).

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PREAMBLE

“O doutoramento é essencialmente um ato de liberdade entre orientando e orientador...”

(Carlos Neto, 17 de Janeiro de 2013)

Motivation

According to the UNICEF report on the state of world children (UNICEF, 2012), childhood experience is becoming increasingly urban, more than one billion children are living in cities and towns. Portugal is no exception, and statistics indicate that the largest population densities of children in Portugal (0-14 years old) is concentrated in urban municipalities, and in the Great Lisbon area this percentage is of 20.5% (Pordata & Statistics Portugal, 2011).

In a previous published research, Lopes & Neto (2014) showed that children's independent mobility in Portugal, that is their freedom to move around autonomously without adult supervision, is very restricted, especially in the urban centers. This confinement leads to an exclusion of children and of youths from public space, augmented by lack of participatory public policies focused on the relationship between children and the cities' physical environment, and on fostering active and independent mobility of their young citizens.

. Consequently, it is very relevant to elaborate studies about city spaces as promoters of multidimensional transactions, or interactions from the perspective of children as preceptors and actors "in movement" and "in place". Moreover, this type of actor in place research can provide municipalities with valuable knowledge to develop projects and policies that improve the city's and their citizens' well-being, health and happiness.

Moved by these ideas and instigated with curiosity to better understand children's mobility through the city and their use of public spaces, this thesis was brought to light. The underlying challenge that came with it was to build an empirical perspective on how the physical city can act as a mediator of multidimensional transactions for children; and how does children's behavior adapt to the city's landscapes.

Thesis outline

The first chapter of this thesis (*Theoretical Contributions*) initiates with an overview on the theoretical approach adopted in this thesis. This summary (*Theoretical Axis*) provides an insight to the main theoretical concepts (mobility, affordances and urban space) and to the theoretical scope of the methodology (*SoftGISchildren*) used in this PhD study. We then move in to the *Theoretical Background* sections where a comprehensive body of conceptual explanation is presented across four main topics.

In the “*Person-environment relationship and child-place transactions*” a couple of central ideas stem from this specific theoretical mosaic. The structural and dynamical approach to Barker’s “behavioral-setting” (Barker & Wright, 1955) as theoretically relevant to legitimate study of children’s behaviour in different physical settings; consideration of multidimensional levels of the environment; and not just focusing on the immediate microsystems of children but also moving into meso and exo systems (Urie Bronfenbrenner, 1979); transactional approach where the unit of analysis is, in fact, “child-in place experience”, materialized as localized multi-place specific transactions which are conceptualized as “*affordances*” (J. J. Gibson, 2014; Harry Heft, 2012; M. Kytä, Broberg, & Kahila, 2012; M. Kytä, 2004); and the expressional multidimensionality of affordances as an understanding route to the multi-dimensional layered meaning that children have of places (Lim & Barton, 2010).

In the topic of “*Children’s independent mobility*”, first it is summoned the importance of children’s movement and autonomy in perceiving and actualizing multidimensional affordances. Secondly, it is presented first very relevant research on the theme, where it were conceptualized mobility licenses given by parents to their children (Hillman, Adam, & Whitelegg, 1990), and subsequent studies that focused on the children’s mobility and use of places. The third section on this topic is constituted by a diagnosis of children’s independent mobility in Portugal, and then specifically on the effect of urbanization on children’s freedom of movement. This diagnose is presented in the format of two published articles, as result of previous research conducted by this thesis’ author in collaboration with other researchers (Cordovil, Lopes, & Neto, 2015; Lopes, Cordovil, & Neto, 2014).

In the topic of “*Urban Open Space*”, theoretical considerations stemming from Urban Planning and Sociology are carried out in order to conceptualize “public space” and typologies of urban spaces”. Here, particularly relevant are the contributions of Tonnelat (2010) addressing public space as space which is accessible to the public (therefore “open”), whether it is managed under public, private, or by a combination of both entities; and the possibility of using urban space typologies to study the relationship between the physical form of open space and its functions. Consequently, three typologies are presented, Sandalack & Uribe (2010), Francis (1987) and Brandão (2008), which will be referential for devising a typology of urban space specifically for the effect of this study, in the methodological chapter of this thesis.

In the last topic of the theoretical background, SoftGIS Methods are addressed. The methodology used in this thesis is SoftGIS and due to its complexity needs to be addressed within the theoretical background of this thesis. In this way the distinction between Geographic

Information Systems (GIS) and Public Participation Geographic Information Systems (PPGIS) is explained, where the former presents as *a set of computer procedures for geocoding, storing, decoding, analyzing, and visually representing spatial information*; where map/spatial information is converted to digital source tied to a coordinate reference system Golledge (p. 244, 2002); and the latter refers to *a general set of methods for integrating public knowledge of places to inform land use planning and decision making* Brown (p.289, 2012).

The term *SoftGIS* (soft geographical information systems) defines a methodological approach of web-based data collection that combines 'soft' subjective data with 'hard' objective GIS data, enabling the study of human experiences and everyday behavior in the physical environment (Kyttä & Kahila,2011). Whilst "hard" refers to urban structure characteristics (i.e: residential density; proportion of green spaces; proportion of children), "soft" addresses to people's perceptions and experiences in the physical settings (M. Kyttä, 2011). After this initial consideration, *SoftGISchildren* method is reported as child-friendly (M Kyttä, 2003; Moore, 1986) and as being designed for research with children and youth about environment quality (Broberg, Salminen, & Kyttä, 2013; M Kyttä et al., 2012). This section is finished by presenting a list of arguments and theoretical bridges with the field of Childhood Sociology to support claim that *SoftGISchildren* methodology is actor-centered.

In Chapter 2, "*Research aims*", it is clearly identify the study's goal as discussing child-place relationships by exploring the interplay of mobility, affordances and use of public spaces by children in the city realm. From this, research goals are postulated.

In Chapter 3, "*Methodology*", two major parts constitute such chapter. Section 1 congregates methodological procedures that were carried out, namely, construction of a Beta version of the *SoftGISchildren* survey and trial testing; re-elaboration of a permanent web-map survey to be used in the data collection; and development of two specific instruments, *Urban Space Typology* and *Clustering of Affordances* which are used for indirect data collection. In Section 2, research groups and procedures are identified, as well as operationalization of research variables and main research questions. Three research groups in different geographical areas- *LH (Lisbon Historical)*, *LBS (Lisbon by Sea)* and *LM (Lisbon Modern)*- integrate this study and together constitute a fourth research group- *L (Lisbon)* which represents the Metropolitan Area of Lisbon.

Chapter 4, "*Results*", is structured on a research analysis framework composed by three sections where landscapes of children's transactional behavior are analyzed. In the first section, ("*Descriptive landscapes of children's transactional behavior*"), a descriptive perspective captures an overview trend of children's transactional behavior and mobility in the environment focusing in the research group as whole (L). In the second section, ("*Comparative landscapes of children's transactional behavior*"), results focus on establishing comparisons and differences on mobility, affordances and urban space across LH, LBS and LM research groups. In the third section, ("*Interplay of variables on the landscapes of children's transactional behavior*"), results address the comprehension of children's transactional behavior in the urban metropolitan area of Lisbon (L group) based on the analysis of interrelationships between

variables expressed in the research questions previously formulated. After each section of results is address a synthesis of most relevant findings is also presented.

The last chapter of this thesis, "*Discussion*", is composed by five sections. In the first section "*Critical Discussion*", main findings across the three analysis on landscapes of children's transactional behavior in urban space (descriptive, comparative and interplay) were summoned together in themes and contextualized in the light of research results and theoretical proposals of other authors; and a hypothetical theoretical model of Child-Place interactions designated as "Child-City Transactional Model" is presented, stemming from conceptual thinking elaborated across the work developed in this dissertation. In the remaining four sections, research limitations are presented; research innovations and future research stemming from it are discussed; practical implications relevant for planning and creating richer transactional environments for children and youth are suggested; and a general conclusion of the work developed along this research is presented.

1. CHAPTER 1- THEORETICAL FRAMEWORK

“Para poeta a sério falta-me a concretude
de ter um dia percorrido as ruas
as ruas todas
Precisaria para isso de me levantar mais cedo
ou mais tarde
e ter outra soltura rente ao chão”

(Miguel Cardoso, in “*Lá (em Alemão, Erlebnis)*”)

1. Theoretical axis

The theoretical axis of this work is summoned here as to provide an overview of the theoretical and conceptual background, which will be further developed along the thesis body.

Movement is intrinsic to animal nature and essential for person-environment experiences to take place. Human movement through space becomes more complex and diverse, concomitantly, as developmental processes take place and as purpose of movement widespread (Maver, Mead, Oglesby, Shrader, & Widule, 1968). In this sense, it is suggested that purpose of human mobility is, on its hand, related with place-experience. Thus, the topic concerning children's independent mobility is of crucial relevance to understand the present thesis and, therefore, it will be addressed with more detail in the next section of this work.

The focus of this thesis is the study of child-place transactional relationships within the city realm. Therefore, it is essential to consider *context* and *process of transaction* when delving into child-place experiential interactivities. Henceforth, these are contents of thorough discussion throughout this work, where *context* relates to the terminology of "*urban space*" and *process of transaction* to the "*affordance*" concept.

Moreover, it is also crucial to exert about the main methodological approach used in this investigation- *SoftGISChildren* methodology. A pioneer research conducted by Kytta, Broberg, & Kahila (2012) about mapping children's meaningful places, revealing their mobility behaviors and perceived health using this methodological approach was, in fact, inspirational for the development of our investigation. Such work and of others (Bhosale, Duncan, Schofield, Page, & Cooper, 2015; Broberg, Salminen, et al., 2013; Stewart et al., 2015) have proved the online interactive mapping methodology to be very effective in the study of child-place relationships.

For the present research, *SoftGISChildren* methodology allowed children to map and qualify their meaningful place experiences from their perspective as mobile active participants in the city landscapes; explore the associations between mobility, actualization of affordances and use of public space, and to gain better clarity about children's actual and ideal mobility in the urban environment. Therefore, *SoftGIS* methodology will be a topic of relevance in the theoretical background and in the methodology chapter of this thesis.

1.1. Theoretical background

1.1.1. Person-Environment Relationship: Roger Barker and Herbert Wright's research within Ecological Psychology

The desire to study people in their natural environments through psychology was inspired by the work developed by biologists in their research on animal behavior in the natural settings. The opportunity to widen the scope of psychological research on human behavior, from the laboratorial context to an ecological one, motivated Roger Barker and Herbert Wright to found the Midwest Psychological Field Station, in the 1940s. They believed that until then Psychology was very much an experimental science, and that knowledge related to human behavior was reported under conditions of experiments and clinical procedures. Also, they assumed that daily life conditions were very hard to recreate in the laboratorial context, however, in the ecological environment, these experiences were taking place naturally and on a daily basis. These natural experiences provided information to develop appropriate data collecting techniques and data analysis tools (Barker, 1968).

Research conducted at the Midwest Psychological Field Station about children and their immediate environment, introduced the “*behavioral-settings*” concept (Barker & Wright, 1951, 1955). With this work, the foundations of Ecological Psychology were established as an eco-behavioral science that studies phenomena, taking in consideration its physical and behavioral attributes (Barker, 1968), incorporated in eco-behavioral natural units (behavioral-settings), which determine observable behavior (Bonnes & Nenci, n.d.).

These units were described via their *structural* and *dynamic attributes* of the “*behaviour-milieu*” units. Structurally, it was defined as *one or more standing patterns of behaviour and the milieu*, where the latter is *circumjacent* and *synomorphic* to the former. This units, which have a structure and are localized in time and space, are composed by entities and events (people, objects, behaviors) with identifiable boundaries; and their components are arranged in a functional way, as part of a whole (Barker, 1963). This means that specific spatial and temporal boundaries surround the scope of a behavioural action (circumjacent); and that the milieu is similar in physical-spatial characteristics to the behaviour (synomorphic). Thus, *behaviour-settings* consisted of *behaviour-and-circumjacent-synomorphic-milieu entities*, where each part of the unit could be referred to as “*synomorphs*” (a behavioural setting would be a set of synomorphs). Dynamically, *synomorphs* had a degree of interdependence that was greater for those of the same behavioural-setting, when compared with the interdependence level between *synomorphs* of different entities (Barker, 1968).

This two levelled interdependence guaranteed stability and homogeneity to individual behaviors within a particular environmental context. The behavioural settings were self – regulating entities whose function was to orient and organize elements of human behaviour towards a state of equilibrium of the setting defined by a program of actions that takes place in a particular environmental context. This “setting programme” included a set of sequences of interactions, time sequenced, between people and the spatial-physical objects of each setting,

where the time spent for each individual in the setting varies according degree of involvement and responsibility. The procedure to identify and describe the variety of settings of a particular environment, whose features become distinctive through the ecological observation, was called “review of behaviour settings” (Bonnes & Nenci, n.d.). Examples of “behaviour-settings” found by Barker and his colleagues across MidWest towns were “basketball game”; “worship service”; “piano lesson”; “household auction sales” (Barker, 1968).

The work developed by Barker, Wright and associates initiated in 1949 was ground-breaking in the sense of a paradigm change on the study of human behaviour and development. Behavior and development is no longer perspective as a simple relationship between stimulus and organism which occurs as a response to a maturational action; but as a transformation that takes place in a sociophysical context, to which is inextricably connected.

Drawing on research conducted by Barker, Wright and their associates, (Wicker (2002) qualifies behaviour settings are self-regulating systems (i.e.: retail-shops, offices, court sessions, church worship services, school classes) of events characterized by specific place and time boundaries; where human and nonhuman components are organized in a way that enables regular activities to happen naturally, or with less or more disturbance. In the latter, the self-regulation mechanisms act in a way to compensate the unbalance of the system, and thus, afford the activity to take place. For instance, “school-classroom” is a “behavioral setting” that encompasses a teacher, pupils, desks, books and other objects which are connected with each other in a way that enables the teaching and learning. If a child is disruptive in a classroom, the behaviour –setting deals with the unbalance by activating the means for corrective action to take place, hence, engaging the system toward homeostasis.

The previous author calls to the attention that although Barker’s research and theory was set on the behaviour of people on their natural grounds, his empirical approach (the use of words to describe certain processes or concepts like “*mechanisms*”; “circuits”; “centripetal and centrifugal forces”; “*behaviour-generating machines*” was an example of this) was very much dictated by the positivist paradigm inherent to the physical sciences, as well as the fact that most data was portrayed using a quantitative analysis perspective.

Barker resumed “behavioral-setting” unities to the immediate ecological environment, hence, synomorphic. Wicker disagrees and designates “behavioral-setting” as social structures that result from interactions of its occupants that, although, are influenced by the presence of particular individuals, namely, their protagonists; they are also perspectived with other behavioral settings and with other conditions within the broader sociophysical environment (Wicker, 2002).

Despite the fact that the methodology applied by Barker, Wright and their colleagues to study child-place relationships will not be used in this thesis, it is theoretically relevant for the nature of this study the theoretical overview of Barker’s theory on children and their actions in the immediate surroundings. Firstly, we concur with the idea that it is very important to observe children in their ecological environment (in our case using a methodology that enables children to recall localized place experiences) in order to gain perspective on the influence of multiple

settings on actual behavior. Secondly, and although we will not be using the “behavioral-setting” concept to operationalize specific child behaviour to a specific type of sociophysical setting, Wicker’s multi behavioral intertwined settings is useful to understand the assemblage of diverse public types of spaces that exist in the urban realm, as a non-synomorphic contexts that have an effect on the actualization of child-place relationships. Thirdly, is true that in this investigation, we want to understand if within the urban realm there are certain settings (i.e.: green areas, street, waterfront, etc) which are more prone to certain types of behaviour (i.e.: playing football; meeting friends; feeling quiet). Thus, the structural and dynamical approach to Barker’s “behavioral-setting” is theoretically relevant to legitimate such research intention.

1.1.2. Person-Environment Relationship: Urie Bronfenbrenner’s Bioecological Model for Human Development

Urie Bronfenbrenner formulated a theory on human development based on the perspective of an interplay between the developing person and the changing environment. Human development is defined as *“the progressive, mutual accommodation between an active, growing human being and the changing properties of the immediate settings in which the developing person lives, as this process is affected by relations between these settings, and by the larger contexts in which the settings are embedded”* (p. 21, Bronfenbrenner, 1979).

Bronfenbrenner (1993) presents a recreation of Kurt Lewin’s equation representative of his *“Field Theory”*, which gave birth to the ecological paradigm, by replacing *“Behavior”* (B) for *“Development”* (D) as a *joint function of Person and Environment* ($B=f(PE)$ for $D=f(PE)$). With this alteration, *“time”* (t) is included in the formula because development is studied along periods of time ($D_t = f_{(t-p)}(PE)_{(t-p)}$), where t refers to a time where a developmental observation takes place and $t-p$ to the prior period, or periods of interaction, carried out by the joint function of person and environment resulting in a developmental outcome at t instant. In this sense, and according to the author, developmental research should focus on understanding the bi-directional processes of interaction between the person and the environment, and not on the results of such reciprocity.

Children’s development occurs in socioecological contexts ranging from proximal to distal ones, through an evolving process of reciprocal interactions between the child and the multidimensional levels of the environment- physical, material, social, emotional, symbolic, and cultural-, which are also subjected to a dynamic interrelationship between them (Bronfenbrenner, 1993). These bi-directional interactions established between the child and his immediate environment are called *“proximal processes”* (these will be addressed with more detail further along this section).

According to Bronfenbrenner & Morris (2006), the person has a set of personal potentials to be attuned to the immediate environment which serve as dynamic relational dispositions towards it. These active behavioral characteristics can either set in motion and maintain proximal processes of development, or inhibit and even disrupt their occurrence. These individual qualities are grouped in four distinct categories and are generally designated

as *developmentally instigative characteristics* (Bronfenbrenner, 1993). The first one refers to personal characteristics that promote or hinder reactions from the social environment fostering or inhibiting the actualization of psychological processes (i.e.: a fussy versus a happy baby; a hyperactivity versus an inactive child; an attractive versus an unattractive person encourage or discourage certain reactions on others). The other three categories, unlike the first one that solemnly evokes reactions from others, refer to the personal characteristics that influence the individual's direct effect on the physical and social environment. These personal characteristics tend to emerge sequentially throughout childhood and reflect progressively more complex psychological functioning. The first one is called *selective responsivity* and is responsible for the individual's sensitivity to explore certain aspects of the social and physical environment. The second sequential type of developmentally instigative dispositions is referred to as *structuring proclivities*. These characteristics involve a more consistent and structured engagement with social, physical and symbolic environment, including elaboration, shaping and recreation of those multidimensional environmental elements; leading to a more complex level of psychological processes and functioning. The fourth and last category of developmentally instigative characteristics is called *directive beliefs* and expresses children's evolving capacity to progressively conceptualize their psychological and environmental experience. These developmental dispositions reflect synergic relations established between the forces of the self and particular features of the environment, resulting in the progressive development of directive belief systems which will guide the person's actions in the environment and psychological phenomena.

Bronfenbrenner stresses that the scientifically relevant features of the environment affecting behavior and development are its objective and subjective properties. The latter plays a significant role in psychological development because they traduce relevant meaning given by the person to the former (Bronfenbrenner, 1979). Therefore, what matters most for development is the interdependent forces that derive from the real, physical and objective attributes of environment, and from the way this environment is subjectively lived by the person. This environmental subjectiveness, which emanates on early childhood and persists throughout life, is twofold. *Phenomenological*, as how the environment is perceived and shaped by the subject, and *experiential*, as the emotional and motivational content inherent to the subjective feelings that are experienced. Both stability and change characterize such experiential qualities (Bronfenbrenner, 2005).

The proximal developmental processes established between a person and the immediate environment are dependent of mutual interaction between the two parts. When focusing just on the latter, Bronfenbrenner (1993) stances that the physical, social or symbolic environmental characteristics *invite*, *permit*, or *inhibit* a reciprocal attunement towards a progressively more complex interactional activity in and with the immediate environment. The characteristics and features in the sociophysical environment which promote development are those that allow for manipulation and exploration; whereas environments characterized by instability, confused structuring, and unpredictability inhibit development (U. Bronfenbrenner &

Morris, 2006; U. Bronfenbrenner, 1993). Drawing on the work of Bronfenbrenner (1989;1993) about physically and socially responsive and unresponsive environments, Kytä (2003), in her PhD thesis, exemplifies the former as *quiet places, interactive toys, decorations in a child's room, a nanny's sensitivity to a baby's cries, or participation in a child's activities*; and as for the latter, she indicates the following characteristics: *unpredictability, a lack of clearly defined systems, noise, a lack of space, conflict, and the use of force* (p. 24). Moreover, she ties another contribution of Bronfenbrenner's "Ecological Systems Theory", published in 1989, on the significant properties of the physical environment (i.e.: physical injuries, physical attractiveness, or race) to the development of the affordances theory. More specifically, Bronfenbrenner refers to specific physical characteristics of the environment, whose solo features are psychologically irrelevant for the person, but, however, afford the person with psychological effects. Kytä then points out that bodily perceptions are central to the theoretical approach on the concept of "affordance". In other words it could be said that the psychological consequences brought to the person from the physical environment are mediated through bodily perceptions.

The Bioecological Model of Human Development is composed by four fundamental properties, *process, person, context, and time* which dynamically interact with each other (Bronfenbrenner & Morris, 1998).

Process is the central intermediate element of the model as it represents particular forms of interaction that occur over time between the person and the environment. These reciprocal interactions, designated of *proximal processes*, progressively become more complex and are considered the key agents of human development (Bronfenbrenner & Morris, 1998). However, the degree of influence these *proximal processes* have on development vary according the interrelationship given by the evolving person's characteristics, the immediate and more distal environmental contexts, and the time periods of these interactions (Bronfenbrenner & Morris, 2006).

Bronfenbrenner (1994)¹ explains that these processes take place especially in the early stages of development, however persisting throughout the cycle of life. Hence, the active and evolving biopsychological child progressively establishes more complex and reciprocal interaction with other people, objects and symbols in his the immediate environment. He adds that for the proximal processes to be effective the interaction has to endure regularly and over an extend period of time, such as parent-child and child-child activities, group or solitary play, reading, studying, learning new skills, athletic activities. The operationalization of proximal processes requires energy transfer between the child and the surrounding elements in the immediate setting. Such transference can be uni-directional (from person to environmental features or vice-versa); reciprocal; separately or simultaneously (Bronfenbrenner & Evans, 2000).

¹ This article was reprinted in: Gauvin, M. & Cole, M. (Eds), *Readings on the development of children, 2nd Ed.* (1993, pg. 37-43). NY: Freeman. Accessed online in <http://www.psy.cmu.edu/~sieglar/35bronfenbrenner94.pdf>, 19/01/2016

The model's property "*Person*" includes three types of person characteristics (*dispositions, resources and demands*) that more influence the course of development by affecting the direction and power of the *proximal processes* (Bronfenbrenner & Morris, 2006). *Dispositions* are personal characteristics that ignite, interfere and inhibit the actualization of proximal processes (i.e.: curiosity, initiative, selective responsibility). *Resources* are the skills, knowledge, abilities necessary for the effective functioning of proximal processes. *Demands* are the person's characteristics which attract social approval, disapproval or even disruption of proximal processes (Bronfenbrenner & Morris, 1998; Bronfenbrenner & Morris, 2006).

Context refers to the physical, social, symbolic, cultural characteristics of the environmental settings that are relevant to the proximal processes of human development, including those of the immediate settings, as well as those emanating from broader and more distal environments. Bronfenbrenner (1979) refers to the ecological context as a set of nested interdependent systems (settings) where each one fits inside the other, from a micro to a macro level; and setting as a place where people can readily engage in face-to-face interaction, such as home, day care center, playground, etc. The bioecological context systems are conceptualized in four levels designated as micro, meso, exo and macro systems.

Microsystems include the child's immediate settings, such as home, neighbourhood, school, day care centre, peer group, family, etc, where the proximal processes are activated. The *microsystem* encompasses a *pattern of activities, social roles, and interpersonal relations experienced by the developing person in a given face-to-face setting with particular physical, social, and symbolic features that invite, permit, or inhibit engagement in sustained, progressively more complex interaction with, and activity in, the immediate environment* (Bronfenbrenner, 1994, p.39).

Mesosystems aggregate two or more microsystems, such as "*child-home*" and "*child-school*" relations, or "*child-home*", "*school-home*" and "*home-leisure centre*"; and congregates interconnections and synergies between settings in which the developing person becomes an active participant. The *mesosystem* underlines the importance of focusing on the complexity dictated by the interrelationship between microsystems when studying a particular phenomenon. Therefore the *mesosystem is a system of microsystems* (Bronfenbrenner, 1994, p.40), formed whenever *the developing person moves into a new setting*, involving a multiform of interconnections represented by *other persons who participate actively in both settings, intermediate links in a social network, formal and informal communications among settings, and the extent and nature of knowledge and attitudes existing in one setting about the other* (Bronfenbrenner, 1979, p.25) .

Exosystems refer to distal systems that are not directly connected with the person's daily interactions in the immediate setting but indirectly affect them (i.e.: events that occur at parents' work place and community structure are exosystems that affect the child's family life). *The exosystem comprises the linkages and processes taking place between two or more settings, at least one of which does not contain the developing person, but in which events occur that indirectly influence processes within the immediate setting in which the developing*

person lives (Bronfenbrenner, 1993, p. 24). Referring to studies of other authors, Bronfenbrenner indicates that three exosystems, parents' workplace, family social networks and neighbourhood community contexts, are likely to have an effect on children and youth development by an indirect influence on the mesosystem composed by family, school and peer group (Bronfenbrenner, 1994).

Macrosystems comprise the social, historical and cultural shared frame and referential where the person's development is embedded in. A macrosystem is characterized by the cultural institutions, norms and symbols that serve as molar archetypes of day to day interactions. Macrosystems include the exo, meso and micro systems of a given culture or subculture and comprise broader societal organizations and structures such as government, economy, media, belief systems, lifestyles, resources, hazards, etc (Bronfenbrenner, 1994; Bronfenbrenner, 1989). Bronfenbrenner summons the idea of the macrosystem as the *societal blue print for a particular culture or subculture* (Bronfenbrenner, 1994, p.40).

In the sociocultural ecological model presented in Bronfenbrenner's Ecology of Human Development, in 1979, the temporal dimension was not included as one of the properties. However, in subsequent research (Bronfenbrenner, 1989), a "*chronosystem*" was introduced as a transversal dimension on each of the other model's properties, the developing person, changing environment and the proximal processes established in between them (Bronfenbrenner & Morris, 2006). The *chronosystem* allows for change and consistency to be studied over time, both in the characteristics of the person and in the environmental contexts where life occurs (Bronfenbrenner, 1994). Through the *chronosystem* it becomes possible to identify expected or unexpected sequences of events or isolated ones regarding human development which emanate from the person or the environmental context (Krebs, 2002). The inclusion of the temporal dimension in the bioecological model for human development reflects *microtime*, the person's persistence to engage in molar activities; *mesotime*, the time which an event persists; and *macrotime*, as time defined by social and historical conditions (Bronfenbrenner & Morris, 1998).

Bronfenbrenner's bioecological paradigm was undoubtedly paramount for environmental psychologists to focus on the reciprocal person-environment influences within and in between the hierarchical and nested environmental systems devised in his model for human development.

Harry Heft, in a paper about the understanding of the cognitive map in the light of an *interactionist* versus a *transactional* approach (Heft, 2013), praises Bronfenbrenner's work and suggests that probably the most notable outcome of his ecological model is that "culture" started then to be addressed as a topic of concern within environmental psychology. However, in the same article, Heft explores very effectively the limitations of Bronfenbrenner's sociocultural ecological model by presenting three interconnected critical points (p.17), with which we concur:

- *The model has a static nature, as it fails to convey adequately the dynamic qualities of both within level and between level processes, leading the researcher to focus and consider psychological phenomena as an occurrence that takes place on a critical*

moment in time. Heft argues that transactionism addresses *events at all levels from the individual to the sociocultural are on-going and dynamically engaged in, on the one hand, maintaining stability of the systems involved, and, on the other, participating in processes of change and transformation.*

- The concentric structures of the model (micro, meso, exo and macro systems), depicted by Bronfenbrenner as analogy to the nested Russian dolls (*matryoshkas*), are portrayed as being as interdependent, but separate, layers of the environment, tucked inside one another from the most distal (culture) to the most proximal (family and peers) to the person itself. This *interactionist* view comprehends that the person is a *semi-autonomous psychological/biological core unit* from the overlaying environmental conditions, including the sociocultural ones, which influence the person's behaviour in diverse ways. Heft refuses this idea and refers to sociocultural and psychological processes as mutually constituting. Thus, sociocultural processes *are not merely layered on a semi-autonomous set of psychological functions*, but are constituent of the acting individual as a culturally embedded being, and, reciprocally emerge through the *collective actions of individuals in context.*
- The Bronfenbrenner's model suggests that top-down processes, like those dictated by socio-cultural context, causally, linearly and mechanically impose structure to lower level processes that occur in exo, meso and micro systems. Conversely, transactionism approach to human-environment relationship rejects *causality* and supports *emergentism* as common shared properties, which co-emerge through *constitutive relations* between levels of processes whose components are merged in a certain way. In this sense, Heft claims that the *relationship between socio-cultural processes and individual processes is constitutive rather than causal.*

Although the present investigation is not fully grounded in Bronfenbrenner's bioecological view for human development, some of his contributions are very relevant for the framework of this thesis. The list of these are as follows:

- In our research, child-place relationships are studied as children's meaningful places, indicated by themselves, according social, functional and emotional categories. These significant places are located in different parts of the urban sphere, ranging from the home environment, through the neighbourhood and school, and to other more distant spaces spread through the municipality. In this way, we followed Bronfenbrenner's advice by considering multidimensional levels of the environment; and not just focusing on the immediate microsystems of children but also moving into their meso and exo systems. Also, in our study, the two of the research contexts are composed by participants who attend public schools, and one of the research context is composed by children who attend a private school. In this sense, we think that those children who attend public schools are immersed in a more diverse sociocultural context (macrosystem) when compared with those from private schooling, whose participants come from more privileged social and cultural backgrounds.

- As mentioned previously in this section, for Bronfenbrenner the environmental subjectiveness which emanates on early childhood and persists throughout life, is twofold, phenomenological, as how the environment is perceived and shaped by the subject; and, experiential, as the emotional and motivational content inherent to the subjective feelings that are experienced. He adds that the environments can be physically and socially responsive and unresponsive. We agree with the author on this matter, and in the present work, meaningful places are considered those which are marked by children, and identified as places where functional, social and also emotional experiences occur. In other words, meaningful places are those which are socially, functionally and emotionally responsive.
- Bronfenbrenner & Morris (2006) when referring to the effects of the physical environment on psychological development, using for that effect the research conducted by Theodore Wachs in 1979 (where it was found a consist pattern of relationships between specific physical features of the infant's home environment and their cognitive development, over the first two years of life), suggest that more research should be done on this topic. Our present study, although it doesn't include Wachs's age group and cognitive development, among other goals, explores relationships between different public space typologies and specific types of children's transactions which occur in those places mediated by the psychological concept of "*affordance*" (Gibson, 1979; Heft, 1988a). The concept of "*affordance*" will be central to theoretical and methodological body of this thesis. Thus, it is relevant for this investigation Bronfenbrenner's reference to those specific physical characteristics of the environment that by themselves are psychologically insignificant for the person, but, simultaneously, induce psychological consequences. In this sense, we concur with Kytä (2003) on the importance of psychological consequences of physical features and of corporal perceptions for the establishing of the affordances theory.
- The Bioecological theory on human development is grounded on an *interactional* view of the person-environment relationship, where the person and the environment are considered two independent entities and the relationship between them is merely causal (Heft, 2013) . Although we take seriously some of Bronfenbrenner perspectives leading us to adopt some of his concepts in the theoretical body of this thesis (as we have mentioned previously), the child-place relationship approach we want to stance is one more focused on a transactional perspective. Hence, Heft's criticism to the bioecological model for human development (Heft, 2013) is welcomed to the theoretical ground of this thesis. Hereby, we understand the person-environment as a holistic entity, where the relationship between the acting person's psychological processes and the multidimensional environment's processes is constitutive rather than causal.

1.1.3. Person-Environment Relationship: a Transactional Approach

On an everyday basis, people roam through different environmental contexts, where life is brought to life within a complex range of internal and external features, processes, and activities. Undeniably, human behavior is always situated in a sociophysical environmental context. The Environmental Psychology focuses on the *study of human behavior and well-being in relation to the sociophysical environment* (p. 1). This definition proposed by Stokols & Altman (1987) reflects the societal and scientific gap that this field of psychology came to fill as it emerged during the 60s. In this period there was a growing concern on community problems, constraint on the use of ecological resources and the diminishing of environmental quality. Concomitantly, Psychology had been very much focused on studying human behavior as a result of micro-level interactions with intrapersonal processes (perception, cognition, learning, development). The founding work of this emergent new discipline was designated "*Environmental Psychology: Man and His Physical Setting*" and written by Prohansky, Ittelson and Rivlin, in 1970.

For the theoretical basis of this thesis, the *Transactional* approach brought by *Environmental Psychology* on the person-environment relationship is valuable. This perspective was shaped by the work of Altman & Rogoff (1987). These authors present four different philosophies to comprehend the complexity of the world. "Trait", where the emphasis is set on the person and psychological features as determinants of action; "Interactional" where people and the physical or social environment are considered independent and separate entities that by inter-acting with each create change; "Organismic", the person and the environment are separate elements that constitute independent holistic entities which interact with other independent holistic entities in complex and many times reciprocal ways towards a homeostatic and ideal state, where the whole is more than the sum of the parts; and finally "Transactional" where phenomena are holistic entities composed simultaneously of *people, psychological processes, physical environment, and temporal qualities*; where all of these are considered as interplaying "aspects" that define each other, and are intrinsic to the whole (Altman & Rogoff, 1987; Bonnes & Secchiaroli, 1995; Werner, Brown, & Altman, 2002).

Werner et al. (2002, p. 204) define each of these "aspects" within transactional analysis. *People* refers to *social participants* and to their *social milieu*; more specifically, the former are those whose actions and mental processes are the study's primary focus, and the latter refers to meaningful people around participants whose influence may affect the actualization of those actions or processes. *Psychological processes* withhold a complexity of human actions, cognitions, emotional and affective experiences, and display of sociocultural norms, as well as response to it. These processes *define relationships among different participants* (i.e.: *friend, subordinate, relative, leader*); *define the connections between participants and their social milieu* (i.e.: *should I conform?*); and *define participants' relationships with the physical environment* (i.e.: *is this place beautiful?; what is its meaning? , what should my actions be here?*). In other words, it could be suggested that psychological processes are related to what defines the content of transaction. *Physical environment* includes a wide variety of settings at different size scales and, basically, is represented by where the transaction takes place, such

as, home objects, rooms, home itself, neighbourhood, city, nature, etc. An important aspect to underline is that physical environment is not merely the background; it is dynamic because it shifts and changes in to many forms providing and limiting possibilities for transactions to take place. Time and temporal qualities are intrinsic to meaning and to definition of the events because these are continuous and ever changing across their temporal scale.

Bonnes & Bonaiuto (2002), referring to the work of several theorists, sustain that this perspective safeguards the importance of looking in to the context dimension when studying place specific experience; focuses on a holistic transactional perspective of person-environment relationship within a multiplace system of place experiences; and accommodates social-psychological processes behind the interdependencies among individuals and among individuals and their meaningful contexts, both locally, as localized place-specific actions, and globally as part of collective social-place dynamics that mold place identity and communal environmental practices.

Transactionism is also addressed by Wapner & Demick (2002) that draw to the attention of examining the person-in-environment through actions and experiences of the individual in a variety of contexts and situations, enhancing the holistic nature of place experiences and the value of “*transactions*”.

Hinged on the work of others, Bonnes & Bonaiuto (2002, p. 30) present a set of ideas and principles related with the transactional contextual approach to the person environment relationship that are relevant for the understanding of transactional approach to the child-place relationship. These are as follows: *the person-in-environment provides the unit of analysis; both person and environment dynamically define and transform each other over time as aspects of unitary whole; stability and change coexist continuously; the direction of change is emergent not pre-established; the changes that occur at one level affect the other levels, creating new person environment configurations; and the physical environment or setting embodies socio-physical properties and psychological processes, inherent to interaction with it, turning place in to an experiential unit of the geographical environment which emerges individually and collectively through spatial-physical properties, activities and cognitive or evaluative experiences or meanings.*

Henceforth, the transactional approach to the person-environment relationship is theoretically relevant in our study because the unit of analysis is, in fact, the “child-in place experience” materialized by the idea of localized multi-place specific transactions. In terms of methodology, the present research is transactional oriented because SoftGISchildren methodology, and the use of the “affordance” concept as operationalization of transaction focus on the dynamic interplay of children and their everyday environmental contexts.

1.1.4. Child-Place Transactional Relationship

This thesis focuses on “child-in place experiences” grounded in a theoretical transactional perspective. Gibson’s Ecological Perceptual Psychology and the core principle of his ecological approach- *affordance*- are central contributions to the present work. Altman &

Rogoff (1987) identify Gibson's ecological psychology as a transactional approach on the study of person-environment psychological phenomena. Likewise, Heft (2012) stresses Gibson's ecological view of the person-environment relation as very competent within a transactional approach to psychological research. Heft undermines the importance of Gibson considering the individual experience in the environment as not being of one (the individual), or of the other (the environment), but actually of being of both. Gibson considers animals and persons as active perceivers and, therefore, understands perception as an active process of exploring and detecting the functional and meaningful properties of the environment. This means that the individual perceives an "*affordance*" by *detecting an environmental property that provides opportunity for action and that is specified in an ambient array of energy available to the perceiver* (E. J. Gibson & Pick, 2000).

In this thesis, the child-environment relation is perspective as an "*on-going constitutive eco-niche*" that "*co-emerges*" as an embodied transaction in place. These transactions are materialized as multidimensional environmental affordances. Heft (2013) proposes a transactional approach to environmental psychological research where the person-environment relation is embedded in a network of dynamic processes that have a constituting rather than causal nature. The author specifically addresses the relation between culture and the person's individual processes, where "*sociocultural influences hardly stand apart from psychological processes, but instead, are enmeshed in on-going environment-person relations as constitutive influences at the level of individual experience*" (p.14). Moreover, in Gibson's theory of affordances (Gibson, 1979/1986), "*eco-niche*", or ecological niche is a setting of environmental features (a set of affordances) that afford value, meaning and action possibilities for an animal when utilizing a specific environmental niche. In this sense, an eco-niche is more related with *how an animal lives than to where it lives* (p. 128). *An affordance is neither an objective property nor a subjective property; or it is both if you like*. Gibson was against person-environment dualism and stances that *an affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy* (p.129). Thus, we suggest that child-place relations are mutually constituting and co-emergent in the course of human functioning.

Other theoretical and research works focused on children's environments are also important to outline the transactional perspective at which we aim to conceptualize child-place relationship in the environment. In this sense, it is fundamental to mention Roger Hart's study about children's experience of place, where the author draws attention to the *phenomenal landscape* as an entity composed by the child and his or hers meaningful scenarios; where these landscapes are exposed in the light of the child's transactions with it (Hart, 1979). Similarly, Moore's (1986) extensive field work on children's relationship between play and space, echoes importance on children's access to a diversity of urban environmental resources as a prolific socio-ecologic context for creative place use and meaning through exploration and play. Also, this author throughout his research used and developed the behavior-mapping technique to directly observe and register children's behavior in the natural settings (Cosco, Moore, & Islam, 2010; Moore & Young, 1978).

In the following sections, we elaborate about more detail the theoretical approach determined by James Gibson's Ecological Perceptual Psychology and the use of the "affordance" concept as a psychological relevant concept; and the multidimensionality inherent to the child-place transactions mediated by the multidimensional affordances.

1.1.4.1. James J. Gibson's Transactional Ecological Perceptual Psychology and the *Affordance* as a psychological functional concept.

"The fact is worth remembering because it is often neglected that the words *animal* and *environment* make an inseparable pair. Each term implies the other... Every animal is... a perceiver of the environment and a behavior *in* the environment" (J. J. Gibson, 1979/1986, p.8).

"The world of physical reality does not consist of meaningful things. The world of ecological reality, as I have been trying to describe it, does. If what we perceive were the entities of physics and mathematics, meanings would have to be imposed on them. But if what we perceive are the entities of environmental science, their meanings can be *discovered*." (J. J. Gibson, 1979, p. 33).

"The ecological approach to visual perception...is a theory about perceiving by active creatures who look and listen and move around... Perceiving creatures are part of a world from which they seek information and in which they use it..." (E. J. Gibson & Pick, 2000, p.14).

When considering a psychological approach to the environment it is necessary for psychological research, concomitantly, to include rigorous scientific criteria, while capturing human –place experience in its diversity (Heft, 2012). Heft argues that both types of psychological research, one solemnly focusing on the environmental qualities and physical metrics meets the first criteria but not the second one; and the other centered on the person's phenomenology on the psychological experiences with the environment partially addresses the second criteria but fails to be connected with the real and objective physical and spatial determinants. He adds that within a "transactional" research frame, the "*mind-environment*" fit is viewed as a whole, holistic entity; and that the Gibsonian ecological psychology by considering the mutuality between people and their environment and the individual experience as both objective and subjective plays a very important contribution in the field of transactional psychological investigation.

The core concepts of Gibson's ecological approach to visual perception are "*affordance*" as the *user-specific relation between an object or event and a an animal of a given kind* ; "*information*" as *how events in the world are specified for perceivers in ambient arrays of energy*; and "*information pickup*" as *how the information is obtained by an active perceiver and what is actually perceived* (E. J.Gibson & Pick, 2000, p. 15). We concur with these authors when they affirm the "*affordance*" concept as a central core aspect in Gibson's theory. In fact, the affordance is a mediator of the relationship between the person and the environment, embracing the mutuality existing between them two.

Next, we present our thoughts concerning the relation between these three concepts based on a conceptual reflection conducted in a previous work (Lopes & Neto, 2014).

The information available in the environment is perceived as goal oriented, thus becoming meaningful, and contributes to the regulation of behavior (Gibson, 1979/1986). The person is a whole body active perceiver when exploring and detecting the properties of the environment (Heft, 2012), because *one sees the environment not just with the eyes but with the eyes in the head on the shoulders of a body that gets about* (Gibson, 1979/1986, p.222).

By considering the person as an active perceiver, Gibson is simultaneously including the domain of “acting”. In fact, the affordance consubstantiates such “acting”. The realization of the affordance requires for the animal and the environment be adapted for one another and for a reciprocity between the perception-action process (E. J. Gibson & Pick, 2000). Gibson stresses that locomotion and manipulation are guided by perception, and, vice-versa, perception itself depends on locomotion and manipulation. However, he calls to the attention that just by standing and looking at (not moving) the observer invariably detects affordances for behaviour, although is not actualizing them, and consequently *not behaving at the moment* (p.223).

Perception is associated with the intentional activity to which is connected, and the relationship person-environment is immediate (direct) and it is based on practical activity. In this way, perception and action are not seen as separable but as cooperative processes designated by Gibson (1966) as *perceptual system*. The actor’s mobility and nature of perception are inextricably connected, where mobility, or action is a way for an organism to understand the reciprocal relationship between itself and the physical and social environment (Gunther, 2003). Mobility plays an important role in revealing the meaningful environmental information necessary for the perceptual system to function. Therefore, *we must perceive in order to move, but we must also move in order to perceive*, (Gibson, 1979/1986, p.223).

As mentioned previously, the active perceiver is the “person-actor” that actively pursues, explores, detects and captures meaningful information in the environment. This means that the person does not pick the information as a solo detached element but as a specified relation established between the information and its source (i.e.: as a car is approaching a person what is perceived is not the “car” but rather the car’s locomotion path in relation to the person) via direct perception (E. J. Gibson & Pick, 2000). For this to occur, it is necessary for the perceiver to dispose of available information in the environment that matches with the environmental property to be detected; and for the person and information to share a specific mutuality in a perceiver-environment fit. The sources of information are composed by events (including social events), surfaces, edges, objects and layout of the environment and are designated by Gibson as *ecological optics* (Gibson, 1979/1986, p.65). The active moveable perceiver picks up information from a “dynamic ambient optic array”, where through movement finds out the invariant and variant features of the environment. Body movement and mobility allows for a continuous changes of perspective on the layout of the environment and this is a fundamental premise for the individual to perceive the constant aspects of the environment (E. J. Gibson & Pick, 2000; Gibson, 1979/1986; Heft, 2012). For this reason, Gibson uses the term

“direct perception” as the activity of getting information from the ambient array of light through a process of information pickup that involves the exploratory activity of looking around, getting around, and looking at things (Gibson, 1979/1986, p. 147), enabling the active perceiver to directly detect functional environmental properties.

Perception guides the action and, reciprocally, action facilitates the detection of the environmental properties (*affordances*) which have a functional significance for the active whole bodied individual (Heft, 2012). J.J. Gibson’s theory of affordances is developed from the approach of what the environment affords to animals in terms of “*values*” and “*meanings*” which are directly perceived. His central questions and hypothesis on this topic are conspicuous of the relational conceptualization of person-environment relationship present within a transactional approach: *How do we go from surfaces to affordances? And if there is information in light for the perception of surfaces, is there information for the perception of what they afford? Perhaps the composition and layout of surfaces “constitute” what they afford. If so, to perceive them is to perceive what they afford* (Gibson, 1979/1986, p. 127).

The Gibsonian concept of affordance designated as *what it* (environment) “*offers*” the animal, *what it “provides” or “furnishers”, either for good or ill*” refers to both the environment and the animal, and denotes a matching between them (Gibson, 2014). The affordances exist in the environment as potential resources that are only actualized if perceived by the individuals, and for that to happen a person-environment fit needs to be established. This could be interpreted as if the affordance is dictated by the person’s subjectivity. According to Gibson (1979/1986), this is a misconception because *the environment as whole with its unlimited possibilities existed prior to animals* (p. 128), and in spite of the individuals dependence on their environments to live, the opposite is not true. Although perceiving is directly dependent on the conspicuous availability of potential affordances, the opposite is not verified because the affordances are objectively real properties independently if their perception or realization takes place (E. J. Gibson & Pick, 2000). Nevertheless, the nature or quality of the affordance is defined by the relationship established through the specific person-environment fit. This dual specificity is determined by the information that specifies the functions of the environment together with the information that specifies the corporal aspects of the person within the same eco-niche (Gibson, 1979/1986).

Therefore, an affordance is neither physical (objective), or phenomenal (subjective), it is actually both because connects simultaneously to the environment and to the perceiver. In this way, when perceiving an affordance, the active perceiver does not detect a *value-free physical object* with added meaning but, instead, detects directly a meaningful *value-rich ecological object* (Gibson, 1979/1986). Thus, an affordance is a relational psychological concept that refers simultaneously to the individual and to the environment (Heft, 2012). More precisely, Heft refers to an affordance as a psychological property of the environment in relation to the functional (action) possibilities of the individual. This means that the environment is experienced immediately (directly) according to its functionally, by the detection of meaningful properties which are psychologically relevant for the perceiver.

The affordances depend on the characteristics of the individual (which vary over the course of development) that perceives them and on the meaning the environment has for the individual through the possibilities of action which are offered to him or her. For each animal typology, there is a set of affordances which is specified by the individual developing characteristics and by his/her process of exploring possibilities of action in the environment. As mentioned previously, Gibson points out that within the affordance concept there is, concurrently, information that specifies the functionalities of the environment (exteroception) and information that specifies the corporal perceiver (proprioception). Hence, through the perceptive act the developing and active individual detects immediately and directly affordances. Moreover, as the individual develops and grows the affordances that a certain surface, object, event, or other people offer also change. For example, an adult does not perceive the metrical qualities of a chair, but, instead, perceives the possibilities of action this object provides, sitting; in case of small child, he or she could perceive and actualize the chair as a hiding place (the adult could also perceive this possibility but might be put off doing it because the body size does not allow it or because it is socially not expected). In this sense, the developing individual actively perceives behavior by an association to a condition and not the condition in its literal sense, via transactional relational properties, the *affordances*.

Action is essential for children to build knowledge of the world over time because that same knowledge derives from that same action. In this way, progressive mastery of action in the course of development widens the possibilities of perception since new possibilities of action reveal new affordances, within a permanent, continuous and perpetual cycle. Clark & Uzzell (2002) stance that action extends knowledge about the environmental context that supports such action and of the action itself. This type of knowledge is available since very early stages of life and changes very rapidly throughout childhood.

According to Gibson (1979/1986), the child starts to perceive affordances related with her own personal behavior through locomotion and manipulation of her own body and also has to learn to perceive the affordances actualized by other people. In his view, socialization comes from this process of recognizing the value and meaning other people attribute to environmental elements. Gibson studied the invariant properties that are revealed through the perceiver's movement. Particularly, for two children with different perspectives of the same solid object, he found out that they perceive a common affordance. Gibson concludes that an affordance within the same eco-niche is often perceived and actualized by all individuals who share the environment.

1.1.4.2. Beyond materiality and physicality of affordances

In Gibson's theory of affordances (Gibson, 2014), he elaborates about the diversity of environmental resources in the actualization of a diversity of affordances and stresses the following:

- Surfaces and layout afford posture, locomotion, collision, manipulation and general behavior.

- Different places, which are composed by different combinations of surfaces and layout promote different affordances, such as, danger, feeding, mating and hiding of one self or of a detached object from others. The affordance of “hiding” involves social perception. Moreover, when hiding from others, the observer is able to perceive if others are hidden or unhidden and, simultaneously, if himself is concealed or unconcealed. This affordance seems particularly relevant for survival and development because it is very recurrent in children’s behavior.
- Detached objects afford various behaviors, such as carrying, lifting, grasping, cutting, etc., and they are essential for children’s development because it is easier to percept the meaning of an object than all of its variables.
- Affordances are either positive or negative in reference to an active observer, in the sense that the former happens when the environment provides beneficial opportunities and the latter when it affords dangers. For instance, fire may afford warming (positive) or burning (negative) affordances; another person may afford comfort (positive), or aggression (negative); a detached object, such as a knife, may afford cutting or being cut, etc. Nevertheless, Gibson calls to the attention that to classify an affordance in these terms should only be done with great thought and is better applied to what he considers to be biological and behavioral facts. To assess an affordance on this perspective is to determine its emotional meaning, or nature. On this topic, Kytä (2003) refers that sociocultural factors, as well as previous personal experiences may affect the active observer’s evaluation regarding the emotional positivity and negativity of an affordance.²
- The other animals and persons afford *the richest and most elaborate affordances of the environment* (p. 58). The others are considered as the most valuable ecological “Live-Objects”. “Objects” in the sense that the body surface reflects light and that the information that specifies which actions are provided by him or her is shown in the light; and “Live” because Gibson recognizes that persons are more than objects in the sense that they interact with the active perceiver and with each other becoming active perceivers too.

In this sense, it stands to reason that Gibson actually laid out foundations for the extension of the concept of affordances to go beyond its material and physical category.

1.1.4.3. The Sociocultural nature of Affordances

Although, Gibson (1979/1986; 2014) focused on the material nature of the affordance concept and its functionality, and never used the term “social affordances”, he reinforced that the affordances provided by other humans are the most interactional of the environment because they provide mutual and reciprocal affordances at a high level of behavioral complexity. He adds that humans as animated moving beings are affected and affect other

² In the subsequent section entitled “The Emotional and Sociocultural nature of Affordances” we will get back to this point in order to elaborate about the emotional nature of the affordances.

animated moving beings in a complex interactional rich cycle of reciprocal transactions. The other persons, just like oneself, continuously interact with others in a perpetual cycle of corporal movement and movement within places, increasing the complexity of relationships established between people and between people and the surrounding environment. These interactions enable complex social interactions, namely, sexual, economic, nurturing, agonistic, cooperative, playful, political and communicative transactions (Gibson, 1979; Kyttä, 2003), which are essential for survival and development.

Moreover, it is important to reaffirm that Gibson was against any kind of dualism in the person-environment relationship. His transactional approach emphasizes the relational mutuality between the person and the environment. Likewise, and although he focused his work on the material and functional nature of the affordances, he was against a division of the affordances' experiences in material, social and cultural domains, and considers the environment as a whole, and therefore, simultaneously, physical, social and cultural. When perceiving functional significance (i.e.: a mailbox as a place to put letters), one is simultaneously perceiving the complex sociocultural system which co-emerges with it (Gibson, 1979/1986, p. 139).

According to Brandtstädter (2006), the cultural context sets up the conditions for the actualization of constrictions and affordances which guide and fixate human developmental processes, as, simultaneously, such guidance is essential for the perpetuation of the cultural matrix. This means that sociocultural systems can promote or inhibit the perception and actualization of affordances and that these two processes are vital for the appropriation of the sociocultural values and norms.

The social and cultural tissue in which the lives of human beings take place and are shaped differentiate the ontogeny and phylogeny of human species from the other animal species. Through human course of evolution, the sociophysical environment has been manipulated and transformed under the auspice of sociocultural practices. Rietveld & Kiverstein (2014) emphasize the role of human collective sociocultural processes in the actualization of affordances through the exercise of abilities in particular ecological niches; and sustain that a rich landscape of affordances are embedded in sociocultural practices.

The authors sustain that sociocultural processes are (re)produced by human beings and, simultaneously, mold ecological niches which create culturally and socially produced forms of life in the sociophysical environment; and that these abilities have been acquired, experienced and trained within the realm of collective sociocultural practices which define ecological niches. *It is the ecological niche of a particular form of life that is made up of affordances, and each affordance must be understood in relation to the abilities available in a form of life* (p. 26).

Moreover, these researchers underline that affordances depend on the coherence between material environment specificities, the existing abilities within the ways of life and shared sociocultural norms and values. In this sense, a way to enhance the repertoire of affordances is to experience different sociocultural practices.

Likewise, Costall (1995), Pickering (2000) and Reed (1993) sustain that the process of actualization of affordances is affected by social and cultural factors. This idea is very well grounded on the theoretical work of Marketta Kyttä on the children's environmental affordances (M. Kyttä, 2004; M Kyttä, 2003). Next, we present a synthesis of the main aspects explained by this author on this topic which we find relevant to underline the affordances' social and cultural etymology:

- Parents and other adults have a crucial role in the teaching of some affordances to children (i.e.: how to use dishes in a correct way according what is culturally expected). Moreover, through the process of socialization, children are actively guided by their meaningful adults' perception on what specific affordances they are able to actualize without jeopardizing their well-being and safety.
- Sharing of affordances in between individuals is essential to establish communication and social connectivity. The world becomes more interesting and complex when affordances are shaped and new affordances perceived and actualized. The adult and the child enhance the level of communication when the latter is able to focus on the adult perceiving and actualizing an affordance, and not on the adult himself. Additionally, when the child is able to comprehend the reaction of others towards his/her own attempt of actualizing an affordance (language development expands this capacity), new meaning is added to the initial layer of the affordance. By this, it becomes possible for the child to mold an existing affordance or to perceive and or actualize a new one. In this sense, we believe that the process of creating layers of affordances, through social interaction in between children and adults, enables children to enlarge scope of meaning and to build complexity around their material, social and cultural worlds.
- The actualization of affordances is a process affected by sociocultural influences as depicted in the following diagram (Figure 1) developed by Marketta Kyttä in her article about creating a hypothetical model for child-friendly environments (cf. Kyttä, 2004).

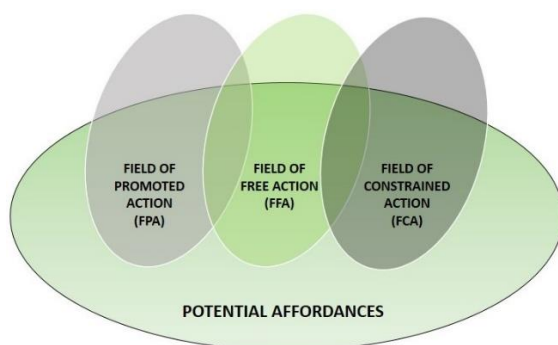


Figure 1-Marketta Kyttä's scheme on the relationship between environmental potential affordances and the actualization of them through the fields of promoted, free and constrained actions

1. The environment offers the individual an infinite number of *potential affordances* which act as a potential for human multidimensional activity. It is within this range of environmental potential that intentional perception-action cycles take place. For this to happen a matching

between the individual's corporality, expressed by his physical, social and psychological characteristics, skills and necessities, and the material and sociocultural features of the environment has to be actualized. This actualization of the person-environment fit, framed by an immensity of *potential affordances*, is visible through a subgroup of *actualized affordances* which the actor actively and intentionally, in a socio-historic time and place, is able to perceive, utilize and shape.

2. The transactional relationship of the person with the environment mediated by the actualization of affordances operates within three fields of action. The *field of promoted action* (FPA) *regulates which affordances can be actualized as well as the time, place and manner in which they can be actualized in a socially approved way* (Kyttä, 2004, p.182). The *field of constrained action* (FCA) refer to sociocultural constricts (social rules and cultural influences) and to the material restrictions in terms of physical design of elements and features which actively hinder or even unable the actualization of affordances. In the child-parent relationship this field of action is very common because a great deal of the parental interaction refers to limiting children's actualization of affordances, either verbally, or by drawing the child's attention to other sources of interest. The *field of free action* (FFA) refers to the affordances which the person freely perceives, utilizes or shapes. These affordances are very common in children as they explore and discover their surroundings. This autonomous discovery of affordances in terms of number, content, complexity and diversity, is dependent on the child's personality, skills, preferences, as well as on perceptual, motor and social development.
3. The FFA is intersected by the FPA and FCA, since the actualization of the free will affordances can be socially legitimated and encouraged, or, conversely, hindered or banished. The effect of the FPA and FCA on the FFA is very frequently observed when children are playing (supervised or unsupervised) and in the adult-child interaction. Moreover, when there is social disapproval on the expression of an independent affordance, this same affordance can still be intentionally or unintentionally actualized, and thus be considered as a transgression or violation of a social norm, or rule.
4. The set of potential affordances is affected by the shaping of affordances within the promoted, free and constrained fields of action because the shaping of an affordance makes it available for other actors in the potential environment and, simultaneously, changes and enhances it bringing more diversity and complexity to both the environment and the active individual. When observing children moving, playing and interacting with the sociophysical environment it is very clear and pervasive the dynamics between the fields of promoted, free and constrained actions and the set of potential affordances.

1.1.4.4. The Emotional nature of Affordances

Marketa Kyttä in her PhD thesis, announces that the emotional nature of affordances and the motivational basis for activity has been disregarded in the field of ecological perceptual psychology and that it should not be dismissed (M Kyttä, 2003). In this sense, she proposes that the theory of affordances should contemplate the emotional and motivational basis for

immediate behavior grounded by the multiple systems perceptual model (Neisser, 1994). Next, we present our reinterpretation of Kytä's and Neisser's perspectives and other relevant authors on the perceptual qualities of the affordances, as we try to establish its emotional nature.

When a person is detecting affordances, the three perceptive systems, direct perception, interpersonal perception or social perception and recognition collect individually specific environmental information qualities and, simultaneously, cooperate with each other to actualize such affordances.

Direct perception is fundamental for all affordances available to the senses to be perceived and actualized; and information is based on universal and optical laws which are common to every person and to most animal beings. On the other hand, social perception is related with social interaction between individuals and, as direct perception, is based on movement cues. However, some social perception requires for object recognition (very much dependent on previous experiences) and, therefore, is not immediate. In social perception, the observer picks up social meaning of other persons' non-verbal communication (gestures and expressions) and replies back using interactional corporal language. Moreover, the social perception information depends on sociocultural habits that ground people's interactions, and provides a dynamic interactional emotionality between actors and within different situations.

Similarly to social perception, emotional meaning of the affordances is subjected to the person's experiences and sociocultural contexts and factors. One same affordance might be experienced by some people and not by others due to differences when assessing its emotional intensity via an evaluation of how positive or how negative the affordance is (i.e.: a mother may allow her child to play freely in a public plaza if it considers it to be safe, while another mother may not allow her child to do so, considering it dangerous; a father may allow a two year old child to climb the stairs in order to reach the top (considering it safe), although if the child stands still in one step, the father may interfere and prevent the child of reaching the top (because of the risk of falling down while standing still).

Kytä claims that direct perception is emotional too; and stresses an emotional nature to the affordances, as a result of social perception, which meaning or value may be dichotomous, positive or negative or more gradient (along the two poles) for the individual, including the child. Therefore, social and emotional perception come hand in hand with one another. These emotional meanings of the affordances are immediately (directly) perceived because capturing an affordance is a process of perceiving directly a meaningful ecological object (Gibson, 1979/1986).

In this sense, we share with this author the view in which *every affordance has its own emotional coloring that is uniquely apparent to each individual* (p. 72), its own *emotionalization* (p.71); and that an emotional rich affordance does not need to be coherent with its functionality richness and vice versa (M Kytä, 2003). This "emotionalization" of the affordances is important when searching for the motivational basis for the actualization of affordances. According to Gibson (1966), the motivation underlying the action course is linked with performance (according to the person's expectations and directed at the visible environmental objects) and

exploration (towards the discovery of new unexpected possibilities) in the environmental resources.

Hence, we suggest that meaning of a place affordance resides on the intensity of the emotionality associated with its expressional multi-dimensions (functional, social, emotional, etc)³ in consonance with the environment multidimensional character.

1.1.4.5. Expressional multi-dimensions of children's place affordances

As we have demonstrated in the three previous sections, affordances stem within both material (physical and functional) and immaterial (emotional, social and cultural) aspects or contexts in the meaningful environment. Simultaneously, affordances are perception-action possibilities detected by the individual in the environment, meaning that their content becomes expressive. In fact, J.J. Gibson was able to study affordances because of their expressiveness (i.e.: water affords drinking; a rigid surface affords support; a ball affords throwing; other people afford cooperative behavior; a hiding place affords concealment, etc); and although his conception of the world was holistic (he perceived the person-environment as a relational transactional entity), he focused on the material and functional expressivity of the affordances, in other words, on the functional character of the environment. Nevertheless, other characterizing layers co-exist with the materiality of environmental structures and elements. Subsequent research moved in to this direction by widening the scope and use of the affordance concept, namely, to study children's environments, activities, and place interactions and as a tool to assess and design child-friendly environments and places (Heft, 2012).

Kaufmann & Clément (2007) make a distinction between the physical, social and cultural determined affordances. They share Gibson's view that the affordances provided by the presence of others are the most complex of all and that social interactions generates behavioral specificity in between social objects and provides knowledge about the structural and dynamical aspects of social processes, namely, which appropriate behavior to have and what to expect in a social interaction with others.

In the same way that the nature of the affordances stretches beyond functionality, the expressional content of affordances also comprehends social, cultural, emotional and other properties of the environment. In order to considerer these environmental properties, it is central to conceive the environment as being socially, emotionally and culturally meaningful from the perspective that the individual perceives social, cultural and emotional meanings in the environment, the same way he or she perceives functional meaning.

Schmidt (2007) illustrates the previous by explaining the conceptual perspective that needs to be adopted in order to apply a theory of affordances to social meaning.

By using two examples of personal meaningful objects (a cup offered to him as a gift by his daughter; and the stairs of his childhood home), the author demonstrates that besides the functional affordances which these two objects provide (graspability and climbability,

³ Expressional multi-dimensions of place affordances will be of further discussion in a subsequent section of this thesis.

respectively), they also allow for the perception of social affordances as a consequence of the social nature of these objects intertwined with their material nature, creating additional environmental properties which afford social utilities.

“However, this is my cup and when I perceive this cup, I apprehend not only its graspability but also that this cup affords using every day for coffee because it was a gift from my daughter. Take the stairs... . Ecological theory would claim that I would perceive that this layout of surfaces affords climbing—their climbability—based upon the pickup of information about the riser height and the length of my legs (Warren, 1984). However, when I perceive these stairs, I apprehend not only their climbability but also that these stairs are from my childhood home, that I interact with them within a certain social context (e.g., as part of a warm greeting on holidays), and that they afford walking up them and through the door behind them without knocking. Notice these objects have additional meanings beyond graspability and climbability that are part of my particular social environment and based upon my roles in that environment (e.g., being a father, being a son).” (Schmidt, 2007, p. 139)

This description of social affordances emphasizes the “property” role of social processes in the object’s environmental properties, as well as in the actions of the perceiver. Schmidt sustains that to be in consonance with the ecological perceptual theory, both the environment and the action systems of the perceiver are perspective as being socially constituted by social properties and dynamics which are real and embodied; and that perception of social affordances is immediate.

As for the first conceptual assumption, Schmidt understands social activity as being guided by shared social rules among individuals within a frame defined by a “cultural game” that, simultaneously, provides social properties for the environmental object and provides new action roles for the perceiver. For instance, Schmidt’s cup affords ownership properties and a disposition for the perceiver and others to act under the social norms that establish principles of ownership. These social properties are not structuring parts of the environment (like the diameter’s size of a cup). However, they are abstract environmental properties that emerged through past social behavior regulated and sustained by a sociocultural eco-system. Likewise, the dispositions for the perceiver to act in social conformity (social abilities) are not structural properties of the actor-perceiver, such as the grasper property of a hand, but are, in fact, abstract social processes that guide the actor’s action towards what the object property affords.

It is important to underline that the functionality of a physical affordance like “graspability” of a cup is determined by the relationship between the physical properties of both the cup and the hand. This is not the case when dealing with social affordances, its functionality is determined by the social layer from which social properties and processes stem from. Moreover, these abstract properties and processes are a result of interactions among individuals extended through time and history. Hence, social affordances of objects emerge from the dynamical social layer interaction determined by the relationship of abstract, temporarily, functionally defined properties of the actor and of the environment.

As for the second conceptual premise for establishing a theory of social affordances, Schmidt argues that perception of social affordances is directly perceived just like the perception of physical affordances. This means that information on the social property of an object *is directly available to be picked up so that an object can be directly perceived and socially acted upon* (p. 149). In this way, it is of utmost importance to comprehend how social information on the abstract and temporally extended properties of the perceiver and the environment is built and picked up. By using Gibson's primacy of events in an ecological ontology and the occluding edge notion it is possible to understand social perception of an object as directly perceived.

"In order to apply the theory of affordances to social actions, a number of conceptual scaffolds are needed. The first is to acknowledge the reality of social properties of the environment and social effectivity structures of the actor...We additionally need to accept that the ongoing perception of events is the basic epistemic reality and that specific episodes of perception cannot be fully understood without seeing the series of which they are a part." (p. 149)

As mentioned previously, the social layer intrinsic to the person-environment fit is established through ecological experience temporally extended. This means that the perceptual context of a social affordance is not focused just in the isolated moment in time where the econiche has been specified, but in the context of ongoing experiences that led to the present moment. In this sense, the *econiche of the animal is truly dynamic in history and our perceiving and acting within it is based upon the tonic perception of ongoing events* (Schmidt, 2007, p. 149). The social information of the past is always reintegrated in a continuous ecological event in which the actor has been taking part. The present social-econiche is simultaneously past and present because it is composed of recent and distant events that define social experience related to an object. In this sense, what is directly perceived is the ongoing temporal extended context of the present that emerge as abstract social properties specifying events in time; and the information that is being picked up is not static but refers to *higher-order properties that are invariant across the episodes of the series that comprise these long-term events*⁴ (p.147).

R.C. Schmidt perspective on social meaning of objects is very important because it provides solid theoretical ground to apply the Gibsonian ecological perceptual psychology to functional person-environment properties, either than physical, but also social.

⁴ Schmidt (2007) raises the following questions: "So how is it possible for me to directly perceive the gift affordance of the cup... when there is no information about such social meanings in the immediate sensorial array? We can see now that there is information available for the gift nature of the cup because my econiche is temporally constructed with respect to both recent and less recent on-going events. My perception of the affordance of the gift nature of the cup on that Monday morning at 6 a.m. when no one is around is not an isolated moment but an episode in a number of nested long-term events that make up the ongoing dynamics of my social environment—my econiche. What are these events? ... One is defined by the series of episodes of cultural gift giving and appreciation that extend to the beginning of my life (birthdays of mine and others, Christmases and other holidays). Another began with the birth of my daughter and is made up of all my interactions with her that ultimately define my relation- ship with her. Yet another began on the Christmas day she gave me the cup is de- fined by all of my interactions with the cup." (p. 147)

Heft (2003) considers the affordances to be multidimensional as a result of a person's intentional participation in the immediate everyday multiple activities; which are set in an environment characterized by structural and sociocultural layers. Moreover, he emphasizes human experience as being driven by motivation and by an "*intentional structure of action*" that detects multidimensional meaning in the environment. Consequently, perception and actualization of affordances has to be multidimensional too.

All affordances are psychological functional properties of the person-environment econiche. J.J. Gibson focused his approach on the physical-motoric affordances (i.e.: graspability, walkability, climbability, throwability, etc). Inspired by Gibson's work, Harry Heft created a preliminary "Functional Taxonomy of Children's Outdoor Environments" (Heft, 1988) by analysing and comparing several studies, in the field of Ecological Psychology and Environmental Psychology, about children's environmental activities, namely, those conducted by Barker and Wright, Robin C. Moore and Roger Hart. In Heft's taxonomy all affordances are predominantly physical and motoric and as his goal was to use the taxonomy as a valid tool to interpret the functionality of the children's outdoor environment. Thus they are considered as functional affordances⁵.

This seminal work (Heft, 1988) was an important milestone because it offers a way to think about environment in a psychologically meaningful perspective in detriment of the approach sustained on describing the form of the elements. It also reinforces the idea that *psychological functioning in everyday settings is fundamentally active and goal-directed* (p. 36). As a result of the relational nature of the affordance concept, affordances vary along the course of development of an individual (old affordances are reshaped giving way to new ones through an interrelationship between maturation and experience) changing the functional properties of the environment along the person's life cycle. Moreover, the affordance concept plays an important role as an aid to environmental design towards the conception of the environment as appropriate to user's needs and behaviours. Here are some examples of Heft's children's functional affordances from a taxonomy developed by the author (Heft, 1988, p. 36):

- *Flat, relatively smooth surfaces- affords walking, running; affords cycling, skating, skateboarding.*
- *Non-rigid, attached objects- affords swinging on (e.g. tree branch).*
- *Climbable feature- affords exercise/mastery; affords looking out from; affords passage from one place to another (e.g., stairs, ladder).*
- *Moldable material (e.g., dirt, sand)- affords construction of objects (e.g., pottery); affords pouring; affords modification of its surface features (e.g., sculpting).*

⁵ Other meaningful investigations on children's environmental experiences also consider Heft's functional taxonomy as composed by functional affordances (Clark & Uzzell, 2002; M Kytä et al., 2012). Thus, in the present thesis we have adopted the terminologies functional, social and emotional to characterize each types of affordances, or, in other words, the multi-dimensional expression of children's affordances.

- *Water- affords splashing; affords pouring; affords floating objects; affords swimming, diving, boating, fishing; affords mixing with other materials to modify their consistency.*

Marketta Kyttä throughout her research has been interested in studying the material elements of the environment which potentiate or hinder children's social activity, or, in other words, what she describes as the *environmental opportunities for sociality* (Kyttä, 2003, p. 63). In research about differences of children's affordances in between Finnish and Byelorussian communities, and in between the home, yard and immediate surroundings (M Kyttä, 2002); and in the studies about assessment for environmental child-friendly (Kyttä, 2003, 2004), this author introduced a novelty aspect to Heft's functional taxonomy of affordances by adding a category named "*affordances for sociality*", designated as such by Gaver (1996) when referring to possibilities for social interaction offered by the physicality and materiality of the environment. Kyttä's affordances for sociality included in her previous mentioned works were "*affords role playing*", "*affords playing rule games*", "*affords playing home*", "*affords playing war*", "*affords being noisy*", "*affords following/ sharing adult's businesses*". Moreover, in Kyttä (2004), she suggests that it is possible to widen the scope of the affordance concept in order to include emotional and cultural action possibilities beyond the functional and social ones.

Clark & Uzzell (2002) developed assessing scales to measure adolescents' affordances in different settings of the urban environment that included home, neighbourhood, school and town center. They focused on sociality because of its relevance in development at this particular stage of life, namely the need for places of social interaction and for retreat. Consequently, 34 affordances for social interaction and retreat were identified, and rated by participants according the number of places existing in each setting to actualize them and in terms of how often these places were used. Some of the affordances which integrated this study were "*avoid people*", "*be active*", "*be free from the expectations of your family*", "*be free from the expectations of your friends*" *be noisy*", "*be on your own to think*", "*be peaceful*", "*be with close friends*", "*be free to be yourself*", "*be happy*", "*get away from friends*", "*get away from parents*", etc. (p. 100).

More research work has been developed embracing the concept of affordance as multidimensional place experience. Under this auspice, Min & Lee (2006) show that neighborhood place experience is hinged on environmental attributes which support children's choice of affordances. Chatterjee (2005) in a work about children's friendship with places refers to affordances as emotional, psychological, social and cognitive as fundamental properties for children to develop a sense of place. Within a phenomenological approach, Graumann (2002) alludes to a transactional nature of child-place relationship; where meaning of place is intersubjective, as a result of a "shared action" among children that turns lived space into an experienced meaningful one. Pia Christensen and Mikkelsen (2013) sustain that children actively pursue and create meaningful places via social, material and symbolic processes through movement and transactional relationship

Lim and Barton (2010) combine Gibson's ecological approach of action-perception, where the latter is a result of the subject's caption of affordances and the former an essential

condition for latter, and vice-versa, with ethnography and phenomenology approach to child-place interaction. The authors sustain that to understand children's sense of place, it is necessary to examine the interactional and relational relationship between child and place- a *child in a place, in action-*, through operationalization of the concepts "place identity" and "affordances of place". The latter is conceptualized, operationalized and interpreted as a multidimensional concept layered by functional, social and emotional meaning that children make of it.

The expressional multidimensionality of affordances plays a central role in this thesis because among other research goals we are interested in understanding the multi-dimensional meaning that children give to different urban places, namely, through what we designated as functional, social and emotional affordances. These expressional categories of affordances were set from Kytä et al. (2012) seminal work using *SoftGISchildren* methodology to, among other interests, study children's meaningful place experiences in the urban environment. Further along, on the methodology chapter of this thesis, we explain in a detailed manner this categorization of affordances and specifically address the process that was devised to implement those expressional types of affordances in our research.

1.1.5. Children's Independent Mobility

1.1.5.1. The importance of children's independent mobility in perceiving and actualizing multidimensional affordances

The daily activity of a subject is in consonance with the affordances which are perceived and actualized. Gibson reinforces the idea that a person when behaving (interacting with the surrounding environment) does not perceive surfaces, objects and animals as detached elements but, instead, perceives affordances as the possibilities of action provided by these elements. The affordances are perceived through action (movement) as, simultaneously, the perceptual systems captures the required information for the realization of the meaningful transaction animal-environment.

Movement is crucial for a child to learn about the surrounding environment, enabling him or her to grasp physical and emotional control over it (Holt, 1975). Piaget's theory on child's development of the conception of space is still recognized as one of the most extensive and valuable pieces of research work. On his research, Hart & Moore (1973) explain that the child constructs his/her knowledge about the environment through *acting-in-space*; and Weston (2010) points out that physical movement through the environment is necessary for learning about it and that young people are physically able to travel independently and are psychologically prone to it. Moore (n.d.) withstands that movement is an essential part of a child's healthy development process, affording social interaction and exploration and, simultaneously, allows for environmental and place experiences (Moore & Young, 1978). Moreover, it is through mobility, or action that an organism is able to understand the reciprocity relationship between an organism and sociophysical context (Gunther, 2003).

In this sense, mobility, namely, independent mobility is crucial for child-place interactions and its inherent transactionism. Children's mobility in the city environment is fundamental for children's access to diversified sociophysical spaces, where these transactional interactions take place. Along the course of childhood, children's behaviour of exploration and of interaction with the physical and social environment are very much focused on manipulation and adaptation of the senses and of the body itself, in order to create their own meanings and directions for actions (Neto, 2001). Moreover, the references of the body's social identity are, in childhood, built by the equilibrium between body's action in the physical space and the interactional richness of the housing space, street, school, and of the city; and independent mobility as roaming freely through in the physical and social environment, without adult supervision, constitutes one of the characteristics of such corporeal social identity (Neto, 2006).

The capacity of children's autonomy mobility towards the physical environment, enables the development of freedom and autonomy in play, discovery of the environment and its functionality, and development of cognitive representation of the physical and social environment. (Neto, 2001). Correspondingly, the same author sustains that the way children learn about environmental functionality, based on places where children travel to so that they can play, meet, and socialize with friends allows to better understand the development of their progressive autonomous capacity towards physical space.

Thus, children's independent mobility is a concept that should be understood within an evolving perspective of the child's development, who, throughout time, acquires a more consistent cognitive representation of the surrounding space, as a consequence of a progressive autonomy and freedom of action; such autonomous corporeal interactivity results from perception, exploration, identification, discovery, learning and memory of the physical and social environment and its functionality (Neto & Marques, 2007).

Along the line of the corporeal interactivity an identity perspectives, children's mobility is proposed as a polyphonic concept transversally linked by spatial and social mobility. In this way, it becomes fundamental in this study to conceptualize children's mobility as travelling mode and travelling accompaniment to different spaces in the urban realm, where a series of multidimensional transactions takes place.

The topic of children's independent mobility in Portugal has been treated with detail in two previous articles (Cordovil et al., 2015; Lopes et al., 2014) that can be consulted in **Appendix 1** of this thesis. These two research works are presented as preliminary studies which precede the transactional investigation central to this thesis. However, and for the purpose of the current section on theoretical chapter of this thesis, a few considerations will be addressed on the next section.

1.1.5.2. Children's Independent Mobility etymology and cross-research works

Earlier studies referred to *home-range* as children's *spatial manifestation of exploring* autonomously playful and social environment outside children's home (Van Vliet, 1983). Further along, Hillman, Adam, & Whitelegg (1990), from Policy Studies Institute in London, produced a report about a pioneer cross-cultural research on children (7-11 years old) and young people's (11-15 years old) mobility in England and in Germany. The methodology used in this study was parental and children questionnaires; and, in the English sample, data from previous surveys conducted in 1971 was compared with data from 1990, while country differences were studied comparing data from 1990. In this study, independent mobility was operationalized as a set of rules defined by parents and turned in to licences, allowing their children to move freely in the environment (i.e. allowed to go to school or to ride a bicycle independently). Later on, Prezza et al. (2001) included traveling to shops and peer's homes, and Tillberg Mattsson (2002) going to leisure places.

Hence, children's independent mobility in the urban setting can be defined as permission for children to move without adult supervision in their neighborhood and city (Tranter, 1994) so that they can explore and learn about the environment at their own rhythm (P Björklid & Nordstrom, 2004), towards a progressive and wider freedom of action and movement (Tonucci, 2005).

At present time, there is a comprehensive body of research on children's independent mobility due to its drastic reduction and consequent pernicious effects in child's development

and in childhood experience; for its claim as territory of research-intervention with an interdisciplinary character; and for its implications on devising of childhood public policies.

Children's mobility, use of public space and place experience have been studied from several theoretical perspectives (i.e.: human movement sciences; children's development; geography; ethnography; phenomenology; urban planning; environmental psychology; sociology of childhood, etc) and using diversified methodologies (Lopes & Neto, 2013). In Table 1, a list of some of these relevant studies, conducted in the last 16 years, their goals and methodological gear is presented.

Table 1-. Research studies on children’s mobility and/or place experience

Study Title	Goal Study	Methodology	Author(s)
The study of independent mobility and perception of the physical environment in rural and urban children	Characterize independent mobility, affordances and life routines of two groups of Portuguese children (8-9 years old) from rural and urban environment	Child and parents questionnaires; children’s interview; activities diaries	Arez & Neto (1999)
Children’s Independent Spatial Mobility in the Urban Public Realm	Examine how 1378 children (10-11; 13-14 years old) from contrasting urban environments, in the city of London, move around , use meaningful public space and report about place experience	Child and parent questionnaires; focus group discussions; child and parent interviews; mapping exercises; neighbourhood observations; walk-about; photo-journals	O’Brien, Jones, Sloan & Rustin (2000)
Restorative experience, self-regulation, and children’s place preferences	Examine role of restorative experience and self-regulation in the formation of place preferences by 55 Finnish children (8-9; 12-13 years old)	Parent questionnaire; children structured interview	Korpela, Kyttä & Hartig (2002)
Freedom of movement and environmental knowledge in elementary school children	Evaluate effects of ‘autonomy of movement restrictions’ in acquisition of environmental knowledge in a group of 46 Italian children (8-11 years old)	Sketch-map of home-school itinerary; localizing meaningful places	Rissotto & Tonucci (2002)
The extent of children’s independent mobility and the number of actualized affordances as criteria for child-friendly environments	Determine relationship between independent mobility and number of actualized affordances through a co-variation of the two variables; proposal of a hypothetical model of four different environments for children ‘s place experience; define child-friendly environment (227 children; 8-9 years old; from Finland and Belarus)	Individual interviews and questionnaires	Kyttä (2004)
Perils, pleasures and parents: children aged 10 to 13 on their	Understand how Belgian children (10-13 years old) experience mobility, what they	Focus group discussions; board game created for the effect;	(Meire, 2004)

growing autonomous mobility	enjoy, how they deal with risks, and what 'autonomy' and 'dependence' means to them	brainstorming session	
Children's local travel behaviour - how the environment influences, controls and facilitates it	Explore how 74 English children (8-11 years old) move in local environment, in terms of speed, energy consumption and sinuosity	Questionnaires; activity monitors; GPS monitors; diaries	Mackett, Brown, Gong, Kitazawa & Paskins (2007)
Is Children's Independent Mobility Really Independent? A Study of Children's Mobility Combining Ethnography and GPS/Mobile Phone Technologies	Examine conceptual underpinnings of children's independent mobility by exploring the impact of socio-physical environment on Danish children's mobility (n=40; 10-13 years old and 30 families)	Formal and informal interviews (children and teachers); home visits; naturalistic observation (classroom and daily environment); guided tours interviews (walking/cycling along with children); GPS; rolling mobile phone survey	(Mikkelsen & Christensen, 2009)
Exploring insiderness in urban children's sense of place	Explores children's relationship with their urban environment within a phenomenological and ethnographic approach (19 children, aged 11-13 years old)	Interviews; neighbourhood mapping; autophotography; walking-along	Lim & Barton (2010)
'There is Nothing Here for Us..!' How Girls Create Meaningful Places of Their Own Through Movement	Study Danish girls (10-13 years old) mobility patterns , place-making activities and place-meaning process in an suburban context	Mixed-methods design combining ethnographic methods: family and child interviews, participant observation and guided-tour interviews with GPS technology and a mobile phone survey	Christensen & Mikkelsen (2013)
Urban Environment and Children's Active Lifestyle: SoftGIS Revealing	Determine the relationship between urban structure characteristics,	Internet-based SoftGIS survey	(M Kytta et al., 2012)

Children's Behavioral Patterns and Meaningful Places	environmental experiences and active behavioral patterns, and perceived health and body mass index in a sample of 1837 Finnish children (10-12 and 13-15 years old)		
Physical environmental characteristics promoting independent and active transport to children's meaningful places	Assess associations between urban structure around children's meaningful places and mobility to them (n=901; year 5-year 8, approximately, 11-14 years old)	Internet-based SoftGIS survey	(Broberg, Salminen, et al., 2013)
A novel assessment of adolescent mobility: a pilot study	Test the use of an electronic questionnaire with integrated mapping to assess mobility within adolescent population in New Zealand (n=28; 13-18 years old)	Internet-based SoftGIS survey- (VERITAS- CAPI*)	(Stewart et al., 2015)

*Visualization and Evaluation of Route Itineraries, Travel Destinations and Activity Spaces-Computer Assisted Personal Interview) under the guidance of trained interview technicians

1.1.5.3. Diagnosis of children's independent mobility in Portugal

As mentioned previously on this section, two articles that integrate this thesis (available in **Appendix 1**) were produced and serve as a diagnosis of the children's independent mobility in Portugal and also more specifically in the city of Lisbon. Results and conclusions of these two works (Cordovil et al., 2015; Lopes et al., 2014) were a motivational paramount to study child-place interactions in a more comprehensive and ecological scale within the core of this thesis. Next the abstracts of these two studies are presented.

Children's (in)dependent mobility in Portugal

Objectives: *To characterize children's independent mobility in Portugal, by studying the influence of age, sex, school type (primary/secondary) and location (urban/rural). To explore associations between mobility licences and children's actual independent mobility.*

Design: *Cross-sectional study of 1099 children between 8 and 15 years of age and their parents. Children attended primary (n = 660, 49% boys, 69% urban) and secondary (n = 439, 43% boys, 72% urban) schools.*

Methods: *The Portuguese version of the child independent mobility survey (Policy Studies Institute, London) was completed. Parents reported the mobility licences granted to their children. Children reported their independent mobility on school journeys and on weekends. Differences were examined in mobility licences and independent mobility by sex, urban/rural setting and primary/secondary schools. Multiple logistic regression models examined the associations between different variables and actual independent mobility.*

Results: *Secondary school children are granted more licences and have greater levels of independent mobility than primary school children. Only 21% of primary school children and 45% of secondary school children come home from school actively and independently. Overall, sex does not influence the licences granted to children in Portugal but boys have greater levels of independent mobility during the weekends than girls. Children in rural settings report engaging in more activities during the weekend. The number of mobility licences granted to the child was identified as predictor for actual independent mobility on school days and during the weekend.* Conclusions: *Portuguese children lack independent mobility. Complementary qualitative research will be important to inform about the better practices to tackle this problem.*

Children's independent mobility in Portugal: effects of urbanization degree and motorized modes of travel

This study is aimed to evaluate the impact of urbanization in children's independent mobility in Portugal. Mobility licenses, actual mobility, fear of traffic, stranger danger and sense of community were compared in highly, moderately and non urbanized environments and according to gender. Results showed that increase of urbanization leads to a decrease of children's licenses to independently cross and cycle main roads; go out after dark and go to places other than school. The rising of urbanization leads to an increase of children's mean age for independent active travel; and at the same time a decrease of independent active school-home travel and leisure time activities. Parental fear regarding traffic is the most frequent cause

for concern regarding children's safety when they are outdoors. Stranger danger and low sense of community are more prevalent in parents from the highly-urbanized environment. Overall, girls enjoy less actual mobility than boys. The discussion shows that children's freedom of movement in the highly-urbanized setting is very restricted due to a pervasive automobile dependence, proposing a shift from a motorized to a walkable city.

1.1.6. Urban open space

1.1.6.1. Meaning of urban open space

Public space meaning, theories and practices have evolved since the Greek agora and Roman forum congregated citizens in public arenas to equally discuss public affairs of the city life. The study of public space is conducted by a wide range of fields and disciplines such as urban planning, architecture, sociology, geography, environmental psychology, politics and economics. Overall, focus on public space is oriented by three major approaches- legal-economic, socio-spatial and political (Neal, 2010). For the present study, the socio-spatial perspective is brought to relevance and it is mainly supported with theoretical contributions from urban planning and sociology. Neal (2010), hinged on previous pivotal works carried out by Lynch, Jacobs and Whyte, informs that socio-spatial perspective on public space seeks to identify the impact of spatial features on the social construction of mental maps that are fundamental for navigation and making sense of the surrounding environment; understand links between spatial configurations and social functions among communities; and depict relationships between place typologies and functions.

In urban planning, “public space” is, traditionally, designated “open space”, as opposed to the privatized domains of the house and work, such as, streets, parks, recreation areas, plazas, etc; and, contemporarily, understood as space which is accessible to the public, whether it is managed under public, private, or by a combination of both entities (Tonnelat, 2010). The seminal work of Lynch (1984) on the attributes for a good city, the critical review in urban-open space research and design practice conducted by Francis (1987) and the reflexive exploration of public space and public life by Carr, Francis, Rivlin, & Stone (1992) define “public accessibility” as key element of “open space”.

Sociology has directed efforts in to studying the physical features of urban landscape and citizens' everyday interactions within those spaces. In this field, accessibility, conceptualized as a physical and psychological measure, is twofold, as it enables for people and goods to move around freely; and it launches formation of collective representations where images of the city are composed (Tonnelat, 2010).

Open and publicly accessible places such as parks, neighborhood playgrounds, community gardens, downtown plazas, streets and malls are devised for human activity and enjoyment (Francis, 1987); offer the physical structure that allows for flow of movement in between nodes of spatial communication; and provide grounds for blooming of communal interaction (Carr et al., 1992). Concurrently, Sandalack & Uribe (2010) withstand that people's urban daily experiences stem from “*shared city places*” that constitute the “*public realm*”, namely, streets, parks, squares and plazas, where people are by right entitled to be in. The reasons for this being is that public realm spaces grant people's access to diversified meaningful places, where family and community life, work, shopping, leisure and play take place; thus, providing citizens to experience the city's urbanity.

Carr and colleagues (1992; pp. 19-20) argue that public places should be *responsive* (*serve the needs of their users*), *democratic* (*protect the rights of user groups*) and *meaningful*

(allow for people to make strong connections between the place, personal life and the larger world). Place meaningfulness is very much related with the symbolic representation of place. In this sense, Goheen (1998) stresses public space as a symbolic one which is collectively valued by the public; and where the individuals are able to express their views and act upon it according to their will and purposes. Place use and meanings arise through an interactive process of use, understanding and renegotiation due to their changeable nature.

Marcus & Francis (1998) referring to work conducted within the field of Psychotherapy, concur to spending time in urban open spaces as beneficial in terms of developing mental health, mainly, in managing of fear and distrust experiences, and in building sense of communality and tolerance with and for people with different age and other socio-cultural ethos. According to Brandão (2008), public space is not only the founder of urban shape, but also what establishes socialization and common-living as collective good for the community. Moreover, this author explains that urban identity reports to typological and morphological characteristics of public space, as well as symbolic meanings transmitted by traditional and novel elements; giving way to rising diversity and complexity of urban identity.

Thompson (2002) explores the role of urban open space in the 21st century, and what demands public realm of the future city should meet in contemporary times. In her view, proliferation of virtual information technologies has given people the ability to plan social interactions in the urban landscape that are more in line with their preferences and likings must not be forgotten; and, therefore, urban open spaces must allow for a crescent individual expression, in a culturally eclectic society. However, she refers that these spaces must still assure meeting of strangers; encounters with nature; landscape experimentation and intervention; and address the need for anonymity and privacy. Moreover, this author withstands that public realm ought to afford an ecologic, shifting and dynamic use of space. In this sense, she proposes that urban open space should comprise “tight-fit” and “loose-fit” places, where the former are specifically designed for specific purposes and uses, and the latter are transient and very often unplanned.

In reality, people carry out all sorts of activities and diversified interactions, some intended and others unexpected, in the physical settings of the urban environment, such as streets, sidewalks, plazas, squares, parks. Consequently, “tight-fit” spaces will become, over time, inevitably “loose-fit” ones through means of people’s interactions with the physical space. Referring to previous studies (see section 8 *in* Thompson, 2002), “*loose-places*” are described as found, unregulated, un-designed and culturally more inclusive spaces (than designed ones, affording place interaction for the underprivileged too) enabling place interactions that designed spaces do not. The nature of this type of spaces is one of “continuous becoming” from one momentary purpose to another guided by a haptic sense towards escape, risk (and simultaneously search for safety) and freedom. These are crucial ingredients to human life in the urbanized world. Therefore, loose-spaces are essential providers of life, vitality and play to the city environment (Franck & Stevens, 2007). Loose-environments are places of possibility and imagination where the unexpected and unplanned takes place because of “loose” uses and

meanings (Franck, 2000). Stem of loose-fit places depend on place types; accessibility to the place; freedom of choice in terms of place interaction; perception of physical elements; perceived and actualized affordances⁶ (on the latter considering possible risks involved); laws; and sociocultural norms (Franck & Stevens, 2007).

1.1.6.2. Typology of urban open space

As mentioned previously, in the city's public realm a variety of open urban spaces coexist with each other and are fundamental for citizens to interact with each other and with the surrounding environment. Thus, and in consonance with present study motivation (mentioned earlier on this section of study), in order to better gain clarity on the effect of urban space differences in the perception and actualization of children's affordances, it was necessary to (re) create a typology of open space.

The adopted urban open space typology will be presented further in the methodology chapter of this thesis, since it was developed as a methodological instrument to classify meaningful places located by children. Nevertheless, it is important to give notice to some theoretical assumptions and principles, exposed by Sandalack & Uribe, (2010, pgs. 45-46) which underpin the development of such a typology and, simultaneously, meet the present study horizon. These are as follows:

- ✓ A typology of urban space is relevant for analyzing and designing of urban forms and for teaching urban design, planning and architecture.
- ✓ Urban space typology is a useful tool to study the relationship between the physical form of open space and its functions, as well as interrelationships in between existing built elements.
- ✓ Functional needs and aesthetics views guide development of built form types.
- ✓ Built forms/public spaces are always twofold, as they serve a particular physical form and meet with a *way of life*.

The city's role should be providing places where citizens afford public life amenities and experiences.

In terms of the present study, it was of utmost importance to establish a relationship between form and function. Hence, to adopt urban open space typology in order to classify children's meaningful public places (where the affordances were perceived and/or actualized).

Francis (1987, p. 78) presents a typology of traditional (public and neighbourhood parks; playgrounds; pedestrian malls; plazas) and innovative (community and neighbourhood open spaces; schoolyards; streets; transit malls; farmers' market, town trails; vacant/undeveloped open spaces; waterfronts; found spaces) urban open spaces for American cities. In another work, this same author

⁶ The terminology used by the authors in the original source is not "*Perceived and Actualized Affordances*". However, it was found appropriate to use the current terminology because authors refer to "*For a site to become loose, people themselves must recognize the possibilities inherent in it and make use of those possibilities for their own ends, facing the potential risks of doing so.*" (pg. 2)

presents a detailed typology of public spaces (Francis, 2003, pp. 6-7) adapted from previous work conducted by himself, Steve Carr, Leanne Rivlin and Andrew Stone (Carr et al., 1992). This typology is as follows:

1. Public Parks-public/central park; downtown parks; commons; neighborhood park; mini/vestpocket park .
2. Squares and Plazas- central square.
3. Memorials
4. Markets-farmers markets.
5. Streets- pedestrian sidewalks; transit mall; traffic restricted streets; town trails.
6. Playgrounds- playground; schoolyard.
7. Community Open Spaces- community garden/park.
8. Greenways and Linear Parkways
9. Urban Wilderness
10. Atrium/Indoor/Marketplaces- atrium; marketplace/downtown shopping center.
11. Found/Neighborhood Spaces- everyday spaces; neighborhood spaces.
12. Waterfronts- waterfronts, harbors; beaches; riverfronts; piers; lakefronts.

Sandalack & Uribe (2010, pp. 51-57) sustain the need for a theoretical conceptualization and methodological tools to understand and design meaningful public space for citizens. In this paper they present an open space typology used in Canadian cities, composed by the following categories and elements: street (residential streets, commercial streets, civic boulevards); park, garden, cemetery (gardens, cemeteries, ornamental parks); linear system, green corridor, path (paths, bikeways, trails, rights-of-way); outdoor sport and recreation facility (tot lots, playgrounds, sports fields; school sites; golf courses; skateboard parks); campground and picnic area (camping areas, picnic and day-use areas); natural/semi natural green space (woodland, grasslands, wetlands, canals, open and running water, ecological reserve).

In the district of Lisbon, the municipality of Odivelas (northwest of Lisbon city) carried out a research work that led to the creation of a municipal document that characterizes collective living in public spaces. Herein, a public space typology for this municipality is presented (Grave, Rosado, Cardoso, Barreiras, & Serra, 2011, p. 14) based on a previous taxonomy proposed by Brandão (2008, p.19). The former comprises the following urban forms: square, plaza, yard; garden, park; churchyard, passage, gallery, courtyard; playground; other situations. The latter one is more detailed and it encompasses 15 public space typologies organized within 6 structural space categories and synthesized in the following categories and elements:

1. Tracing –meeting spaces (squares and plazas) and circulation spaces (roads and avenues).
2. Landscape- leisure spaces (parks and gardens) and contemplation spaces (panoramic and view points).
3. Traveling- transport spaces (transport stations and stops), channel spaces (railroads and high-ways), parking spaces.
4. Memory- longing spaces (cemeteries); archeological spaces (industrial, agricultural; services); memorial spaces (monument).
5. Economy- semi-indoor spaces (markets; shopping centre; arcades); semi-outdoor spaces (marketplace, kiosks, marquees).
6. Generated- spaces- by buildings (churchyard, passages, galleries, courtyard); by equipments (cultural, sportive, religious, childlike); by systems (lighting, furniture, communication, art).

1.1.7. Softgis methodology

1.1.7.1. GIS and PPGIS

Before digging into SoftGIS methods it is important to first address the concepts of Geographic Information Systems (GIS) and Public Participation Geographic Information Systems (PPGIS). The former is defined by Golledge (2002, p. 244) as *a set of computer procedures for geocoding, storing, decoding, analyzing, and visually representing spatial information*; where map/spatial information is converted to digital source tied to a coordinate reference system. GIS is backgrounded by a bunch of disciplines such as geography, computer science, spatial planning and census administration (Rantanen & Kahila, 2009). Sieber (2006) announces GIS as a tool that enacts or constricts participatory democracy because it has the *potential to enhance or limit public participation in policymaking, empower or marginalize community members to improve their lives, counter or enable agendas of the powerful, and advance or diminish democratic principles* (p. 491). The latter was coined in 1996 at the meeting of the National Center for Geographic Information and Analysis (Sieber, 2006).

According Brown & Reed (2009), PPGIS describes the process of using GIS technologies to produce local knowledge towards inclusion and empowerment of marginalized groups. Moreover, PPGIS refers to methods that use GIS to foster participatory democracy by widening the spectrum of public involvement in policymaking and contribute for capacity building and social change undertaken by nongovernmental organizations, grassroots groups, and community-based organizations (Sieber, 2006). The link between PPGIS and Urban Planning is intrinsic to the development of PPGIS concept, discourse and practice. In this way, Brown (2012) refers to PPGIS as *a general set of methods for integrating public knowledge of places to inform land use planning and decision making* (p.289). Nevertheless, PPGIS nature, process and output is transdisciplinary and polyphonic. On this matter, Sieber (2006) shows that PPGIS was and is socially co-produced by a diversified range of researchers and practitioners from several disciplines, fields, and public and private sectors (urban planning, community development, landscape ecology, as well as natural resources; social work, etc).

It is our opinion that PPGIS comes forward as a moving concept subjected to a continuum construction which is sensitive to the evolution of information and communication technologies. Consequently, the incorporation of internet in PPGIS methods was natural due to the pervasiveness of web consumption in contemporary times and people's identities, in the form of internet based tools, such as blogs, wikis, social networks, web-mapping applications, etc. Moreover, these tools are used by individuals, groups, communities and organizations to foster communication and obtain shared agreements on different issues.

Despite some existing controversy regarding the use of internet based PPGIS platforms when compared with traditional paper supported models (Pocewicz, Nielsen-Pincus, Brown, & Schnitzer, 2012), the former has created new possibilities to explore participants' spatial local knowledge (Brown & Reed, 2009; Rantanen & Kahila, 2009). Evidence is pointed out by researchers, enhancing the qualities of internet PPGIS methods, such as: i) Widen the

scope and diversity of methods and data collected (Brown & Reed, 2009; Brown & Weber, 2011; Pocewicz, Nielsen-Pincus, Brown, & Schnitzer, 2012); ii) Very effective, practical, cost-benefit, inclusive and user-friendly (Rantanen & Kahila, 2009); iii) Fast development and access to remote territories, and spatially more accurate (Brown & Kytta, 2014); iv) Rapid implementation of research and allows for higher representativeness of population (G. Brown & Reed, 2009); v) Extension to a wider audience (Sieber, 2006).

Regarding the process of PPGIS, Brown & Kytta (2014) summon the following relevant aspects: i) initially paper maps and markers were adopted evolving to web-map applications; ii) PPGIS participants referred as *stakeholders* are residents, or visitors to an area, experts-or non-experts, decision-makers or decision-takers; iii) mapping activity can take place where it happens (field) or from the distance in built environment (i.e.: home, office, school, community center, etc); iv) mapping categories comprise landscape values, development preferences, place qualities, and participant experiences; v) PPGIS use several geospatial techniques which grant collection and place mapping of daily subjective environmental experiences in the physical environment, allow for stakeholders to be actively engaged in public processes of participation; vi) PPGIS expresses a participatory mapping process, that depends on participants' capacity to recall their experiences in the physical environment, leading to an attribution of meaning and value for specific places; and, therefore, theoretically and conceptually delimited by the transactional approach of people-environment relationships, supported by Gibson's (1979) concept of affordance; vii) PPGIS research is widespread worldwide, as it is reflected by the work of these same researchers Greg Brown and Marketta Kytta who have conceived and/or implemented more than 40 empirical studies on this topic.

1.1.7.2. SoftGIS concept

As discussed above, PPGIS aims to connect public knowledge of places with the one of those traditionally responsible for policymaking relative to urban planning towards a more informed and resident's sensitive land use planning and decision making. However, planning is still a very much top-down oriented process meaning that local experiential knowledge has not been integrated in PPGIS processes (Talen, 2000). Additionally, it is necessary to develop techniques within these public participatory systems which enable stakeholders (residents, planners and researchers) to "fiddle", analyze, and visualize collected data in a user-friendly way (Rantanen & Kahila, 2009).

SoftGIS methodology was designed to specifically address former issues and enhance participation by allowing residents to share their local knowledge about environmental experiences with urban planners and researchers (Kahila & Kytta, 2010; Rantanen & Kahila, 2009).

SoftGIS methodology is simultaneously a set of methods and a theoretical construction, both trans and multi-disciplinary; where the former is grounded on human geography, environmental psychology and urban planning and the latter on communicative planning, community of practice concepts and knowledge-building (Kahila & Kytta, 2010; Rantanen &

Kahila, 2009). As proposed by former authors, the conceptual nature of SoftGIS methodology enhances the theory of communicative action explored by Habermas (1984); where coordination of intersubjective discourses, practices and languages creates shared agreement. Moreover, internet language code is used as a twofold context, one that promotes place based local knowledge, and other that allows for inter-communication between stakeholders (Rantanen & Kahila, 2009); both actively contribute to dissipate public participation constringency. In this sense, Kahila & Kytta (2010) reinforce SoftGIS methodology as a valuable tool that fosters communication and better links between urban planners and residents of communities and of municipalities towards collaborative planning practices.

According to Kytta & Kahila (2011), the term *SoftGIS* (soft geographical information systems) defines a methodological approach of web-based data collection that combines 'soft' subjective data with 'hard' objective GIS data, enabling the study of human experiences and everyday behavior in the physical environment. Whilst "hard" refers to urban structure characteristics (i.e: residential density; proportion of green spaces; proportion of children), "soft" addresses to people's perceptions and experiences in the physical settings (M. Kytta, 2011). Consequently, people's local knowledge of the environment is personal, place-based, action-driven and spatially referenced (Rantanen & Kahila, 2009), stemming from transactional interactions between person-environment.

In the transactional approach, Altman & Rogoff (1987) underline that people and their environment are mutually influenced by each other, as a consequence of an inter-active influence between these aspects, thus creating an interactive relationship. A transactional approach to comprehension of human behavior and its research endorses people, psychological processes, physical environment and temporal qualities as holistic unities, not parts or elements, but rather *aspects* which are inter-tangled and mingled in the same *phenomena* (Werner et al., 2002).

A central concept in transactional framework and thus in SoftGIS methodology is the one of "affordance" introduced by Gibson (1979) and further developed by Heft (1988), as functional significant properties that are perceived in the environment by the individual; and the extension of it to social, emotional, and cultural possibilities or constricts of interactions provided by the environment (M. Kytta, 2004). More recently, these multi-dimensional affordances have been referred to as meaningful places (M Kytta et al., 2012).

1.1.7.3. SoftGIS surveys

In this type of applications participants are asked to fill in internet-based surveys through user-friendly internet based applications. The surveys are associated with maps allowing users to produce self-reports based on their localized environmental perceptions and experiences. The subjective perspective of residents' environmental perceptions is combined and analyzed along with the information concerning the physical structure of the environment. SoftGIS methods allow the linkage of human experience in the physical setting with its spatial expression.

The first prototype of SoftGIS methodology was developed in Finland, in 2004, by groups of media technology students in the Institute of Technology of the Espoo-Vantaa University of Applied Sciences and it was used to study localized perceived affordances on the quality of environment in the Finnish city of Järvenpää. Since 2005, internet base softGIS methodology has been developed in Aalto University enabling the collection, analysis and delivery of soft, localized, geocoded knowledge produced by 9000 Finns, across eleven Finnish cities (Kahila & Kyttä, 2010; M. Kyttä, 2011).

Kahila & Kyttä (2010) present three categories of SoftGIS methods, namely, mapping the perceived environmental quality, specific thematic and special group. SoftGIS for children is included in this last category. The purpose of SoftGIS-special group is very much related with the idea of generating citizen's participation on issues which are relevant to the general public. Therefore, softGIS methods should be easy to use by people, meaning that the usability of the applications ought to consider that people are not familiar with web-based GIS services, ensuring that they are the most user-friendly as possible. Moreover, the content of the surveys should be relevant and meaningful to group's needs, perceptions and interactions in daily life.

In this way, Kyttä et al. (2012) launched a pioneer research to study the relationship between urban structure characteristics, children's environmental experiences and active behavioral patterns, and perceived health and body mass index (BMI), in the city of Turku (Finland). For this effect, *SoftGISchildren* method was specially conceived to be use by children and young people. This survey was grounded by the definition of environmental childfrienliness (M Kyttä, 2003; Moore, 1986), where the diversity of environmental resources or affordances and access to play and exploration are two central criteria for a child-friendly environment.

The specific urban characteristics were operationalized as independent variables, namely, residential density, proportion of green space and a proportion of children, calculated within a 500 meter buffer of each respondent's home. This hard objective data was provided by geographic information system (GIS) based measure of urban structures. The subjective research variables (dependent) were operationalized as self-reported behavioral patterns (activity of school travel mode, territorial range, mobility licenses, and distance to meaningful places); environmental experiences (localized meaningful places, likability index, environmental fears); and self-reported BMI, perceived health, and daily symptoms.

As to regards to localized meaningful places, children were asked to localize their home place and draw the home-school itinerary on the web-map; and were presented four survey pages. In each page a pre-determined list of place experiences, thus, *affordances*, were encompassed and the participant was asked to select those meaningful ones, mark them on the map by localizing the place where the "*affordance*" took place and respond to the associated mobility questions. "Alone and together in Turku" included place experiences according social dimension (i.e.: "I meet my friends", "forbidden place"); "What do I do in Turku?" and "Leisure time in Turku" comprised functional place experiences, where the former refers to specific actions/operations ("I ride my bicycle", "I climb") and the latter to general activities ("I go to the

cinema”, “I just hang out”); and “How does Turku feel?” contained emotional place experiences, such as “boring”, or “a good place to be”.

SoftGIS surveys are not only designed for children and young people use. From 2007 onwards, SoftGIS applications aiming at all age groups participants boosted covering diversified topics and research themes such as perceived environmental quality, urban densification and social sustainability, environmental child-friendliness of various contexts, socio-ecological tools for ecotourism, community development together with NGO, everyday mobility, etc (cf. Greg Brown & Kytta, 2014). At present time, SoftGIS tools are very intuitive and user-friendly. The commercial name given to this product and service is “*Maptionnaire*” (*cloud map based questionnaires and civic participation platforms*), where through administrative pages it is possible to perform the following actions: devise content original surveys by using intuitive and user-friendly procedures and features; operate data collection (from highly structured research to open brainstorming); analyze and report data using *Maptionnaire* visualizing tools or other software of choice; share, discuss and learn about results by publishing them in the cloud (Mapita, 2015).

1.1.7.4. “SoftGISchildren” as actor-centered methodology

In the last topic of the theoretical background, SoftGIS Methods are addressed. The methodology used in this thesis is SoftGIS and due to its complexity needs to be addressed within the theoretical background of this thesis. In this way the distinction between Geographic Information Systems (GIS) and Public Participation Geographic Information Systems (PPGIS) is explained, where the former presents as *a set of computer procedures for geocoding, storing, decoding, analyzing, and visually representing spatial information*; where map/spatial information is converted to digital source tied to a coordinate reference system Golledge (2002, p. 244); and the latter refers to *a general set of methods for integrating public knowledge of places to inform land use planning and decision making* Brown (2012, p. 289).

The term *SoftGIS* (soft geographical information systems) defines a methodological approach of web-based data collection that combines ‘soft’ subjective data with ‘hard’ objective GIS data, enabling the study of human experiences and everyday behavior in the physical environment (Kytta & Kahila, 2011). Whilst “hard” refers to urban structure characteristics (i.e: residential density; proportion of green spaces; proportion of children), “soft” addresses to people’s perceptions and experiences in the physical settings (M. Kytta, 2011). After this initial consideration, *SoftGISchildren* method is reported as child-friendly (M Kytta, 2003; Moore, 1986) and as being designed for research with children and youth about environment quality (Broberg, Salminen, et al., 2013; M Kytta et al., 2012). This section is finished by presenting a list of arguments and theoretical bridges with the field of Childhood Sociology to support claim that *SoftGISchildren* methodology is actor-centered.

SoftGIS methodology is centered on the participants as it aims to report their environmental perceptions and actions anchored on the interactional experiences between

people and the environment. This is particularly relevant for the SoftGIS method (SoftGIS*Children*) which was designed for research with children and youth about environment quality (Broberg, Salminen, et al., 2013; M Kytä et al., 2012), underpinned by environmental child friendliness proposed by Moore (1986) and revised by Kytä (2003), previously described. Additionally, and

in our view, the content of the survey, its digital support as well as its user-friendly characteristics are appealing for participants and also contribute for this methodology to be child-centered and child-friendly.

Another relevant aspect worthy of consideration that we believe reverberates “*childrean*” nature of SoftGIS methodology is that its theoretical nature and purpose shares certain communality with childhood theory and research provided by the field of Sociology of Childhood; where children are viewed as active and competent social actors and, therefore, knowledgeable of their socio-cultural realities (Corsaro, 2011). Next, we present a series of theoretical juxtapositions to sustain the former claim:

➤ *Children, public participation and democracy*

Traditionally, children have been excluded from participating in decision taking processes concerning their lives and interests based on both, the assumption that adults know better what children need and want and that children lack competence to discuss the former (Lansdown, 2001). On this topic, Hart (1992) claims that a democratic nation is one where citizens are involved at community level through participatory actions, including children and young people, to whom should be given opportunities to actively and socially participate in their social and cultural daily contexts of lives. Trevisan (2012) depicts a series of examples where children and young people were successfully included in participatory co-decision processes about school and city life, revealing them as individual and collective competent political actors. Also, this researcher points out that the “child-citizen” statute it is only real and visible when political and social value is truly recognized to children; meaning that they have to be consulted and co-deciders about matters concerning public sphere functioning. On this topic, Tonucci & Rissotto (2001) present the “Children’s City” project where concrete experiences of children and adult shared dialogues and practices were undertaken in a collaborative model of urban planning; revealing children’s competences to identify problems and propose innovative and inclusive solutions. In this sense, the citizen-child paradigm can be used as a new model for the city’s governance (Tonucci, 2005). Following this, SoftGIS methodology lessens the gap between traditional PPGIS methods and subjective knowledge that results of people’s experiences in the physical realm; contributes to reaffirm PPGIS original concept and goal proposed by Sieber (2006) by enlarging public participation domain to an historical excluded group, children that is; and accepts the child as a competent citizen that should be included in co-participatory actor in urban planning.

➤ *United Nations Convention on Child’s Rights and a new paradigm of childhood*

Listening to children's voices has become a topic of special and pertinent relevance for contemporary societies since 1989, when the United Nations Convention on Child's Rights (UNCRC) was adopted and ratified. More specifically, article 12 of the Convention on Child's Rights (CRC) agrees that "*States Parties shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child*" (UN General Assembly, 1989).

In the turn of the century, Sociology of Childhood developed and installed a new paradigm to study childhood emphasizing the social construction nature of childhood, both, theoretically as in terms of research; where children are understood as competent social actors and therefore capable of talking about their social and cultural worlds and socially recognized for that too (Christensen & James, 2008; Corsaro, 2011; James, 2007). Children interact with the socio-physical environment through their peer cultures. The former are defined by Corsaro & Eder (1990) as a *stable set of activities or routines, artifacts, values, and concerns that children and youth produce and share with peers* (p. 197). This creative structural and symbolic active-collective production of aspects, perceptions and actions occurs in a dialogical relationship that children always establish with the adult world. On this, Sarmento (2002) reflects on the importance of peer cultures by allowing children to appropriate, reinvent and reproduce the world around them; considering the child as an interactive social actor gifted in novelty, an inherent condition due to his/her belongingness to a generation that allows for continuity and renewal of the world. In this sense, *SoftGISchildren* methodology creates means to listen to children and young people perspectives about significant issues concerning daily life.

➤ *Children and adults as co-researchers*

In terms of children investigation, Soares (2006) considering children as able social actors, and thus qualified interpreters of their contextual and meaningful social milieu, sustains the importance of designing participatory research that includes children and adults, both as co-researchers involved in a collaborative process of devising inter-subjective and shared social knowledge through the whole process of conducting investigation, including the creation of instruments to collect data. Moreover, research practice with children should enable a genuine and effective presence of children in the agency of research but also in the agency of community intervention and planning (Lauwers, Meire, Vanderstede, & Van Gils, 2005; Soares, 2006; Trevisan, 2012).

It is true that *Softgischildren* methodology is not devised with co-participation of children and participants are partially led in this research process by the adult convictions about children's use of the environment, namely, through the list of pre-determined possible interactions (affordances) available. Nevertheless, it is also true to say that *SoftGISchildren* methodology congregates certain aspects that resonate with participatory research sustained in the actor-paradigm childhood studies. First,

SoftGIS*Children* method is developed and applied on the basis of children's subjective experience in the spatial environment, crucial aspect proposed by Lauwers et al. (2005) as relevant for devising methodological approach for constructionist and phenomenological research of childhood. The second communality is related with the use of Habermas theory of communicative inter-action. In the case of SoftGIS methodology, this Habermasian theoretical approach sustains two fundamental characteristics of this method, communicative planning and shared knowledge building through a digital web of public communication between SoftGIS participants and other stakeholders (Rantanen & Kahila, 2009). As to action-participatory investigation with children, the Habermasian theory of communicative inter-action is intrinsic to the methodological collaborative process of devising inter-subjective and shared social knowledge among the group of research participants (Lopes, 2009).

Data collection procedures

In action-participatory childhood research, it is recommended the use of participatory procedures, such as, oral expression tools (individual interviews and focus groups); creative written and graphic tools (diaries and drawings); multimedia tools (video, photographs); drama tools (role-playing and symbolic play); individual or group visual techniques (childhood cartography; and that these methods should be devised with effective children's participation, as co-builders of methodological procedures (Soares, 2006). The previous author continues by expressing that this methodological co-operation between adults and children implies the former to recognizing the latter as competent and critical actors and negotiation in between them; the use of participatory tools allow for diversified modes of children's expression which reinforce participants personal competences, and enables researchers to capture children's representations of their sociocultural and spatial contexts. Likewise, Lauwers et al. (2005) underline that childhood investigation sustained on the "*actor-paradigm*" implies research design and practice should focus on generating data that effectively grasps children's own meaningful interactions with the surrounding world. Hence, childhood researchers should focus on collecting data related with concrete lived experiences children undertake in their environment, using methodological procedures that enable children to create meaning and knowledge according their perspectives (*cf.* Castonguay & Jutras, 2009; Jorgenson & Sullivan, 2009; Lim & Barton, 2010).

As mentioned previously, SoftGIS*Children* is not methodological devised with children's participation but it shares relevant common theoretical and conceptual aspects with methodological approach proposed by actor-paradigm childhood research. Some other points of convergence can be evoked, such as: i) SoftGIS*Children* methodology allows children to recall their transactional experiences in the socio-physical environment; and, through an interactive process of place mapping, locate places which are significant according several categories of interactions. This reflects the importance of collecting data about concrete daily experiences children have in their territory, a mutual concern

for SoftGIS methodology and for actor-paradigm childhood research; ii) SoftGIS*Children* questionnaire enables children to qualify meaningful places in terms of mobility and likeability. Additionally, and depending on the content the researcher wishes to add to the questionnaire, it is possible to add other questions related with actor-place interaction. Place qualifying carried out by children contributes to generate more specific knowledge about their geographies. This is also a relevant issue for Sociology of Childhood, namely, in terms of deepening socially constructed representations of significant places for children; iii) SoftGIS*Children* web-questionnaire could be (partially⁷) included in the set of multimedia and/or cartography participatory tools described earlier. Also, one could argue that as the child is completing the web-map based survey, he or she are recalling their *mobilities* and *transactionalities* and creating a “*digital self-ethno-graphic cartography*”. On this, a recent ethnographic research conducted in Belo Horizonte (Brazil) by Lansky, de Gouvêa, & Gomes (2014) enable the development of an interactive tool, supported by an ethnographic cartography, that grasped children’s appropriation of the city through their mobility and use of public spaces; iv) The use of internet based applications that afford computer game-like usability, as it is the case of SoftGIS*Children* web-map based survey, is desirable and appreciated by children and young people. As for childhood sociologist, it is consensual that digital languages and internet environment is an important and significant part of children’s daily lives and of their peer cultures and identities (Delicado & Alves, 2010).

Critical analysis carried out previously between SoftGIS*Children* methodology, as method and pluri-theoretical construction hybrid, and Sociology of Childhood theory in conjugation with the practical implications around the “actor-paradigm” brought to light some relevant dissimilarities. These contrasts have to be taken in to account when considering SoftGIS*Children* methodology as child-centered and child-friendly. The main restrictions are the fact that the web-map based questionnaire is not devised with children’s co-participation; the application of the software is done individually (one child, one survey) and not collectively (a focus group of children involved in a process of active communication towards inter-subjective collective decision making when completing the survey); and the inexistence of a collective results discussion with adults (researchers, municipality technicians and politicians and other citizens), which undermines a model of co-governance and co-urban planning.

Conversely, in Roger Hart’s eight rung ladder of children’s participation, Kytä’s forerunner research study using SoftGIS*Children* methodology in the city of Turku, could be considered a genuine form of participation, fit in between the fourth and fifth steps, “*Assigned and Informed*” and “*Consulted and Informed*”, respectively. As for the former, it implies that *children understand the intentions of the project; they know who made the decisions concerning their involvement and why; they have a meaningful (rather than ‘decorative’) role; and they volunteer for the project after the project was made clear to them* (Hart, 1992, p. 11). In the

⁷ Partially included as participatory tool to use in actor-paradigm research with children because it was not devised with children’s co-participation

latter, *the project is designed and run by adults, but children understand the process and their opinions are treated seriously* (Hart, 1992, p. 12). In this stage, the author describes an experience of participation where youths from Toronto (Canada) were consulted to express their views and opinions about their city using surveys for the effect. However, Hart explains that for this project to be fully considered in this level of participation, completion of questionnaires ought to be done by students attending public schools as well as data analysis and report.

In sum, we propose *SoftGISchildren* methodology as “actor-centered”, thus “child-centered” and “child-friendly” because it corresponds to a genuine level of participation and it shares specific parallels with Sociology of Childhood and actor-paradigm research.

2. CHAPTER 2- RESEARCH AIMS

“Mas a liberdade só existe quando todos os nossos actos concordam com todo o nosso pensamento;”

(Agostinho da Silva *in Parábola da Mulher de Loth*, 1944)

2.1. Thesis aim

As it was demonstrated in the theoretical framework chapter, place experience allows for children as active perceivers to capture a multi-range of significant properties or meanings in the sociophysical environment (social, emotional, functional, cultural and symbolic) which are displayed as multi-dimensional affordances. Correspondingly, expression of multi-dimensional affordances reveals content of significant properties or layered functionalities of environmental features, as consequence of place experience. Hence, place experience is a transactional process and depends simultaneously on the nature of the environmental feature and on the perceiver's attributes.

Children's mobility in the city environment is fundamental for children's access to diversified sociophysical spaces, where these transactional interactions take place. It is through mobility that as children develop and become autonomous, they progressively develop action and widen perception, utilizing, shaping and creating affordances. The 21st century has been devastating for children's independent mobility and for their freedom to explore, play and interact. Portugal is no exception, and as we have shown in up to date previous studies, the situation in the urbanized realm is quite alarming. This active and autonomous corporal exclusion of public space is jeopardizing children's health and well-being, and, simultaneously, transforms urban spaces in "desert places for children", and in places which are perceived by adults as dangerous, untrusted, and unwelcomed for children and young people. This perpetuates the model of a city focused on the *adult, male, working and car-driving citizen* that forgets the forgotten other citizens (Tonucci, 2005).

Yielded on the above, the aim of this thesis is to discuss child-place relationships by exploring the interplay of mobility, affordances and use of public spaces by children in the urban socio-physical environment; using a participatory research methodology and a more in-depth comprehensive research design framework.

2.2. Research objectives

Descriptive and comparative objectives of this research are as follows:

- Characterize school-home mobility in terms of school-home distance, environmental fears and actual mobility in this journey.
- Characterize actual mobility to meaningful places.
- Quantify use of meaningful places.
- Quantify use of meaningful places across gender and age.
- Characterize meaningful places according categories and clusters of affordances.
- Characterize meaningful places across gender and age.
- Characterize categories of affordances across gender and age.
- Characterize urban space typologies used by children when actualizing affordances.
- Describe use of urban space typologies according gender and across age groups.
- Characterize children's meaningful places in terms of actualization of affordances and categories of affordances.

- Qualify real and ideal functional and leisure affordances in terms of activities led by children or by adults.
- Portray clustering of affordances in each expressional category of affordances.
- Portray likeability degree of meaningful places.
- Portray of mobility to meaningful places in terms of territorial distance and territorial range; and actual and ideal mobility to meaningful places.
- Characterization of urban space typologies used by children as meaningful places.

Research objectives within the interplay of mobility, affordances and urban space consist of analyzing interrelationships between the following research variables:

- Age groups and actual school-home mobility.
- Gender and actual school-home mobility.
- School-home distance and actual school-home mobility.
- Actual and Ideal school-home mobility.
- Age and actual mobility to meaningful places.
- Gender and actual mobility to meaningful places.
- Actual mobility and territorial distance to meaningful places.
- Neighbourhood area and actual mobility.
- Actual mobility and urban space typology.
- Actual and Ideal mobility to meaningful places.
- Territorial distance across categories of meaningful places
- Actual mobility and categories of affordances.
- Neighborhood area and categories of affordances.
- Urban space typologies and categories of affordances.

This kind of research focused on the “actor-in-place” paradigm, where the actor himself re-interprets his/her daily subjective experiences in the socio-physical environment by localizing psychological significant places is, in our opinion, deemed to be extensive to public policies sphere. Planning a city which is relevant for their citizens implies actively listening to their citizens’, including children’s and young people’s perspectives of their place-experiences. Therefore, results which originate from studies like the present one, as well as its methodological instrumentation, could be integrated on the urban planning, maintenance and improvement of spaces, routes and interactional experiences within the socio-physical “transactional-settings”.

3. CHAPTER 3- METHODOLOGY

“Ao mesmo tempo que em corpo me embrenho por vielas e subruas, torna-se-me complexa a alma em labirintos de sensação. “

(Bernardo Soares *in Livro do Desassossego*)

3.1. Methodology outline

This thesis is composed by three studies. The two first studies have already been published as articles in international peer-reviewed journals, and will be presented as such in the results section of this thesis. Therefore, this chapter covers only the methodological issues applied in the other study.

This present chapter is composed in two parts. The first one congregates methodological procedures that were carried out, in order to specifically create the data collection tool and two other instruments used for indirect data collection. The second part refers to operationalization of methodological fields within present research.

3.2. - Methodology I

The present section starts with a run-through on the *SoftGISchildren* method, more specifically the process of creating a “*SoftGISchildren* survey” as research instrument. The former includes a description of procedures to devise a prototype version of the questionnaire; software testing and output analysis towards methodological validation; and explanation of the survey’s content in its ultimate version used for the research data collection purposes. This chapter then moves on to presenting two other instruments named “affordances’ clustering” and a “typology of urban open space”. These were specifically created to allow the researcher to indirectly collect data after participants’ use of the *SoftGISchildren* software. In other words, the researcher was able to classify the data that was collected by participants under the terms of the other methodological tools; and further use this built knowledge for research analysis.

3.2.1. Softgischildren method

3.2.1.1. Devising a softgischildren survey to conduct research in Portugal

The motivation to use *SoftGISchildren* method in a research study in Portugal was to generate local based knowledge about children’s independent mobility and place interaction, namely, in terms of perception on the use of diversified physical settings that exist in the city environment. Also and always an underlying reason to conduct such type of research relates to social change. In this sense, it would be opportune to demonstrate the value of *SoftGIS* methodology to municipalities as an actor-centered methodology and a powerful tool within collaborative urban planning. Moreover, and to the best of our knowledge, the use of *SoftGISchildren* methodology on research about mobility and use of public space in Portugal had not yet been done. Consequently, it was necessary to test the possibility of doing it with success.

In 2012, co-operation with YTK Land Use Planning and Urban Studies Group, of Aalto University and with a company called Mapita Ltd, in Finland, was established in order to develop a prototype of “*SoftGISchildren*” software to be tested in two restricted groups of children and young people (for more details on the Portuguese and Finnish collaboration, consult **Appendix 2**). By the end of 2012, the Beta version of *SoftGISchildren* called “*SoftGIS-Lisboa para ti*” was ready for the subsequent trials.

The content of the Beta *SoftGIS* questionnaire was very much based on the research conducted by Kytta et al. (2012) about the use of *SoftGIS* to reveal children’s behavioral patterns and meaningful places, and it was translated to Portuguese. Hence, survey participants had to indicate their gender, age, bicycle and car ownership and type of house; mark meaningful places according with a predetermined list of affordances organized in four categories; qualify place likability; answer mobility questions related with mode of travel and type of accompaniment to significant places (including school); draw relevant daily trajectories (i.e.: home-school); indicate environmental fears in the home-school journey. Unlike the *SoftGISchildren* research conducted by Kytta and colleagues, perceived health aspects were

not included; in each category some affordances were renamed according cultural sensitivity, and new ones were included based on other research work conducted in Portugal and abroad about children's independent mobility and child-place interactions (Arez & Neto, 1999; Cordovil, Lopes, & Neto, 2012; Cordovil, Lopes, Arez, et al., 2012; Lopes et al., 2011; Machado, 2008; Moreno, 2009; Ben Shaw et al., 2012); likeability of meaningful places was measured using three options (pleasant, unpleasant, sometimes pleasant and sometimes unpleasant); and qualifying action/operation (i.e.: "skating") or general activity (i.e.: "play sports") in terms of structural degree (free-do as I want or structured- I have to follow the instructions of an adult) was added.

3.2.1.2. First trial of testing beta softGISchildren software

As mentioned in the previous section, SoftGISchildren methodology had never been used in Portugal and, therefore, testing this software was crucial to verify the possibility of using it with success for our research purposes. Moreover, by means of observing participants' performance when completing the survey, it would be possible to better identify the appropriate age group for research (participants have to be able to use the mapping software); and to implement posterior changes to the application in order to make it more user-friendly.

Two series of "SoftGISchildren application" testing took place involving two different groups of participants. The general aim was to collect relevant information that could be used to make the application more child-friendly, and consequently benefit posterior data collection. In both of cases, the web-map questionnaire was applied individually to each child under the guidance of the researcher, whereas in Kyttä et al. (2012) study, surveys were conducted in collective manner (many children in a classroom filling the questionnaire simultaneously, using a computer per child) under the guidance of research assistant and teacher. The idea behind this methodological change was twofold. First, it was to allow the researcher to provide a better support to each child, by being able to specifically clarify any aspect, or doubt that might occur throughout the process. Second, it was to experiment viability and (possible) advantages or disadvantages of data collection in those terms.

The first trial testing of Beta SoftGISchildren survey was carried out with 21 children aged between 12 and 16 years old. After this first trial, improvements were made on the SoftGIS application and survey which was then tested again with a group of four children, aged 10, 11, 13 and 14 years old.. Each child was tested twice, one or two weeks apart. The idea underpinned in this specific methodological procedure was to test SoftGIS survey feasibility, namely consonance between answers and mapping of children's interactions in the urban environment.

Full details on the two testing trials can be consultant in **Appendix 2**.

In the first trail testing it was possible to conclude about the effectiveness of using the individual triangular data collection method "child-softGISchildren survey-researcher" as it allowed to capture a greater number of meaningful places when compared with SoftGISchildren collective research conducted by Kyttä et al. (2012) and Broberg, Salminen, & Kyttä (2013). In

both of the studies, larger sets of participants were used, and the mean number of meaningful places per participant was respectively of 7 and 6, whereas in our survey testing the mean number was of 21. In this way, we argue that SoftGIS triangular-individual data collection may afford deeper in-depth knowledge about children's daily experiences in the environment.

Other relevant conclusions were that children from year 5 had more difficulty in using mapping tools and place location features, and that younger children took longer to complete the survey. This was determinant to define research sample characteristics (for subsequent data collection) in terms of age group. In this way, and as to assure that future participants are comfortable using SoftGIS*Children* application, children from year 6 to year 9 will be considered for future data collection. As to adjusting visual aspects related with content display of the questionnaire, place marking and answering of questions, children's suggestions and inputs were integrated in the definite version of the SoftGIS*Children* survey, thus making it more user (child)-friendly.

3.2.1.3. Second trial of testing beta softgischildren software

In the second trial testing it was possible to conclude the following:

- Survey content, more specifically, mobility questions and list of affordances by categories is cultural sensitive and seems appropriate for participants to categorize their place interactions; applicants were engaged and showed enthusiasm in the process of completing the survey, namely, finding and marking significant places; participants found "*Ideal City*" software as user-friendly. These observations confirm previous ones found on the first trial testing sessions of the Beta survey conducted with another group of children.
- In terms of "non-mapping" questions, first and second survey's results are very much congruent with each other. Main differences found were on home-school and vice-versa trajectory in terms of travel mode for one participant and travel accompaniment for another one. In both cases, discrepancies could be due to participants' undeliberate mistakes when filling the questionnaire. Also, it is possible that when the child uses habitually more than one travel mode and type of accompaniment to or from school, the answer given reflects the transport mode and company used on that particular day. Moreover, and for the type of accompaniment to and from school, participant's answers on the second survey included first survey's content and new one. Time span in between surveys was brief (one week) and questions were the same in both trials. In this sense, it could be that on second survey, this child was more reflexive about choice of answers, by broadening the spectrum of responses and including new options (perhaps less frequently used). Although this shows discrepancy of results between surveys, it also underlines this SoftGIS*Children* survey as a tool that is able to congregate different nuances of a particular child's behavior.
- As for "mapping questions", inconsistencies between the two surveys were found in terms of decrease or increase of meaningful places within certain categories of

interaction; a decrease on total number of meaningful places for two participants and a slight increase for another participant; participant's answers on the second survey always include first survey's options and (in most cases) new ones; for two participants second answers include fewer options than on the first survey but maintain original content (likeability degree, travel mode and travel accompaniment). It is possible that these incongruences were due to accidental errors when filling questionnaires; missing answers on second surveys; misreading of travel mode options; frequent use of more than one travel mode to a meaningful place leading the child to give an answer that reflects the transport mode used on that particular day. For the specific affordance "leisure time centre", one participant considered it in one of the surveys as being "free (do as I want to)" and in the other as "organized by adults or organizations". Maybe this affordance is ambivalent in terms of structural type of classification by participants due to the diversity of activities a child can be involved while at this setting. Some of these activities will be more child-led and others more adult-led. Nevertheless, it were also found similarities between the two surveys, namely, same number of meaningful places for one participant; matching of variable number of affordances; and existence of meaningful places/affordances from all categories of interaction. Additionally, in one case particularly, the child chose "on foot" instead of "by bicycle" for the second survey. In spite of this difference, the option on both surveys was active travel mode.

- As to "territorial distance", although there is no exact correspondence between first and second surveys' MCPs (for 3 of the participants), most significant places and daily trajectories are located within the same physical areas of the environment in the two surveys. For the other participant, it was found spatial similarity (area and shape) between first and second surveys' MCPs and for its correspondent daily trajectories. Hence, generally, most affordances/meaningful places are located on common areas that are intersected by the first and second MCPs. Those that were not located on common grounds were placed close to the intersected areas of the MCPs, or within the same public space typology.

Hence, and in spite of not having found exact congruence between answers of first and second surveys, results indicate relevant consonance in between surveys and support *SoftGISchildren* as a feasible methodology to capture children's place experiences and perceptions in the urban physical environment.

3.2.1.4. Content description of SoftGISchildren survey "Cidade Ideal: um jogo de imaginação gráfica!"

The definite name for *SoftGISchildren* survey was "Cidade Ideal: um jogo de imaginação gráfica!" (Ideal City: a game of graphic imagination!). This questionnaire was written in Portuguese and was composed by 9 pages in total. There were no changes in the content of the questionnaire from the one used on the feasibility testing. As mentioned previously, the majority of *Ideal City* survey's content, namely, social, functional, leisure and emotional list of

affordances, and mobility (travel mode and accompaniment) to significant places was previously used in the ground-breaking research work conducted by Kyttä et al. (2012). This investigation focused on the use of SoftGIS methods to capture children's behavioural patterns and meaningful places in the urban sphere. However, in the *Ideal City* SoftGIS, some affordances were reconfigured, others excluded and new ones introduced based on research about children's independent mobility and child-place interaction conducted in Portugal and elsewhere (Arez & Neto, 1999; Cordovil, Lopes, & Neto, 2012; Cordovil, Lopes, Arez, et al., 2012; Lopes et al., 2011; Machado, 2008; Moreno, 2009; Ben Shaw et al., 2012). This procedure allowed for survey's content, namely, the list of affordances in each category, to be cultural sensitive and adequate for Portuguese children. Observations made by the researcher about children's performance in both trial testing sessions confirm the latter. On Table 2, a content description of each of the survey's pages is presented.

Table 2-SoftGISchildren questionnaire “Ideal City: a game of graphic imagination!” description

Page	Page name, relevant features and general content	Questions content (first level)	Pop up questions (second level) ⁸	Type of question (first and second level)
1	A brief introduction to the questionnaire is shown where the child is invited to participate in a survey that enables to collect information about mobility, play, leisure and sensations in different areas of the urban territory towards an ideal city.	Selection of questionnaire according to school name		
2	A brief introduction focusing on the role of the child as a crucial actor for a participatory model of urban planning is visible. <i>Self-description (“auto-descrição”)</i>	writing number of the respective informed consent form*		Number entry
3	Participant’s description Actual and Ideal Mobility Environmental fears	Age; gender; bicycle and car ownership (<i>yes/no</i>); home type (<i>flat/house</i>)		single choice
		Habitual and ideal travel mode to and from school (<i>on foot; by bicycle; by bus/by public transport; by car; by other (skate, scooter, roller-skate, etc.)</i>)		single choice
		Habitual and ideal travel accompaniment to and from school (<i>alone; with other children; with adults; with adults and other children</i>)		
4	<i>Crossing zones (“zonas de passagem”)</i>	Environmental fears in daily trajectories (<i>cars; motorbikes; bicycles; walking alone; adults; other children and youths; dogs or other animals; staying dark; don’t know; other</i>)		multiple choice text entry (other)
	School place and area surrounding it located in the map. Map zoom Drawing buttons: home and route	Marking of home-place Drawing of home-school trajectory and other daily trajectories		place marking route drawing

⁸ After marking each affordance/meaningful place, a series of questions are displayed to the participant. In each category of place interaction (social, play, leisure and emotional) the list of pop-up questions is always the same.

5	<p><i>Social ("social")</i></p> <p>Encouragement to participate focused on imagining an ideal city. Indication for participant to go through the list of social affordances, choose those that are meaningful and mark them on the map where they take place. Social affordances/meaningful places Actual and Ideal mobility Likeability degree of place (actual and ideal) Frequency of place attendance</p>	<p>Marking of social affordances</p> <p><i>"place of arguing"; "nobody is watching"; "being with adults"; "being with animals"; "being mistreated"; "forbidden place"; "allowed place"; "being myself"; "being alone"; "being with friends"; "being in peace and quiet"; "hiding or secret place"; "new people"; "scary people"; "visiting relatives"</i></p>	<p>place marking</p> <p>Likeability degree of meaningful place (<i>pleasant; unpleasant; or both</i>)</p> <p>multiple choice</p>
6	<p><i>Play ("brincadeiras")</i></p> <p>Encouragement to participate focused on imagining an ideal city. Indication for participant to go through the list of social affordances, choose those that are meaningful and mark them on the map where they take place. Play affordances/meaningful places Actual and Ideal mobility Likeability degree of place (actual and ideal) Frequency of place attendance Adult or child led action/activity (actual and ideal)</p>	<p>Marking of functional affordances</p> <p><i>"playing hide and catch"; "jumping"; "running"; "climbing"; "walking"; "swimming"; "skating"; "riding a bike"; "playing ball games"; "going on the swings"; "water playing"; "playing with sand or earth"; "building things"</i></p>	<p>place-marking</p> <p>Do you usually come to this place? (<i>yes/no</i>)</p> <p>single choice</p> <p>Would this place be part of your ideal city? (<i>yes/no</i>)</p> <p>single-choice</p>
7	<p><i>Leisure ("Tempo-livre")</i></p> <p>Encouragement to participate focused on imagining an ideal city. Indication for participant to go through the list of leisure affordances, choose those that are meaningful and mark them on the map where they take place. Play affordances/meaningful places Actual and Ideal mobility Likeability degree of place (actual and ideal) Frequency of place attendance Adult or child led action/activity (actual and ideal)</p>	<p>Marking of leisure affordances</p> <p><i>"cinema"; "museums or/and exhibition"; "library"; "show/concert/disco"; "musical events"; "adventuring"; "parks"; "gardens"; "playing"; "having fun"; "nothing to do"; "hobbies"; "hanging out"; "going out after dark"; "listening to music"; "leisure time centre"; "playing computer/PlayStation/electronic games"; "sports (football, swimming or other)"; "dancing (hip-hop, ballet, or other)"; "shopping"; "going out for a meal"</i></p>	<p>place marking</p> <p>Actual and ideal travel accompaniment to meaningful place <i>I travel to this place... I would like to travel to this place... (alone; with other children; with adults; with adults and other children)</i></p> <p>multiple-choice</p>

	<i>Sensations ("Sensações")</i>		
	Encouragement to participate focused on imagining an ideal city.	Marking of emotional affordances	place-marking
	Indication for participant to go through the list of emotional affordances, choose those that are meaningful and mark them on the map where they take place.	<i>"fun"; "calm"; "good place to be"; "boring"; "pretty"; "ugly"; "untidy"; "tidy"; "dangerous"; "unsafe"; "safe"; "dirty"; "clean"; "polluted"; "unpolluted"; "quiet"; "noisy"; "dark"</i>	
8	Emotional affordances/meaningful places Actual and Ideal mobility Likeability degree of place (actual and ideal) Frequency of place attendance	Actual and ideal travel mode to meaningful place <i>I travel to this place... I would like to travel to this place... (on foot; by bicycle; by public transport; by car; by other (skate, scooter, roller-skate, etc.))</i>	multiple choice
		Adult or child led action/activity (actual and ideal) ⁹ <i>This play/activity is/would be... free (do as I want) organized (by adults or by organizations)</i>	single-choice
9	<i>Your answers and finish ("As tuas respostas e terminar")</i> Praise for participating and indication to press option to exit and go back to initial page of questionnaire		

⁹ Only applied for play and leisure categories of affordances

3.2.2. Clustering of multi-dimensional affordances

Previous research work conducted by Clark & Uzzell (2002) aimed at developing a scale to measure social affordances actualized by adolescents in the context of home, neighbourhood, school and town centre. In order to do so, when analyzing data, these authors grouped the affordances in two categories, “*retreat*” and “*interaction*”, where the former encompasses meaningful places that support retreat behaviours and the latter places that support social interaction. To the best of our knowledge, no other work focused on child-place interaction has yet used subsets of affordances in pre-established categories, namely, functional, social and emotional portrayed individually or collectively in several research works (Broberg, Salminen, et al., 2013; J. J. Gibson, 1979; H Heft, 1988a; M Kytä et al., 2012; Lim & Barton, 2010).

Hence, in the present study, clustering of affordances (for data analysis purpose) in each of the pre-determined categories (social, functional, leisure and emotional) available in the SoftGISchildren questionnaire “Ideal City: a game of graphic imagination!” filled the literature gap and provided a niche for research (exploring possibilities of analyzing participants’ place interactions using clusters of affordances of pre-determined categories across the different urban settings). However, it is important to stress that there is no intention in this present work to claim these sub-sets of affordances as possible taxonomies. Therefore, the choice to agglomerate affordances under a certain cluster type was based on coherent, although, subjective criteria defined by the author. For each “*affordance cluster*” one criteria was devised and preceded by the phrase “*place interactions where*”. Criteria for Social, Leisure, and Emotional categories of affordances was composed based upon definitions of terminologies (Oxford University, 2015) used to name the affordances clusters. Specifically, to define and differentiate affordance clusters’ criteria for Functional Affordances it was used a *Playworker’s Taxonomy of Play Types* (Hughes, 2002).

On the next tables below (Table 3, Table 4Table 5Table 6), it is presented the clustering of affordances according social, functional, leisure and emotional categories and the criteria used to define it.

Table 3-Affordance clusters in Social category of Affordances

Affordance clusters	Criteria (place interactions where)	Affordances
Privacy	it is mainly valued being alone and free from the public eye	nobody is watching being alone hiding or secret place
Relational	it is mainly valued being connected with others	being with adults being with animals being with friends new people visit relatives
Licence	it is/isn't requested the permit from an authority to actualize it	forbidden place allowed place
Affectivity	it is mainly valued the social experience and consequent emotional outcome	being mistreated scary people being myself being in peace and quiet place of arguing

Table 4-Affordance clusters in Functional category of Affordances

Affordance clusters	Criteria (place interactions where)	Affordances
Locomotor Play	action is mainly focused on <i>Locomotor Play</i> "movement in any or every direction for its own sake" (Hughes, 2002)	playing hide and catch jumping running climbing walking swimming
Object Play	action is mainly focused on <i>Object Play</i> "play which uses infinite and interesting sequences of hand-eye manipulations and movements" (Hughes, 2002)	skating riding a bike playing ball games going on the swings
Mastery Play	action is mainly focused on <i>Mastery Play</i> "control of the physical and affective ingredients of the environments" (Hughes, 2002)	water playing playing with sand or earth building things

Table 5-Affordance clusters in Leisure category of Affordances

Affordance clusters	Criteria (place interactions where)	Affordances
Cultural Activities	activities are mainly focused on engaging participants with ideas, customs and social behavior of societies.	cinema museums or/and exhibition library show/concert/disco musical events
Outdoor Activities	activities are mainly focused on the exploration of the outdoor environment	adventuring parks gardens
Recreational Activities	activities are done for enjoyment	playing having fun nothing to do hobbies hanging out going out after dark listening to music leisure time centre
Screen Activities	activities are mainly focused on the use of electronic devices	playing computer/PlayStation/electronic games
Physical and Sport Activities	activities are mainly focused on physical activity and practice of sports	sports (football, swimming or other) dancing (hip-hop, ballet, or other)
Consumption Activities	activities are mainly focused on the use of goods and resources	shopping going out for a meal

Table 6-Affordance clusters in Emotional category of Affordances

Affordance clusters	Criteria (place interactions where)	Affordances
Feelings	The experience of feelings is underlined	fun calm good place to be boring
Aesthetic	it is mainly valued the aesthetical experience	pretty ugly untidy tidy
Safety	it is mainly valued safety issues	dangerous unsafe safe dirty clean
Stressors	the experience of environmental stressors, such as light, noise, etc., is underlined	polluted unpolluted quiet noisy dark

3.2.3. Urban space typology

Children and young people interact with distinct physical settings that coexist within the city environment. Thus, understanding impact of different space typologies in participants' perception and actualization of multi-dimensional affordances is relevant topic of interest in this research. Consequently, a typology for urban public space had to be considered for the contextualization of affordances and, thus, for the analysis of place interaction among daily lives of children and youths.

It could be argued that the urban space typology choice should have been made among those already implemented in previous research and/or established within the theoretical background of relevant disciplines. Next, a list of arguments is presented to justify the (re) creation of a public space typology:

- ✓ It was fundamental to adopt an urban open space typology where the majority of meaningful places selected by children (mapping of affordances) were included in appropriate and representative categories that were relevant for participants, in the present study. Concurrently, this typology aimed at capturing the outline of children's daily mobility in the physical environment; and identifying place typologies that serve as structural references for children's socio-spatial interactions in the city.
- ✓ Place classification according urban open space typology was done indirectly, not in locus, but via a digital software (Quantum GIS); as a result of adopting *SoftGISchildren* methodology to capture participants' meaningful places (affordances). Quantum GIS software enabled the researcher to visualize these places as localized points in a Bing aerial hybrid map¹⁰, together with survey answers related to these meaningful affordances. Subsequently, a new data column for place classification was added to the original data set and the researcher classified those places adopting the urban open space typology created for such purpose. This digital process of looking at meaningful places via a web-map offers some limitations in terms of visualization of the physical features that form place types, namely, some areas and places that are not very much detailed by web-maps, and that may not always be concurrent with children's interpretation of place when marking them through "Ideal City- *SoftGISchildren*" survey. Nevertheless, hybrid layered web-maps, as it was the case of the one used in this study, generally, offers good and clear details of physical features of most places or areas selected by children as meaningful.

Therefore, it was found appropriate to devise an urban open space typology modelled on the previous depicted ones, but altered in a way to enable the researcher to digitally classify children's meaningful places according a public space typology. The urban open space typology (re) created and used in the present study is composed by the following form types:

1. Street

A multi-purposed structure for pedestrian use, movement and experience; and/or for moving traffic.

¹⁰ Places were displayed in a Bing aerial hybrid layered map (map and satellite view simultaneously) which facilitated both processes, place marking according meaningful affordances by the children and classifying according urban open space typology by the researcher.

2. Square

A meeting place of the streets which is often part of the historic development of city centre, associated with an adjacent building (i.e.: church square, courthouse square or collegiate square) or as an independent land parcel.

3. Green space

Open outdoor spaces recognized as gardens, public parks, green parks, neighbourhood parks, natural and semi-natural areas, which are designed for informal recreational and leisure activities. It also includes places that were marked by participants with the *affordances* “garden” and “park”; and other selected places that are defined in the digital hybrid map as “parks”.

4. Exterior play and sports space

Open spaces designed for play (playgrounds), active sport and recreation uses. It also includes selected places that are specifically named, in the digital hybrid map, as sports fields, skate-parks and playgrounds; and places that were marked with the *affordance* “going on the swings” (excluding “going on the swings” marked in the school category).

5. Waterfront space-

Open space along waterways and waterfronts in cities directly related to the natural and semi-natural landscape.

6. Commercial space

Interior private shopping areas (i.e.: shopping centre). It also includes places that were marked by participants with the *affordances* “shopping” and “going out for a meal” (except if it was marked in a place classified as “green space”).

7. Recreational and leisure space

Urban spaces where artistic, cultural and sport activities take place. It was necessary to create this category in order to accommodate specific affordances which were available for the participants' choice under the “leisure” type list, namely, “library” and “leisure time centre” (except if they were marked in the school place); “cinema”; “museums or/and exhibition”; “library”; “show/concert/disco”; “musical events”; “sports (football, swimming or other)”; and “dancing (hip-hop, ballet, or other)”. Also, the *affordance* “being with animals” it was classified under this typology when it was marked in a place recognized with cultural and recreational value and function (i.e.: zoo). Additionally, marked places that correspond to places in the web map signed as recreational associations and sports clubs were classified under the present category too.

8. School

This space was pre-established by the researcher according to the correct location in the hybrid web map when devising the questionnaire; and identified with a dotted line around the area that corresponds to the school for each study sample (for each sample one questionnaire was created). It was very relevant to include this form type in the present typology because of the large expression of affordances found here. Undoubtedly, school place is very meaningful for children's daily routine and, therefore, also significant as a category for this urban open space typology.

9. Housing space

10. Neighbourhood space

For these two designated types of urban open space, firstly, it is important to bear in mind that they were devised based on the concept of spatially defining neighbourhood using buffers. On this, Vanloon (2011) affirms that the most popular approach to define a child's neighbourhood is to define a circular buffer around home or school with size and shape informed by theory and/or empirical data.

Secondly, it is important to mention that it was found a large number of affordances located on the home place (very near to it or almost on the same position) and around it. This led to the assumption that these meaningful interactions took place either at home (i.e.: playing computer; being with animals) or within neighbourhood area. Thirdly, home and neighbourhood built environment has been found fertile for children's actualization of different types of social meaningful affordances (Clark & Uzzell, 2002).

Thus, it became relevant for the present study to conceptualize "housing space" and "neighbourhood space" as two categories within typology of urban open spaces.

Broberg et al.(2013) in a mapping-methodology research focusing on associations between urban structure characteristics and children's independent and active mobility used a 50m circular buffer around each meaningful place. These authors justify this distance as valid to study the immediate surroundings of places and, simultaneously, enable variance in between environmental variables.

In this way, it was found appropriate and relevant to establish a circular buffer with 25m around home place defined by each participant and define this area as an urban open space type named "housing space". This buffer size was selected to include the most proximal home surroundings and to accommodate participants' place marking variations (due to the use of map zoom and restrictions on availability of proximity details regarding certain map areas) when their intent was to locate a certain affordance in the home place. Also, the affordance "visiting relatives" was classified as "housing space" if place marking occurred on the proximity of houses and not only near green spaces and exterior play and sports spaces. Otherwise, it was considered as "other" type. For this affordance, the 25m buffer criteria was irrelevant. Additionally, "playing computer/PlayStation/electronic games" was classified as "housing space", if and only it was marked within the 25m buffer.

As for "neighbourhood space", Francis (2003, p. 7) defines it as a "*publicly accessible open space such as street corners, lots, etc. near where people live; can also be vacant or undeveloped space located in neighborhood including vacant lots and future building sites; often used by children and teenagers, and local residents*". In a study using SoftGISchildren methodology to understand relationship between urban structure, children's mobility and meaningful places, and well-being, Kytta et al. (2012) defined several urban characteristics as independent variables in a 500m circular buffer around each child's home. Likewise, Broberg & Sarjala (2015) in a research about the effect of urban built environment on children's physical

activity and travel mode to school, measures of home built environment were calculated for a radius of 500 m around each participant's home.

Similarly, in the present study, a circular buffer of 500 m around each participant's home was defined. The area ranging on a radius between 26m to 500m (the 500 m radius area was not all included in this category because of the "housing space" type defined previously within the 25m home radius) was conceptualized as an urban form type designated as "neighbourhood space". In terms of urban open space typology, all meaningful affordances found within this home range (26m-500m) were classified as "neighbourhood space", including "playing computer/PlayStation/electronic games"¹¹; and excluding those classified as streets, squares, green spaces and exterior play and sports spaces.-

11. Other

This category was created in order to classify those meaningful affordances/places that did not fit in any of the above categories; and those that were not visible in the web-map due to zooming constraints or to lack of form/physical detail around a particular area.

Regarding the actual process of classifying affordances/places according the devised urban open space typology it is important to underline the following ideas. One of the research groups located in a west historical part of Lisbon was particularly used as base for conceptualization of categories and place classification. Thus, in the west Lisbon sample, in many of the affordances/places, conceptualizing and classifying place types occurred simultaneously. In the second and third case studies, few changes on place typologies classification were undertaken. Also, whenever modifications took place in these two samples, changes were implemented in the west Lisbon case study, accordingly. Initially the devised taxonomy incorporated more than eleven categories. However, it was found necessary to diminish the number of form types by merging some categories in order to obtain a coherent taxonomy in terms of the expressiveness of each type. In the end, it emerged a new "Urban Space Typology" harmonized and consistent for the three study samples (where each one corresponds to a distinct area of the Metropolitan Area of Lisbon); and synchronized with children's geographies through the urban realm.

¹¹ This specific affordance was never considered an outdoor open space type because it was assumed as an activity which is mainly carried out indoors.

3.3. Methodology II

3.3.1. General study features

This cross-sectional research aims understanding transactional child-place relationships in the urban environment, adopting an Environmental Psychology based perspective. In this sense, it was conducted a cross-sectional research focused on the study of children's place interactions in the urban open space mediated by multi-dimensional *affordances*.

A total of 145 sixth to ninth graders from three schools located in the west, off the west coast, and in the northeast of Lisbon municipality, aged 11-17, 11-14 and 11-15 years old, respectively, constituted three distinct geographic research contexts. SoftGIS*Children* methodology was adopted, where participants using a child-friendly web-map questionnaire, selected and marked meaningful places according a set of pre-established social, functional, leisure and emotional affordances; and reported on actual and ideal mobility to these places and to school.

3.3.2. Participants and geographic research contexts

Lisbon (L)

A total of 145 children aged 11-17 years old from three distinct geographic areas in the metropolitan area of Lisbon, integrated three research contexts, *LISBON HISTORICAL (LH)*, *LISBON BY SEA (LBS)* and *LISBON MODERN (LM)*. These three research contexts were also considered together as a whole (*L*) representing Lisbon's metropolitan area research context.

Lisbon Historical (LH)¹²

This research context included 40 children, aged between 11-17 years old, attending a public school (EB 2+3 Paula Vicente) located in the parish of Belém, in the west area of Lisbon municipality. This Parish has an area of 10.43 km² with 16551 inhabitants. Belém is a typical historical consolidated touristic area, southwards facing the riverfront. Most building are low-rise residential types.

The housing is mainly constituted of flats but in some wealthier areas there are single family detached houses. Large pavements run alongside main avenues and roads. The parish's main avenues give access to inner-Parish traffic and to main and busy roads linking to other city areas. In the north of Belém it is located one of the main green forest areas of the city called Parque Florestal de Monsanto. More concentrate in the southern part of the parish, facing the riverfront, exist green areas, such as parks and gardens; recreational and leisure spaces; picnic spaces; play and sports equipment; walking and cycling trails; as well as cultural infrastructures, such as museums; monuments; and art centers. Public transportation network is diverse and integrated.

¹² Information of this geographical area was selected from:

http://www.cm-lisboa.pt/fileadmin/MUNICIPIO/Reforma_Administrativa/Juntas_de_Freguesia/JF_Bel%C3%A9m.pdf. Accessed in 21/07/2016
Statistics Portugal. Retrieved from https://www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE. Accessed in 21/07/2016

Data collection occurred between October and November of 2013. Participants marked a total of 432 meaningful places (affordances) which are represented by yellow dots in Figure 2.

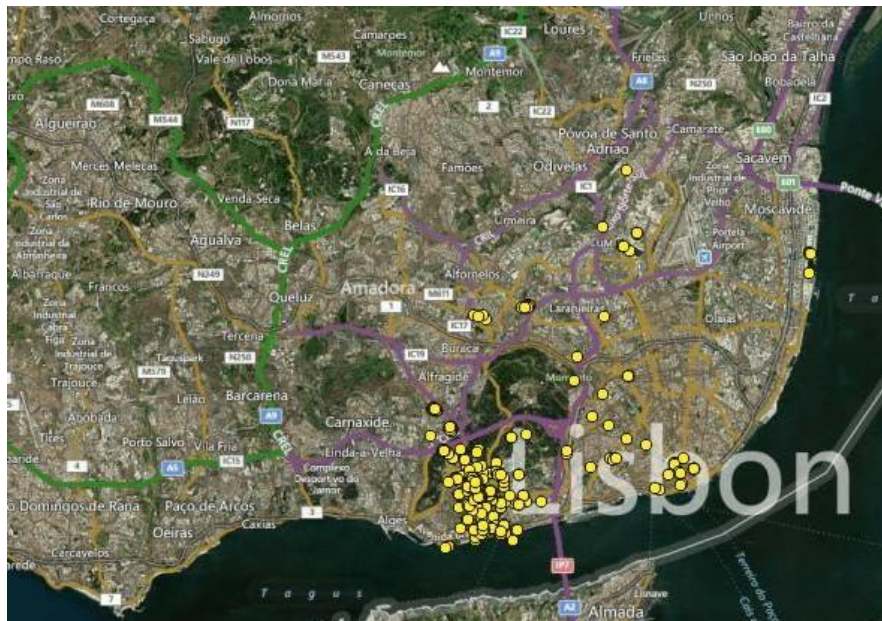


Figure 2- LH sample of meaningful places

Lisbon By Sea (LBS)¹³

This research context included 52 children aged between 11-14 years old attending a public school (EBI Dr. Joaquim de Barros) located at the village of Paço de Arcos (Oeiras municipality), in the coastal area of Lisbon. The village of Paço-de-Arcos is located in the coastal area of this municipality, occupying an area of 3.4 km². The municipality of Oeiras presents one of the highest employment proportions in foreign majority companies and in activities of Communication and Information Technologies. There are also several organisms and entities related with research and science activities, which provide economic and social development. In the municipality of Oeiras, public space is generally qualified, clean, accessible and enriched with a diversity of gardens and parks. The south part of this municipality faces the river/sea front where a promenade along the beach was built. This is a popular place for leisure, physical activity and sports. Also, cutting north-south along the town of Oeiras, an urban park is an important part of the town's built environment. The municipality of Oeiras is spread over an area of 45.72Km² with a total of 172120 inhabitants. Public transportation network within the town of Oeiras and neighbored Paço-de-Arcos appears to be scarce and restricted when compared with the other two research groups. Data collection occurred in May of 2014. Participants marked a total of 581 meaningful places which are represented by yellow dots in Figure 3.

¹³ Information of this geographical area was selected from: Cordovil, R., Lopes, F., & Neto, C. (n.d.). *Children's Independent Mobility in Portugal 2011/2012*. Lisboa. (Unpublished work). Statistics Portugal. Retrieved from https://www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE Accessed in 21/07/2016

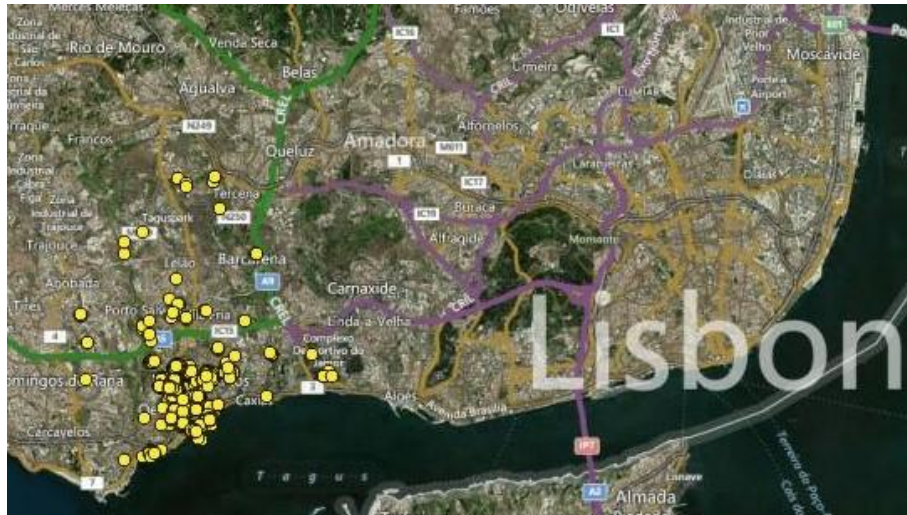


Figure 3-LBS sample of meaningful places

Lisbon Modern (LM)¹⁴

This research context included 53 children aged between 11-15 years old attending a private school (Colégio Pedro Arrupe) located at the parish of Parque das Nações, in the eastern area of Lisbon municipality. The south and north parts of this parish was largely created from scratch in 1998, on the occasion of *Expo 98*, with an urban planning more focused towards pedestrianized mobility. This parish lies on a strip of land, 5 km long by the river Tagus, a third part of which is made up of green space. Built environment is characterized by residential buildings; cultural, ludic and sports infrastructure; green area; restaurants; riverfront leisure areas; and commercial spaces. This parish spreads over an area of 5.44 Km² with a total of 21025 residents. Public transportation network is diverse and integrated.

Data collection occurred in February of 2015. Participants marked a total of 764 meaningful places which are represented by yellow dots in Figure 4.

¹⁴ Information of this geographical area was selected from: Social Diagnose of Parque das Nações parish. Retrieved from [file:///C:/Users/Frederico/Downloads/jfpn-diagno-sticosocial-ultima-errata-4393-4843%20\(1\).pdf](file:///C:/Users/Frederico/Downloads/jfpn-diagno-sticosocial-ultima-errata-4393-4843%20(1).pdf). Accessed in 21/07/2016
 Statistics Portugal. Retrieved from https://www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE Accessed in 21/07/2016

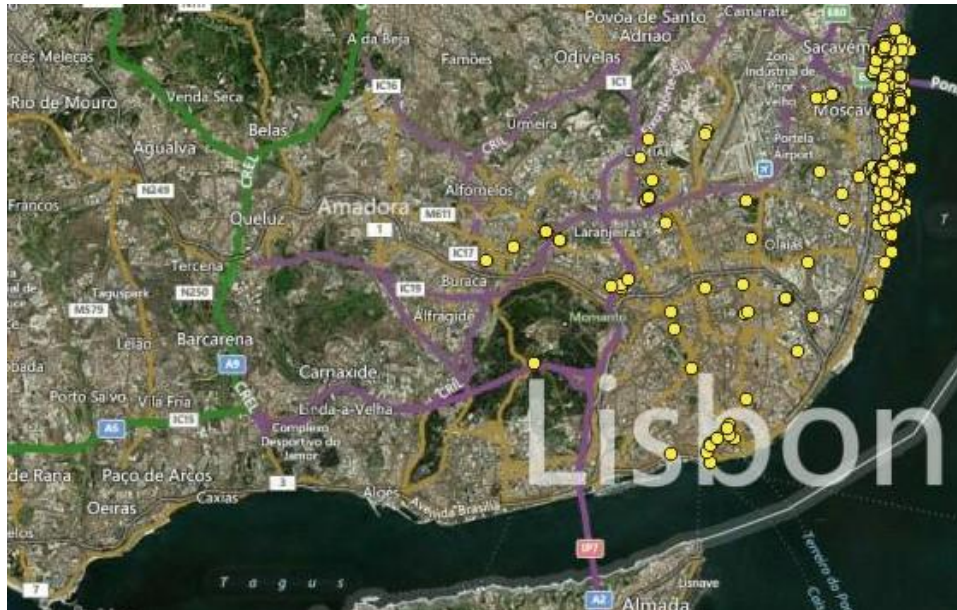


Figure 4-LM sample of meaningful places

3.3.3. Data collection procedures

To carry out this research, ethical approval was granted from the Ethics Council of Faculdade de Motricidade Humana, Portuguese Data Protection Authority, General Department of Education and the School Boards. Also, children were handed a document with the study description and consent form to take home for their parents/caregivers to fill in (see **Appendix 3**). The study consent was brought back to school by children and handed back to the class director teacher; who then pass it to the researcher. Only children whose parents/caregivers expressed their formal written consent were allowed to be present at data collection sessions. Then, the researcher provided children with a brief explanation of the study and handed a form for them to express their own consent. Consequently only children who were allowed by their parents and, simultaneously, expressed their own written consent participated in the present study.

Data collection sessions occurred during school hours and were planned in advance according number of participants. Each session took between 45 minutes to 1 hour. The researcher was always present in each data collection moment. When there were more than 10 children, a research assistant accompanied the researcher. Data collection took place in computer equipped classrooms with internet connection (Figure 5). The researcher and the research assistant helped those children who found difficulties completing the web-questionnaire, namely, clarifying questions, locating certain meaningful places and drawing the home-school itinerary.

The software used to perform data collection was always the same except for the third case study (most recent). Herein, the *SoftGISchildren* application was updated and changed in terms of internet domain from “mapita.fi” to “maptionnaire.com”. Also, in this more recent software it was added a “find” tool, enabling participants to locate places using a text command.

Bellow in it is possible to visualize data collection process using the softGIS survey “Cidade Ideal: a game of graphic imagination!” (Figure 6 Figure 7).



Figure 5-Physical setting of data collection using Cidade Ideal SoftGISchildren survey

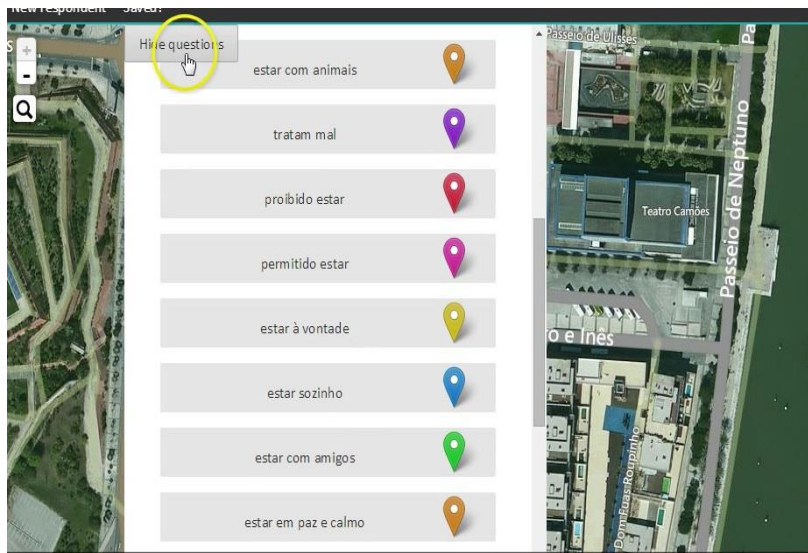


Figure 6- Example of affordance selection using Cidade Ideal SoftGISchildren survey

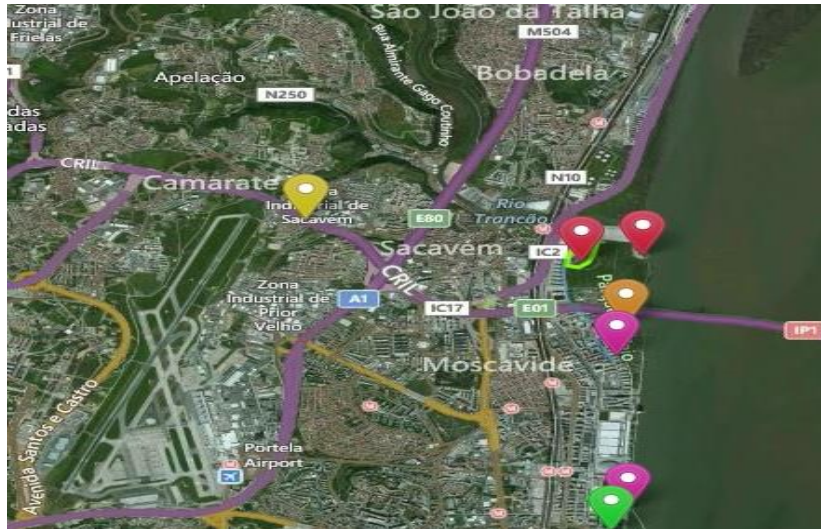


Figure 7- Example on display of meaningful places after affordance location using Cidade Ideal SoftGISchildren survey

3.3.4. Criteria for inclusion of valid participants and meaningful places in research samples

- All participants who marked home-place.
- Minimum of one meaningful place (affordance) per participant.
- All meaningful places of each respondent located within his/her municipality. All places that were marked outside each participant's municipality were excluded. The municipality of each participant was designated according school and home locations, which were both situated in the same municipality.
- In the public school sample located in Lisbon city, a geographical area from another municipality was included due to the pervasiveness of meaningful places and because of its border location to the Lisbon municipality.

3.3.5. Data import

Data was imported from the SoftGISchildren application "*Cidade Ideal: Um jogo de imaginação gráfica!*" to QGIS 2.8.3.-Wien and to IBM SPSS Statistics 22 software. Statistical analysis was performed using SPSS and Excel software on two distinct datasheets, one focusing on the participants general characterization and questions on mobility in between home and school; and another one focusing on the selected meaningful places/affordances and mobility issues. Linear distances between home/school and meaningful places were calculated using QUANTUM GIS 2.8.1 WIEN software. This same software was used to generate map pictures of meaningful places. Meaningful places classification according public space typology and clusters' categories of social, functional, leisure and emotional affordances were also added to the meaningful places' SPSS data sheet and imported to the QGIS software.

3.3.6. Operationalization of research variables

Age and age groups

Age was operationalized as a discrete variable and also as a categorical variable constituted by three categories. Each category represented an age group, “11-12 years old”; “13-14 years old” and “15-17 years old”, labelled “1”, “2” and “3” in the SPSS data sheet.

Gender

Gender was operationalized as a categorical variable in the SPSS data sheet (“1” girls; “2” boys).

School-home distance

School-home distance was calculated by determining mean linear distance (in meters and converted afterwards to kilometers) between participants’ homes and the school which was attended by them.

Actual and Ideal school-home mobility

Actual and ideal school-home mobility were determined by analyzing children’s single choice answers on travel mode and travel accompaniment.

For descriptive purposes, travel mode was operationalized as:

- *Active travel*- when choice included “on foot”, “by bicycle”, or “by other (skate, scooter, roller-skate, etc).
- *Motorized travel*- when choice included “by car”.
- *Hybrid travel*- when choice included “by bus/by public transport”.

Exceptionally, for analysis purposes when addressing actual mobility vs. ideal mobility, travel mode was operationalized as:

- *Active travel*- when choice included “on foot”, “by bicycle”, or “by other (skate, scooter, roller-skate, etc).
- *Non-Active travel*- when choice included “by car” or by “bus/public transport”.

Travel accompaniment was operationalized as:

- *Independent travel*- when choice included “alone” or “with other children”.
- *Non-Independent travel*- when choice included “with adults” or “with adults and other children”.

Environmental fears in the school-home journey

Environmental fears were presented to participants as a multiple choice question. For analysis purposes each fear was coded in the SPSS data sheet as “1” (if it was selected) and “0” if it was not selected.

Meaningful places, categories and clusters of affordances

Meaningful places were operationalized as actualized affordances under four predetermined expressional categories, social, functional, leisure and emotional, which were select by participants when completing the web-map questionnaire. Meaningful places were operationalized as:

- All Places (AP) - All places that were actualized by affordances without considering different affordances’ expressional categories.

- Social Places (SP) - Places where social affordances were actualized.
- Functional Places (FP) - Places where functional affordances were actualized.
- Leisure Places (LP) - Places where leisure affordances were actualized.
- Emotional Places (EP) - Places where emotional affordances were actualized.

Subsequently, four new variables were devised from the four categories of affordances, using four taxonomies which were created for such effect. These four categorical variables, “affordance cluster in social category of affordances”; “affordance cluster in functional category of affordances”; “affordance cluster in leisure category of affordances”; and “affordance category in emotional category of affordance” were then introduced in the SPSS data sheet and in the QGIS software.

Likeability degree of meaningful places

This variable was operationalized as “*pleasant*”, “*unpleasant*” and “*both pleasant and unpleasant*”. In the SPSS data sheet it was coded as “0”, “1” and “2” according to participant’s answer.

Home-meaningful places territorial distance

This variable was operationalized as “*territorial distance*” and it was calculated using the QGIS software by determining mean linear distance (in meters and converted afterwards to kilometers) between participants’ homes and meaningful places where affordances were actualized. Subsequently, this new variable was imported to the SPSS data sheet.

Geographic area

Geographic area was operationalized as “*Neighborhood area*” and defined a circular buffer of 500 meters around each participant’s home.

In the SPSS data sheet, this variable was created to classify meaningful places (affordances) in terms of being located in (coded as “1”) or out (coded as “0”) of the neighborhood area. This variable was devised based on the variable “*territorial distance*” which measured the linear distance between home and meaningful places. Thus, all meaningful places that were located within 500 meters of the respective home place were classified as being “in the neighborhood”.

Actual and Ideal mobility to meaningful places

Actual mobility to meaningful places was determined by analyzing participants’ multiple choice answers on travel mode and travel accompaniment, after locating each meaningful affordance in the web-map. This means that when analyzing mobility to meaningful places, focus is not on the actual participant but on the place determined via the location of an affordance, and its multiple possibilities of being travelled to regarding travel mode and travel accompaniment.

Travel mode was operationalized as three variables (not mutually exclusive):

- *Active travel*- when choice included “on foot”, “by bicycle”, or “by other (skate, scooter, roller-skate, etc).
- *Motorized travel*- when choice included “by car”.
- *Hybrid travel*- when choice included “by bus/by public transport”.

Travel accompaniment was operationalized as two variables (not mutually exclusive):

- *Independent travel*- when choice included “alone” or “with other children”.

- *Non-Independent travel*- when choice included “with adults” or “with adults and other children”.

In the SPSS data sheet, each of these variables was coded individually. *Active travel* was coded “1” if choice included “on foot”, “by bicycle”, or “by other (skate, scooter, roller-skate, etc); or “0” if the choice did not include any of those options. The other four variables were coded in the same way as the previous one.

Territorial range

Territorial range refers to the longest distance travelled autonomously by children from home to places where affordances are actualized. Territorial range was calculated by determining mean linear distance travelled autonomously (in meters and converted afterwards to kilometers) between children’s’ homes and meaningful places where affordances were actualized.

Urban typologies

Urban typologies were operationalized as “*Urban space types*” as a result of taxonomy specially created to classify children’s’ built environment according 11 urban space types.

In the SPSS data sheet, this categorical variable was created to classify the location of meaningful places (affordances) in the above terms.

Action and Activity command

These two variables were solely operationalized for functional and leisure expressional categories of affordances, specifically to report if the behaviors (actions or activities) associated with the affordances were child or adult led. In the SPSS data sheet, two categorical variables were introduced and each one of them was coded in the same way, “1” if the affordance was child led and “0” if the affordance was adult led.

3.3.7. Research questions

Next, in Table 7, school-home mobility research questions research questions and statistical procedures are displayed. Similarly, in Table 8, research questions on the interplay of mobility, meaningful places and urban space are depicted.

Table 7-Children's school home mobility research questions

GENERAL RESEARCH QUESTION	SPECIFIC RESEARCH QUESTIONS	STATISTICAL PROCEDURE
Is participants' age associated with actual mobility in the school-home journey?	Are participants' age groups associated with actual travel mode in the school-home journey?	Frequency analysis Chi-square tests
Is participants' gender associated with actual mobility in the school-home journey?	Are participants' age groups associated with actual travel accompaniment in the school-home journey? Is participants' gender associated with actual travel mode in the school-home journey? Is participants' gender associated with actual travel accompaniment in the school-home journey?	Frequency analysis Chi-square tests
Is school-home distance associated with actual mobility in the school-home journey?	Is school-home distance associated with actual travel mode in the school-home journey? Is school-home associated with actual travel accompaniment in the school-home journey?	Uni-variate Analysis of Variance (ANOVA) Post hoc tests. Independent sample t-test.
Are there differences between participants' actual and ideal mobility in the home-school journey?	Are there differences between children's actual and ideal travel mode in the school-home journey? Are there differences between children's actual and ideal travel accompaniment in the school-home journey?	McNemar test

Table 8-Children’s mobility, meaningful places, urban space and territory research questions

GENERAL RESEARCH QUESTION	SPECIFIC RESEARCH QUESTIONS	STATISTICAL PROCEDURE
Considering “L” research group and meaningful places without discriminating categories (All Places “AP”)		
Is participants’ age associated with actual mobility to meaningful places (AP)?	Are participants’ age groups associated with active travel to meaningful places?	Frequency analysis Chi-square tests
	Are participants’ age groups associated with hybrid travel to meaningful places?	
	Are participants’ age groups associated with motorized travel to meaningful places?	
	Are participants’ age groups associated with independent travel to meaningful places?	
	Are participants’ age groups associated with non-independent travel to meaningful places?	
Is participants’ gender associated with actual mobility to meaningful places (AP)?	Is participants’ gender associated with active travel to meaningful places?	Frequency analysis Chi-square tests
	Is participants’ gender associated with hybrid travel to meaningful places?	
	Is participants’ gender associated with motorized travel to meaningful places?	
	Is participants’ gender associated with independent travel to meaningful places?	
	Is participants’ gender associated with non-independent travel to meaningful places?	
Is actual mobility related with distance between home and meaningful places (AP)?	Are there differences between travelled distances when and when not adopting active	

<p>How does actual mobility relate with distance between home and meaningful places?</p>	<p>travel to meaningful places (AP)?</p> <p>Are there differences between travelled distances when and when not adopting hybrid travel to meaningful places (AP)?</p> <p>Are there differences between travelled distances when and when not adopting motorized travel to meaningful places (AP)?</p> <p>Are there differences between travelled distances when and when not adopting independent travel to meaningful places (AP)?</p> <p>Are there differences between travelled distances when and when not adopting non-independent travel to meaningful places (AP)?</p>	<p>Independent sample t test</p>
<p>Considering neighbourhood area how frequent is each travel mode and travel accompaniment used when going to meaningful places?</p>	<p>In the neighbourhood area how frequent is active travel in detriment of not using such travel mode to meaningful places (AP)?</p> <p>In the neighbourhood area how frequent is hybrid travel in detriment of not using such travel mode to meaningful places (AP)?</p> <p>In the neighbourhood area how frequent is motorized travel in detriment of not using such travel mode to meaningful places (AP)?</p> <p>In the neighbourhood area how frequent is independent travel in detriment of not using such travel accompaniment to meaningful places</p>	<p>Frequency analysis</p>

(AP)?

In the neighbourhood area how frequent is non-independent travel in detriment of not using such travel accompaniment to meaningful places (AP)?

How prevalent is the use of each travel mode and travel accompaniment when going to different urban space typologies to actualized affordances?

How frequent is active travel used across different urban space typologies where affordances area actualized?

Frequency analysis

How frequent is hybrid travel used across different urban space typologies where affordances area actualized?

How frequent is motorized travel used across different urban space typologies where affordances area actualized?

How frequent is independent travel used across different urban space typologies where affordances are actualized?

How frequent is non-independent travel used across different urban space typologies where affordances are actualized?

Are there differences between participants' actual and ideal mobility to meaningful places (AP)?

Are there differences between children's actual and ideal travel modes to meaningful places?

Frequency analyses
McNemar test

Are there differences between children's actual and ideal travel types of accompaniment to meaningful places?

Considering “L” research group and meaningful places discriminated by categories (Social Places “SP”, Functional Places “FP”, Leisure Places “LP” and Emotional Places “EP”)

<p>How does actual mobility to meaningful places vary with specific categories of affordances actualized in such places?</p>	<p>Are specific travel modes to meaningful places more frequent when actualizing affordances from a particular category (social, functional, leisure, or emotional)?</p>	<p>Frequency analysis</p>
	<p>Are specific travel types of accompaniment to meaningful places more frequent when actualizing affordances from a particular category of affordances (social, functional, leisure, or emotional)?</p>	
<p>Within neighbourhood area how does actualization of different categories of affordances vary?</p>		<p>Frequency analysis</p>
<p>Considering different urban space typologies, how does actualization of different categories of affordances vary?</p>		<p>Frequency analysis</p>

4. CHAPTER 4- RESULTS

“O Homem pensa ter na Cidade a base de toda a sua grandeza e só nela tem a fonte de toda a sua miséria. Vê, Jacinto! Na Cidade perdeu ele a força e beleza harmoniosa do corpo, e se tornou esse ser ressequido e escanifrado ou obeso e afogado em unto, de ossos moles como trapos, de nervos trémulos como arames, com cangalhas, com chinós, com dentaduras de chumbo, sem sangue, sem fibra, sem viço, torto, corcunda - esse ser em que Deus, espantado, mal pode reconhecer o seu esbelto e rijo e nobre Adão!”

(Eça de Queirós in “*O Mal da Cidade*”, *A Cidade e as Serras*, 1901)

4.1. Results outline

This chapter is divided in three sections.

Section A- “Descriptive landscapes of children’s transactional behavior”

In this section results focus on a general description of participants’ mobility, affordances and urban space, namely the following aspects:

- General characterization of research groups.
- Characterization of school-home mobility in the four research groups in terms of school-home distance, environmental fears and actual mobility in this journey.
- Characterization of actual mobility to meaningful places in L group.
- Quantification of meaningful places in all research groups.
- Quantification of meaningful places across gender and age
- Characterization of meaningful places according categories and clusters of affordances in L group.
- Characterization of meaningful places across gender and age in L group.
- Characterization of categories of affordances across gender and age in “L” group.
- Characterization of urban space typologies used by children in the four research groups.
- Variability on the use of urban space typologies according gender and across age groups in L group.

Section A- Synthesis of results

Section B- “Comparative landscapes of children’s transactional behavior”

In this section results focus on establishing comparisons and differences on mobility, affordances and urban space across LH, LBS and LM research groups. The analyzed topics are:

- Characterization of children’s meaningful places in terms of actualization of affordances and categories of affordances.
- Qualification of real and ideal functional and leisure affordances in terms of activities led by children or by adults.
- Clustering of affordances in social, functional, leisure and emotional categories of affordances.
- Description on likeability of meaningful places.
- Portray of mobility to meaningful places in terms of territorial distance and territorial range; and actual and ideal mobility to meaningful places.
- Characterization of urban space typologies used by children as meaningful places.

Section B- Synthesis of results

Section C- “Interplay of variables on the landscapes of children’s transactional behavior”

In this section, results focus on school-home mobility and on the interplay of mobility, affordances and urban space in the overall research group ("L"). The topics subjected to analysis are the following:

- Age groups and actual school-home mobility.
- Gender and actual school-home mobility.
- School-home distance and actual school-home mobility.
- Actual and Ideal school-home mobility.
- Age and actual mobility to meaningful places.
- Gender and actual mobility to meaningful places.
- Actual mobility and territorial distance to meaningful places.
- Neighbourhood area and actual mobility.
- Actual mobility and urban space typology.
- Actual and Ideal mobility to meaningful places.
- Territorial distance across categories of meaningful places
- Actual mobility and categories of affordances.
- Neighborhood area and categories of affordances.
- Urban space typologies and categories of affordances.

Section C- Synthesis of results

4.2. Section A- Descriptive landscapes of children's transactional behavior

4.2.1. General characterization of research groups

In Table 9, a general characterization of participants in each case study and in the overall sample is provided.

Table 9-Participants' general characterization

Participants' general characterization	RESEARCH GROUPS			
	LH	LBS	LM	L
Number of participants	40	52	53	145
Municipality	Lisbon	Oeiras	Lisbon	n/a
School type	Public	Public	Private	n/a
Gender	57.5% (girls) 42.5% (boys)	48.1% (girls) 51.9% (boys)	41.5% (girls) 58.5% (boys)	48.3% (girls) 51.7% (boys)
Age	11-17 ($M=13.03$; $SD=1.73$)	11-14 ($M=11.73$; $SD=0.93$)	11-15 ($M=12.57$; $SD=1.32$)	11-17 ($M=12.41$; $SD=1.43$)
11-12 years old	42.5%	79.6%	51%	58.6%
13-14 years old	32.5%	0	43.1%	32.1%
15-17 years old	25%	20.4%	5.9%	9.3%
Bicycle ownership	59%	83.7%	98.1%	82.3%
Car ownership	87.2%	89.6%	100%	92.9%

LH stands for "LISBON HISTORICAL" case study

LB stands for "LISBON BY SEA" case study

LM stands for "LISBON MODERN" case study

L stands for "LISBON" meaning the research sample composed by the three case studies as a whole group

Overall there were slightly more boys (51.7%) participating in this study than girls (48.3%). The biggest discrepancies between genders exist in the LH and LM case studies. In the former it was found a higher percentage of girls (57.5%), whereas in the latter the opposite occurs (58.5% of boys). The mean age of participants for the whole research sample ("L" group) is 13 years old. In terms of age groups, most children are from the 11-12 years old age group with 58.6%, followed by those from 13-14 years old group, with 32.1% of participants, and those from the youngest group (15-17 years old), with only 9.3% of young people. Most children report bicycle and car ownership, although in the LH group only 59% of participants have a bicycle. In all research groups automobile ownership is overwhelming and higher than bicycle ownership, especially in the case of LH group where this difference is more expressive.

4.2.2. Characterization of school-home mobility in the four research groups

4.2.2.1. School-home distance across the four research groups

This distances were of 2.3 Km ($M=2.309$, $SD=2.280$) for the whole "L" group; 2.3 Km ($M=2.292$, $SD=3.279$) for the "LH" group; 1.7 km ($M=1.727$, $SD=1.704$) for the "LBS" group; and 2.9 Km ($M=2.893$; $SD=1.673$) for the "LM" group. Home-school proximity ranged between mean

values of 1.7 km and 2.9 km, closer for children from LBS, followed by those from LH and LM groups, respectively.

4.2.2.2. Environmental fears in school-home journey across the four research groups

In “LH” group, the most frequent fears were other animals (12.5%), travelling alone (10%) and being out when it is getting dark (7.5%). Traffic fears reported 2.5% for cars and the same value for motorbikes; and stranger danger represented 5% and 2.5% for adults and children, accordingly. In “LBS” group, the highest percentages of reported fears were travelling alone (11.5%), seconded by fear of other children (9.6%), of other animals (7.7%) and of being out when it is getting dark (5.8%). Traffic danger was the least frequent of fears with 1.9% for cars and 1.9% for motorbikes, together with adult stranger danger (1.9%). In “LM” group, travelling out alone being out when it is getting dark constitute the most frequent fears mentioned by participants with values of 17.5% and 15%, respectively. Car and adult fears represent 7.5% each, whereas fear of motorbikes, other animals and of other children present a value of 2.5% each.

By cross-reading the three research groups, it is relevant to point out that in each addressed environmental fear, a percentage not superior to 12.5% of participants reported positively on being afraid. When considering “L” group, the most perceived environmental fears were traveling alone and .being out when it is getting dark for 12.9% and for 9.1% of participants, respectively. Traffic fears and stranger danger had little expression with values of 3.8% (cars) and 2.3% (motorbikes) and 4.5% (adults), 5.3% (other children and youths).

4.2.2.3. School-home actual mobility across the four research groups

In the “LH” group, 41% of children travel from school to home using public transportation (hybrid travel), followed by 35.9% that travel actively (on foot or by bicycle, or similar) and by 23.1% that use car transportation (motorized travel). Most participants in this group travel autonomously (independent travel) in the school-home journey (69.2%). For children and young people independent travel is usually associated with travel modes that allow for them to move about without adult dependence. In this sense, active and hybrid travel modes afford such behavior unlike motorized travel. Concerning “LBS” group, slightly over half of the participants (52%) use motorized travel when returning home from school; very few of them (4%) use hybrid travel; and most of participants travel this itinerary accompanied by adults (64%). In “LM” group, 64.2% and 32.1% of children are, accordingly, driven by car and public transport from school to home. Following this trend, it is not surprising that 66% of participants are accompanied by adults (non-independent travel) when returning home from school. In Table 10, results for the four research groups are indicated.

In the school-home journey, active travel is mostly prominent in the “LBS” group (44%), hybrid travel in the “LH” group (41%) and motorized travel in “LM” group (64.2%). As for independent travel, the highest value is expressed by participants of “LH” group (69.2%) and the lowest (3.8%) by those of “LM” group. Overall, in “L” group motorized travel is most dominant with a value of 48.6% and non-independent travel is practiced by 55.6% of participants.

Table 10-School-home mobility across the four research groups. Percent of travel modes and travel types of accompaniment in the school-home journey (%)

			Research groups			
			L	LH	LBS	LM
School-home journey	Travel mode	Active travel	26.8	35.9	44	3.8
		Hybrid travel	24.6	41.0	4	32.1
		Motorized travel	48.6	23.1	52	64.2
	Travel accompaniment	Independent travel	44.4	69.2	36	34
		Non-Independent travel	55.6	30.8	64	66

Note: Travel modes are mutually exclusive as are travel types of accompaniment

4.2.3. Characterization of actual mobility to meaningful places in L group

Mean territorial distance between home and meaningful places in L group was 1.9 Km ($M=1.897$, $SD=2.492$); mean territorial range was 1.8 Km ($M=1.803$, $SD=2.437$); active travel was the most frequently used travel mode to access meaningful places, with 68.8%, followed by motorized travel (43.4%) and hybrid travel (public transport) with 16.1% (Table 11). In terms of travel accompaniment (Table 11), meaningful places are more frequently visited autonomously (independent travel), with a value of 62.7%, whereas non-independent travel (with adults) is used less often (54%).

Table 11-Actual mobility to meaningful places across the four research groups (%)

			Research groups			
			L	LH	LBS	LM
Journey to meaningful places	Travel mode	Active travel	68.8	70.0	60.6	73.7
		Hybrid travel	16.1	21.2	5.1	21.1
		Motorized travel	43.4	30.0	58.9	39.2
	Travel accompaniment	Independent travel	62.7	75.9	54.4	62.6
		Non-Independent travel	54.0	45.8	64.4	50.6

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

4.2.4. Quantification of meaningful places

Bellow in Table 12, it is possible to visualize in detail total number, mean number and frequency of meaningful places in home, social, functional, leisure and emotional places marked by participants across the four research groups. A total of 1777 places were identified, 145 of them were home places corresponding to the total number of this research participants' and 1632 corresponding to affordances distributed in four expressional categories (social, functional, leisure and emotional). The highest frequency of affordances (43.6%) was expressed by LM

participants, followed by LBS (32.4%) and LH (24%). Consequently mean number of affordances by participant was higher in LM (14.42). Overall, in L group, mean number of meaningful places (affordances) by participant was of 12.26. In all groups, participants marked more social affordances (social meaningful places) than the other three expressional categories, with values of 36.7%, 32.5%, 36.7% and 35.4% for LH, LBS, LM and L groups. In terms of functional affordances, the highest number was found in LBS (26%); and as for leisure and emotional affordances, LM was the most expressive group with values of 29.8% and 17.2%, respectively.

Table 12-Quantification of meaningful places in the four research groups

MEANINGFUL PLACES	RESEARCH GROUPS			
	LH	LBS	LM	L
Total number and frequency of meaningful places	432 24%	581 32.4%	764 43.6%	1777 100%
Mean number of meaningful places by participant	10.80 (SD=9.91)	11.17 (SD=5.71)	14.42 (SD=6.99)	12.26 (SD=7.65)
Total number of home places	40	52	53	145
Total number of meaningful places/affordances (excluding home places)	392	529	711	1632
Total number and frequency of social meaningful places/social affordances	144 36.7%	172 32.5%	261 36.7%	577 35.4%
Mean number of social meaningful places by participant	3.60 (SD=3.60)	3.31 (SD=2.80)	4.92 (SD=3.65)	3.98 (SD=3.41)
Total number of functional meaningful places/functional affordances	99 25.2%	138 26%	116 16.3%	353 21.6%
Mean number of functional meaningful places by participant	2.48 (SD=3.05)	2.65 (SD=2.23)	2.19 (SD=2.14)	2.43 (SD=2.44)
Total number and frequency of leisure meaningful places/leisure affordances	95 24.2%	145 27.4%	212 29.8%	452 27.7%
Mean number of leisure meaningful places by participant	2.38 (SD=3.41)	2.79 (SD=2.19)	4.00 (SD=2.84)	3.12 (SD=2.87)
Total number and frequency of emotional meaningful places/emotional affordances	54 13.8%	74 14%	122 17.2%	250 15.3%
Mean number of emotional meaningful places by participant	1.35 (SD=1.76)	1.42 (SD=1.54)	2.30 (SD=2.37)	1.72 (SD=1.98)

Note: number of participants in "L", "LH", "LBS" and "LM" is, respectively, 145, 40, 52 and 53.

4.2.5. Quantification of meaningful places across gender and age in L group

Overall in L group, boys marked 54% of the total number affordances. In terms of age groups, the highest percentage of affordances was reported by participants' age group of 11-12 years old (55.2%), seconded by 13-14 years old (33.9%) and 15-17 years old (10.9%). These results probably go along with the fact that more boys (51.7%) than girls participated in this study; and that there were more children (58.6%) from 11-12 years old group integrating the study sample than in the other two age groups.

4.2.6. Characterization of meaningful places according categories and clusters of affordances in L group.

In social categories of affordances, those with a higher expression of actualization were "being with friends" (20.1%), "being myself" (13.5%), "being with adults" (8.8%), "being with animals" (8.8%) and "being in peace and quiet" (6.8%). As for social clusters, those with higher expression were "relational" and "affectivity" with, 47.3% and 30.7%, respectively. As for the functional category, most actualized affordances were "playing ball games" (13.9%), "riding a bike" (13.9%), "running" (13.3%) and "skating" (11%).

The most expressive functional clusters were "object play" (47.9%) and "locomotor play" (43.1%). As for leisure category, most actualized affordances were "shopping" (18.8%), "cinema" (16.4%), "going out for a meal" (9.7%), "show/concert/disco" (6.9%) and "sports" (6.4%). The most expressive leisure clusters were "cultural activities" and "consumption activities", with 30.5% and 28.5%, accordingly.

As for emotional type of affordances, those that were mostly expressive were "fun" (12%), "calm" (10%), "noisy" (8.8%), and "dangerous" (8.4%).

The most expressive emotional clusters were "stressors" (34.4%) and "feelings" (31.6%). Bellow in Figure 8, clustering of affordances in L group is fully detailed.

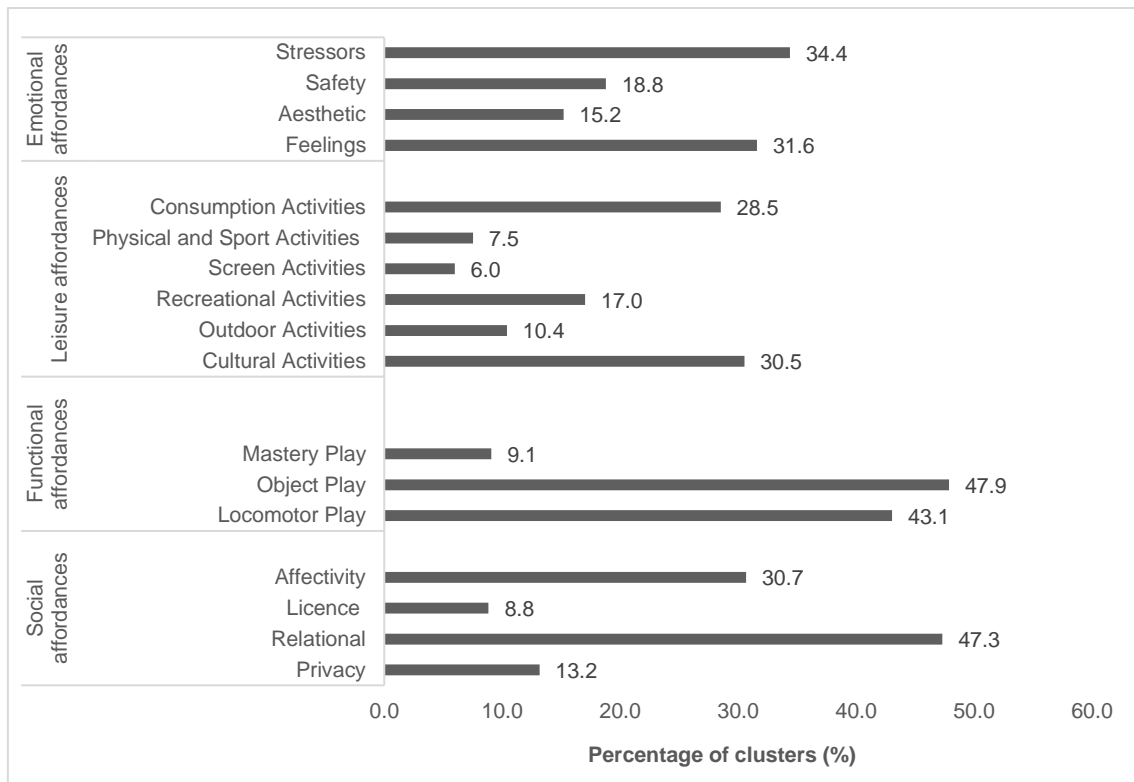


Figure 8-Clusters of affordances in “L” sample

4.2.7. Characterization of meaningful places across gender and age in “L” group

Characterization of meaningful places across gender refers to the frequency variability of expressional categories of affordances that were marked by girls and boys in the whole research group “L”. Girls actualized a higher percentage of social affordances (36.1%), followed by leisure (28.4%), functional (22.5%) and emotional (13%). The categorical trend (social, leisure, functional and emotional) is the same for boys, with 34.7%, 27.1%, 20.9% and 17.3%, accordingly. Hence, in both girls and boys, social affordances which identify social meaningful places are more prevalent than any other types of expressional categories. Results on the three individual research groups (“LH”, “LBS” and “LM”) are available for consultation on in **Appendix 4** (Tables 13, 14, 15).

Qualification of meaningful places across age refers to the frequency variability of expressional categories of affordances that were marked across age groups in the whole study sample “L” (see Table 13, bellow). Here too, social affordances, followed by leisure, functional and emotional applied, except for the oldest age group, where social meaningful places are also more frequent, followed by leisure, emotional and functional. However, the difference between these last two categories is very small, with 18.7% and 18.1%, respectively. Social affordances values on the three groups, from the youngest to the oldest, were, respectively, 34.6%, 35.5% and 39.8%. It seems that as age increases, the frequency of social affordances rises. A possible explanation is that older children are more autonomous when travelling to social meaningful places and more resourceful as to establish social interactions. In this way,

being less dependent on parental chauffeuring, enables young people to be more available to travel independently to meaningful places and, consequently, actualize social affordances.

Results on the three individual research groups (“LH”, “LBS” and “LM”) are available for consultation on in **Appendix 4** (Tables 16, 17, 18).

Table 13-Categories of affordances across age groups in “L” research group (%)

	Categories of affordances in "L"			
	Social	Functional	Leisure	Emotional
11-12 years old	34.6	24	27.2	14.2
13-14 years old	35.5	18.2	30.3	16
15-17 years old	39.8	18.1	23.4	18.7

4.2.8. Urban space typologies use for the actualization of affordances in L group

Bellow in Figure 9, it is possible to visualize the use of urban typologies in the actualization of affordances in L group. Most used typologies were “green space” (19.3%), and “housing space” (16.9%). “School”, “commercial space”, “recreational and leisure space”, “waterfront space”, and “street” come next in terms of place use, with respective values of 11.9%, 11.1%, 10.6%, 8.6% and 6.2%. Under 5% of place use for actualization of affordances, it were found “exterior play and sports space” (4.4%), “other” (4.3%), “neighbourhood space” (4%), and lastly, “square” with 2.6%.

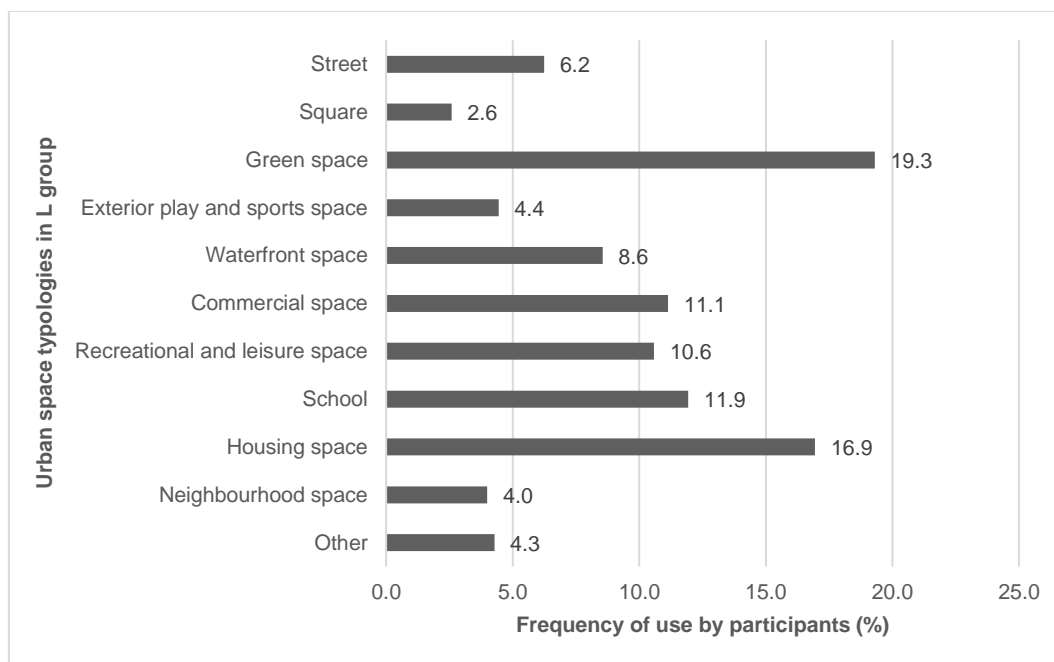


Figure 9-Use of urban typologies in the actualization of affordances by participants in L group

4.2.9. Variability on the use of urban space typologies according gender and across age groups in L group

Descriptive findings on Figure 10 show that participants' privileged urban spaces where more affordances were actualized were green spaces with 19.9% for girls and 18.8% for boys, and housing space with the respective values of 16.2% and 17.6%. Along the eleven space types, girls' frequent use of commercial space was of 12.7%, whereas for boys this value was of 9.8%; and boys' frequent use of exterior play and sports space was of 6.3%, whereas girls' was 2.3%. Descriptive findings on Figure 11 show that for the 11-12 years old age group, most frequent urban spaces to actualize affordances were housing space (19.5%), followed by green space (17.1%) and school (16.7%); for the 13-14 years old group, preference was directed to green space (19.9%), commercial space (14.9%) and housing space (13.9%); for the oldest age group, green space (25%) and housing space (15.2%) correspond to the most frequent used typologies.

Overall, green space and housing space appears to be significant for the actualization of affordances in the three age groups, with a most frequent use by the oldest age group participants (25%). Commercial space for the 13-14 years old age group stands out with 14.9% when compared with values of actualized affordances of the other two groups when using the same space typology. Moreover, school was more prevalent for the actualization of affordances by participants from the youngest age group (16.7%) in comparison with the other two age groups use of such space.

Results on the three individual research groups ("LH", "LBS" and "LM") concerning this section are available for consultation in **Appendix 5** (Figures 4, 5, 6).

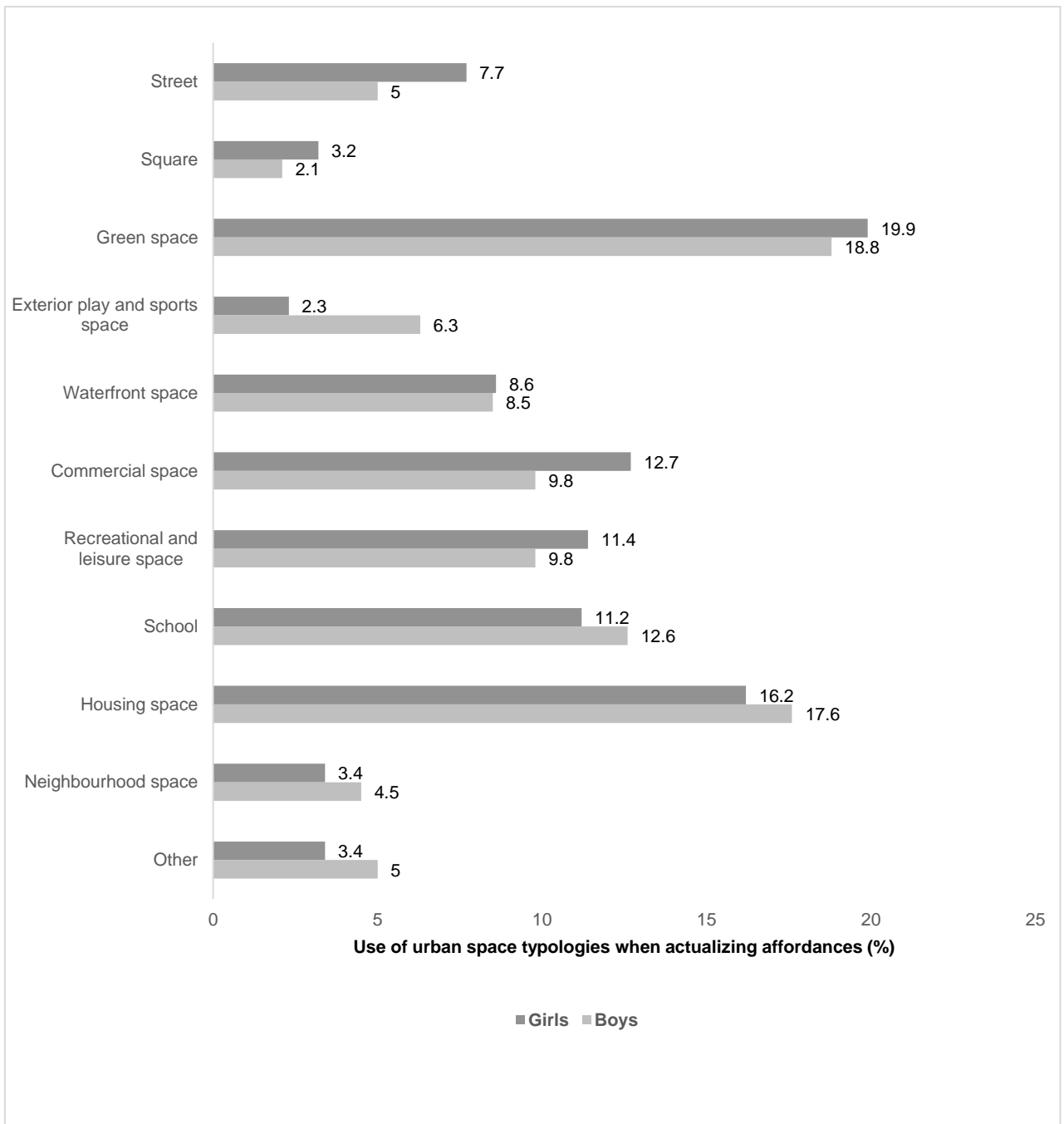


Figure 10-Urban space typologies variability when actualizing affordances across gender in “L” research group

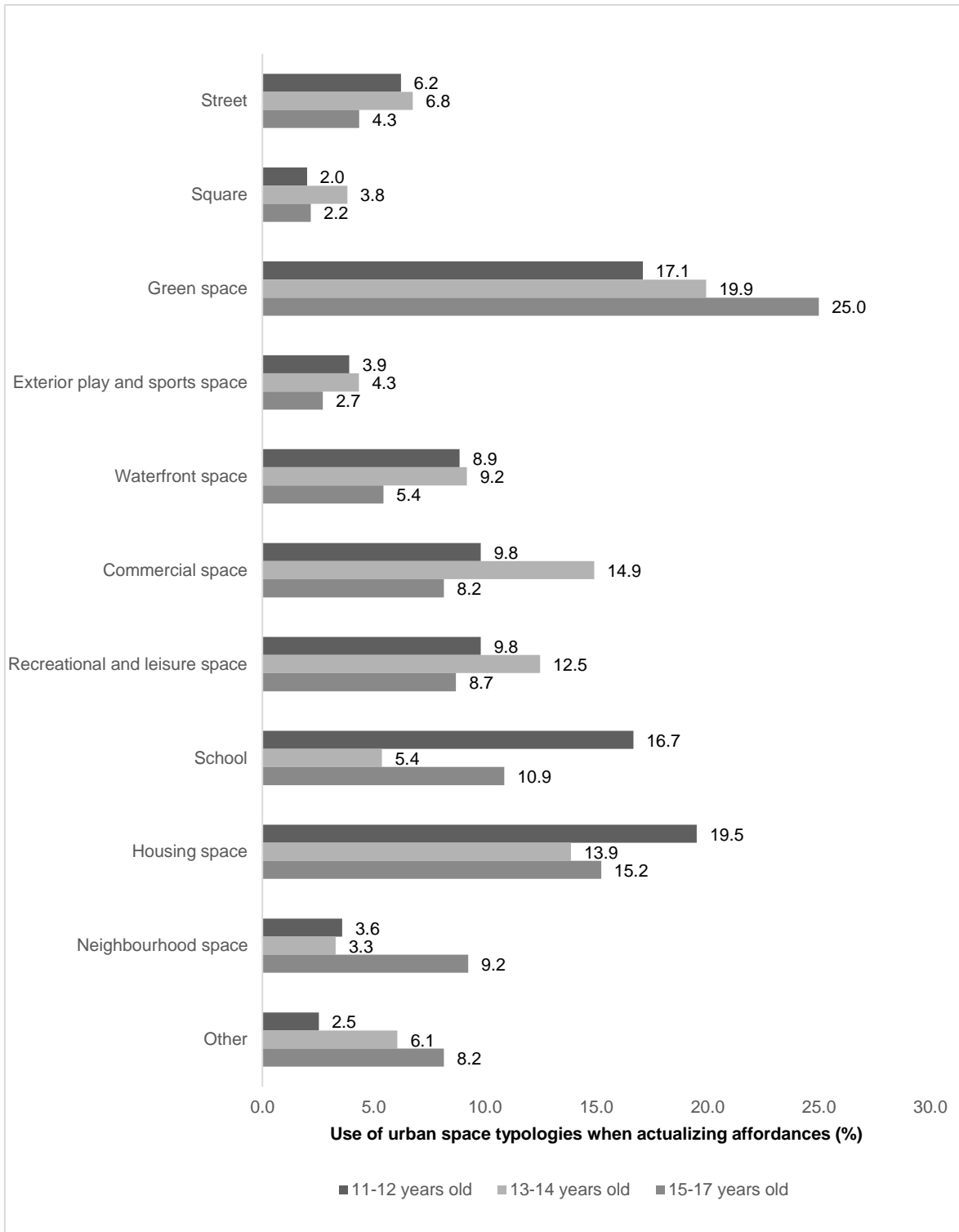


Figure 11-Urban space typologies variability when actualizing affordances across age groups in “L” research group

4.3. Section A- Synthesis of results

In this section, the main goal was to capture a broader understanding of children's transactional behavior in the urban metropolitan area of Lisbon. Therefore, it was essential to focus on the three different geographical areas (west "LH", coastal "LBS" and eastern "LM") as a whole ("L"). Although, there are differences and asymmetries between them, it is also true that they share a cultural trend of children's daily mobility and use of places in urban territories with similar degrees of urbanization located around and within Portuguese main and largest cities (reference).

When children return home from school, motorized travel and non-independent travel is adopted by more participants. The majority of the study's participants does not perceive any environmental fears in the school-home journey; perceived environmental fears were positively referred by only a maximum of 12.9% of participants, namely, traveling alone and being out when it is getting dark. Traffic fears and stranger danger had even a weaker expression with values not superior to 5.3% of participants who positively reported on them.

Mean territorial distance between home and meaningful places was 1.9 Km and mean territorial range was 1.8 Km. Active travel was the most frequently used travel mode used by participants, followed by motorized travel and hybrid travel (public transport). In terms of travel accompaniment, meaningful places are more frequently visited autonomously (independent travel), whereas non-independent travel (with adults) is used less often.

A total of 1777 places were identified, 145 of them were home places corresponding to the total number of research participants' and 1632 corresponding to affordances distributed in four expressional categories (social, functional, leisure and emotional). Mean number of meaningful places (affordances) by participant was of 12.26.

In L group, within social categories of affordances, those with a higher expression of actualization were "being with friends" (20.1%), "being myself" (13.5%), "being with adults" (8.8%), "being with animals" (8.8%) and "being in peace and quiet" (6.8%). As for social clusters, those with higher expression were "relational" and "affectivity" with, 47.3% and 30.7%, respectively. As for the functional category, most actualized affordances were "playing ball games" (13.9%), "riding a bike" (13.9%), "running" (13.3%) and "skating" (11%). The most expressive functional clusters were "object play" (47.9%) and "locomotor play" (43.1%). As for leisure category, most actualized affordances were "shopping" (18.8%), "cinema" (16.4%), "going out for a meal" (9.7%), "show/concert/disco" (6.9%) and "sports" (6.4%). The most expressive leisure clusters were "cultural activities" and "consumption activities", with 30.5% and 28.5%, accordingly. As for emotional type of affordances, those that were mostly expressive were "fun" (12%), "calm" (10%), "noisy" (8.8%), and "dangerous" (8.4%). The most expressive emotional clusters were "stressors" (34.4%) and "feelings" (31.6%).

Boys marked 54% of all affordances, and in terms of age groups, the highest percentage of affordances was reported by participants' age group of 11-12 years old seconded by 13-14 years old, and 15-17 years old. These results probably go along with the fact that more boys than girls participated in this study; and that there were more children from 11-12

years old group integrating the study sample than in the other two age groups. Participants marked more social affordances (social meaningful places) followed by leisure, functional and emotional affordances. This trend is the same when comparing boys and girls and for the 11-12 and 13-14 years old age groups. In the oldest age group, the trend is social, leisure, emotional and functional. As age increases, the frequency of social affordances marked by participants rises. A possible explanation is that older children are more autonomous when travelling to social meaningful places and more resourceful as to establish social interactions. In this way, being less dependent on parental chauffeuring, enables young people to be more available to travel independently to meaningful places and, consequently, actualize social affordances.

Urban typologies mostly used for the actualization of affordances were “green space” and “housing space”. Green space and house space is more predominant for the oldest age group; commercial space for the 13-14 years old age group; and school for the youngest age group. Descriptive gender differences were found in the use of “commercial space” and “exterior play and sports” space. In the former, girls’ frequent use of commercial space was higher than boys’ and, for the latter, the opposite trend was verified.

4.4. Section B- Comparative landscapes of children’s transactional behavior”

4.4.1. Actualization of affordances in “LH”, “LBS” and “LM”

These results are analyzed in terms of the highest expression of affordances (%) in each research group. More detailed information regarding frequency of all actualized affordances for each individual research group (LH, LBS and LM) can be consulted in **Appendix 5** (Figures 11, 12, 13). In LH the most expressive affordances, in a set of 63 marked by participants, were being with friends (8.7%), being myself (4.6%) and shopping (4.3%). In LBS, considering a set of 66 affordances, the most expressive affordances were shopping (6.8%), being with friends (6.2%) and cinema (5.7%). As for LM, and considering a set of 66 affordances, being with friends (6.9%), being myself (5.1%), followed by cinema and shopping with 4.6% and 4.5%, respectively, constitute the highest frequencies of actualized affordances. In this way, being with friends, being myself, and shopping constituted a common ground of affordances in the three research groups.

4.4.2. Actualization of affordances in each expressional categories in “LH”, “LBS” and “LM”

These results are analyzed by frequency of actualized affordances within specific expressional categories of affordance in each research group. Actualized social, functional, leisure and emotional affordances across research groups is depicted in Figure 12, Figure 13, Figure 14, and Figure 15, accordingly.

4.4.2.1. Actualization of social affordances in LH, LBS and LM

Regarding social affordances, being with friends (varying approximately from 19% to 24%) followed by being myself (varying approximately from 13% to 14%) constituted those that across the three groups displayed highest frequencies of actualization. More specifically, being with friends was more expressive in LH (23.6%), seconded by LBS (19.2%) and tailed by LM (18.8%); as for being myself, it was more prevalent in LBS (14%), LM (13.8%) and LH (12.5%). Actualization of social affordances in L group can be consulted in **Appendix 5** (Figure 7).

4.4.2.2. Actualization of functional affordances in LH, LBS and LM

As for functional affordances, the top frequencies were found in LM group in riding a bike (20.7%), playing ball games (19.8%) and skating (16.4%). In LBS, running (14.5%), riding a bike (12.3%) and going on the swings (12.3%) were the most expressive affordances. In LH, the most frequent actualized affordances were playing ball games (13.1%); with values of 12.1% each, playing hide and catch, going on the swings and running; and with percentages under the previous value and over 10%, walking, and skating. From these results, the functional affordances that stand out in the transactional landscapes of the three groups are riding a bike, playing ball games, skating, running and going on the swings. Actualization of functional affordances in L group can be consulted in **Appendix 5** (Figure 8).

4.4.2.3. Actualization of leisure affordances in LH, LBS and LM

In this category of affordances and across the three groups, shopping and cinema, varying approximately from 15% to 25% and from 12% to 21%, respectively, constituted those displayed highest frequencies of actualization. More specifically, shopping was more expressive in LBS (24.8%); followed by LH (17.9%) and LM (15.1%); as for cinema, it was more prevalent in LBS (20.7%), LM (15.6%) and LH (11.6%). Actualization of leisure affordances in L group can be consulted in **Appendix 5** (Figure 9).

4.4.2.4. Actualization of emotional affordances in LH, LBS and LM

The affordance “fun” was actualized more frequently in in the three research groups, with a higher expression on LH (13%), followed by LBS (12.2) and LM (11.5%). Also, and specifically in LH group, the affordances “calm” and “pretty” showed an expression over 10%, more precisely 13% in the former and 11.1% in the latter. Actualization of emotional affordances in L group can be consulted in **Appendix 5** (Figure 10).

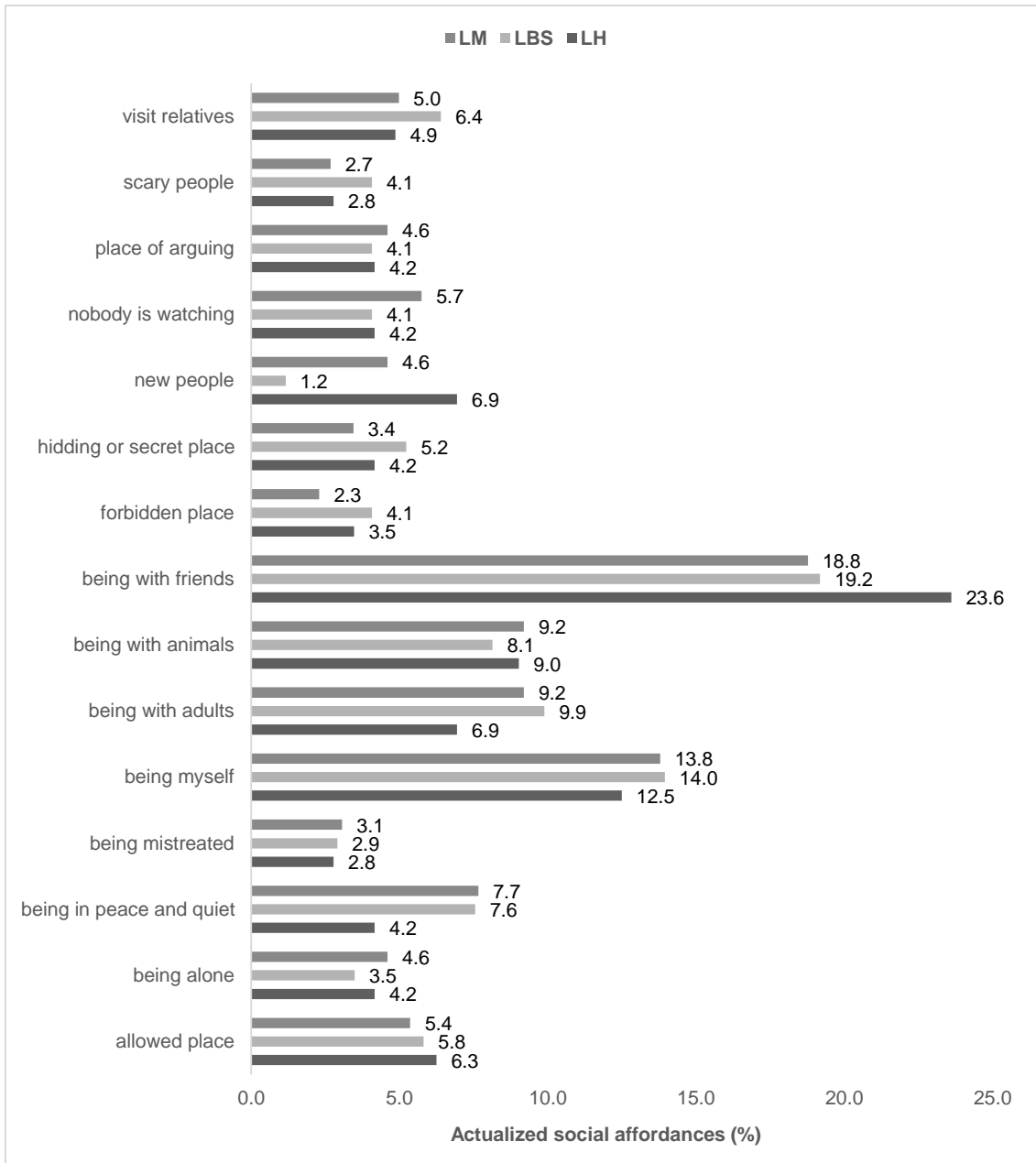


Figure 12-Actualized social affordances across LH, LBS and LM groups

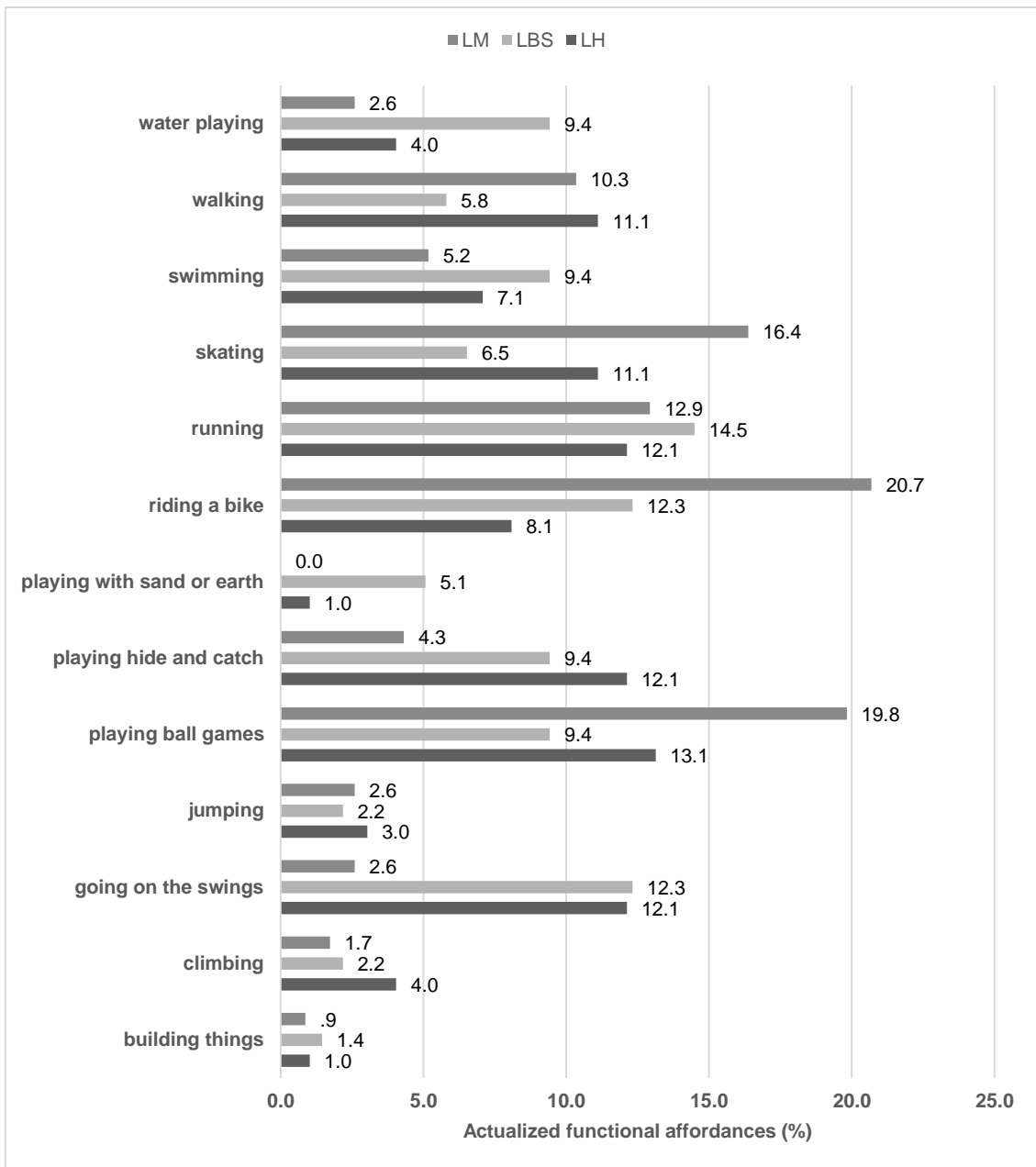


Figure 13-Actualized functional affordances across LH, LBS and LM groups

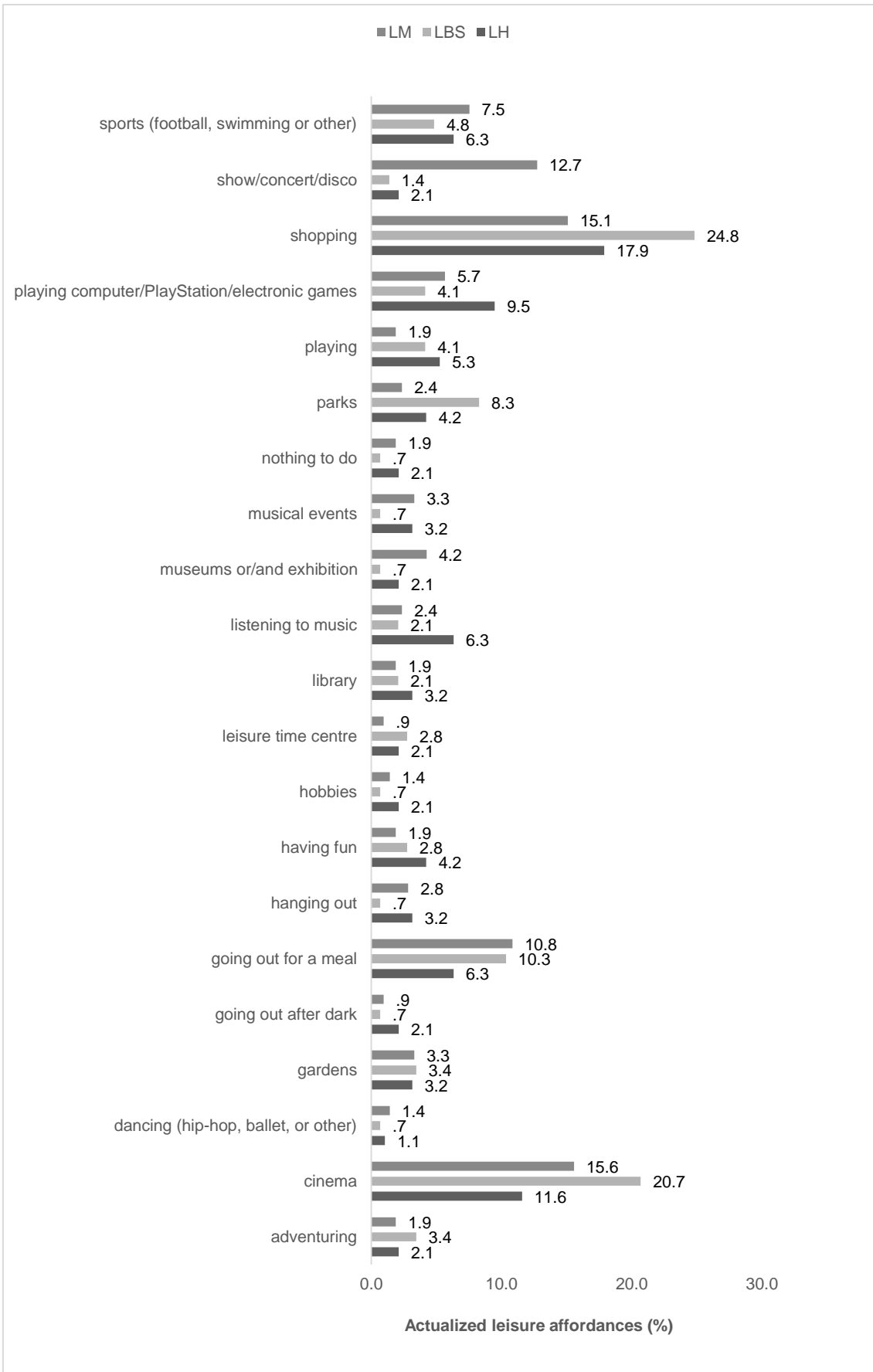


Figure 14-Actualized leisure affordances across LH, LBS and LM groups

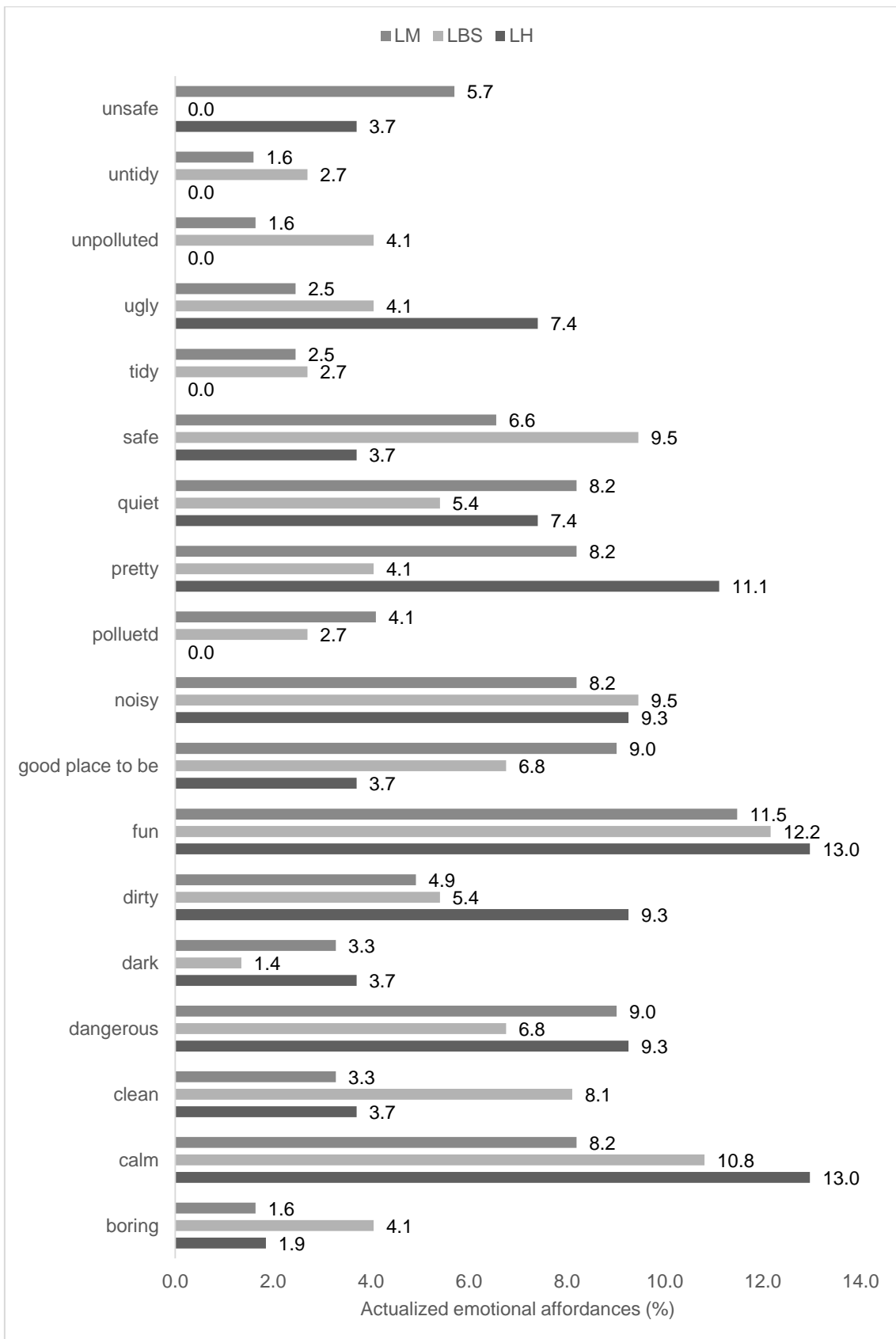


Figure 15-Actualized emotional affordances across LH, LBS and LM groups

4.4.3. Real and Ideal actions/activities command within functional and leisure affordances in “LH”, “LBS” and “LM” research groups

In “LH”, most functional and leisure affordances were considered by participants as being child-led when actualized (81.1%) in reality. Ideally, if given the choice, participants would like for more of these affordances to be child-led (88.1%). In “LBS”, these values were of 69.1% and 93.7%, respectively in each scenario. As for “LM”, these percentages were 68.2% and 93.5%. Overall, and although most functional and leisure affordances were found to be child led, it is clear an increase on the frequency of child-led affordances in an ideal setting, including an overwhelming majority.

4.4.4. Clusters of actualized affordances according to expressional categories in “LH”, “LBS” and “LM” research groups

Considering LH group (Figure 16), in social category of affordances, affordances that integrate the “affectivity” and “relational” clusters were more frequently actualized, with values of 26.4% and 51.4%, respectively. In functional category of affordances, affordances that integrate “object play” and “locomotor play” were more frequently actualized, with values of 44.4% and 49.5%. Regarding leisure category of affordances, affordances that integrate the “recreational, “consumption and cultural activities” clusters were more predominant, with 27.4%, 24.2% and 22.1%, respectively. As for emotional category of affordances, the most predominant clusters were “stressors” (33.3%) and “feelings” (31.5%).

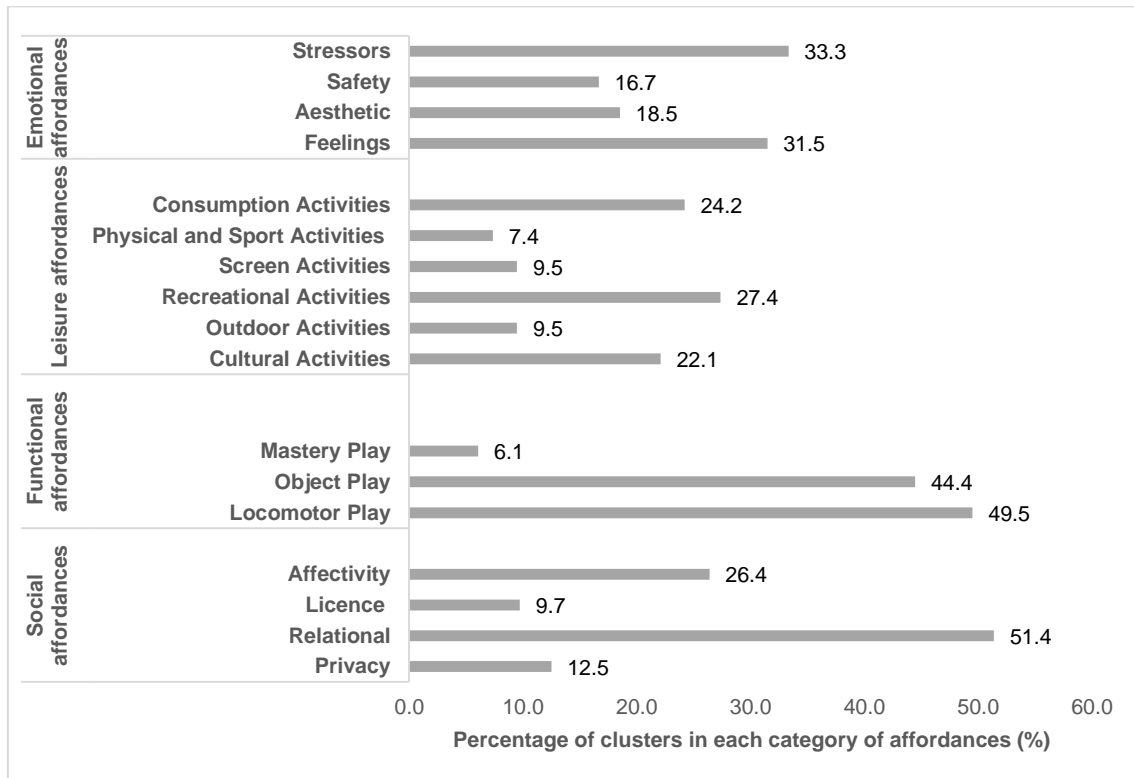


Figure 16-Clusters of affordances in “LH” group

Considering LBS group (Figure 17), in social category of affordances, affordances that integrate the “affectivity” and “relational” clusters were more frequently actualized, with values of

32.6% and 44.8%, respectively. In functional category of affordances, affordances that integrate “object play” and “locomotor play” were more frequently actualized, with values of 40.6% and 43.5%. Regarding leisure category of affordances, affordances that integrate the “consumption and “cultural activities” clusters were more predominant, with 35.2% and 25.5%, respectively. As for emotional category of affordances, the most predominant clusters were “stressors” (36.5%) and “feelings” (33.8%).

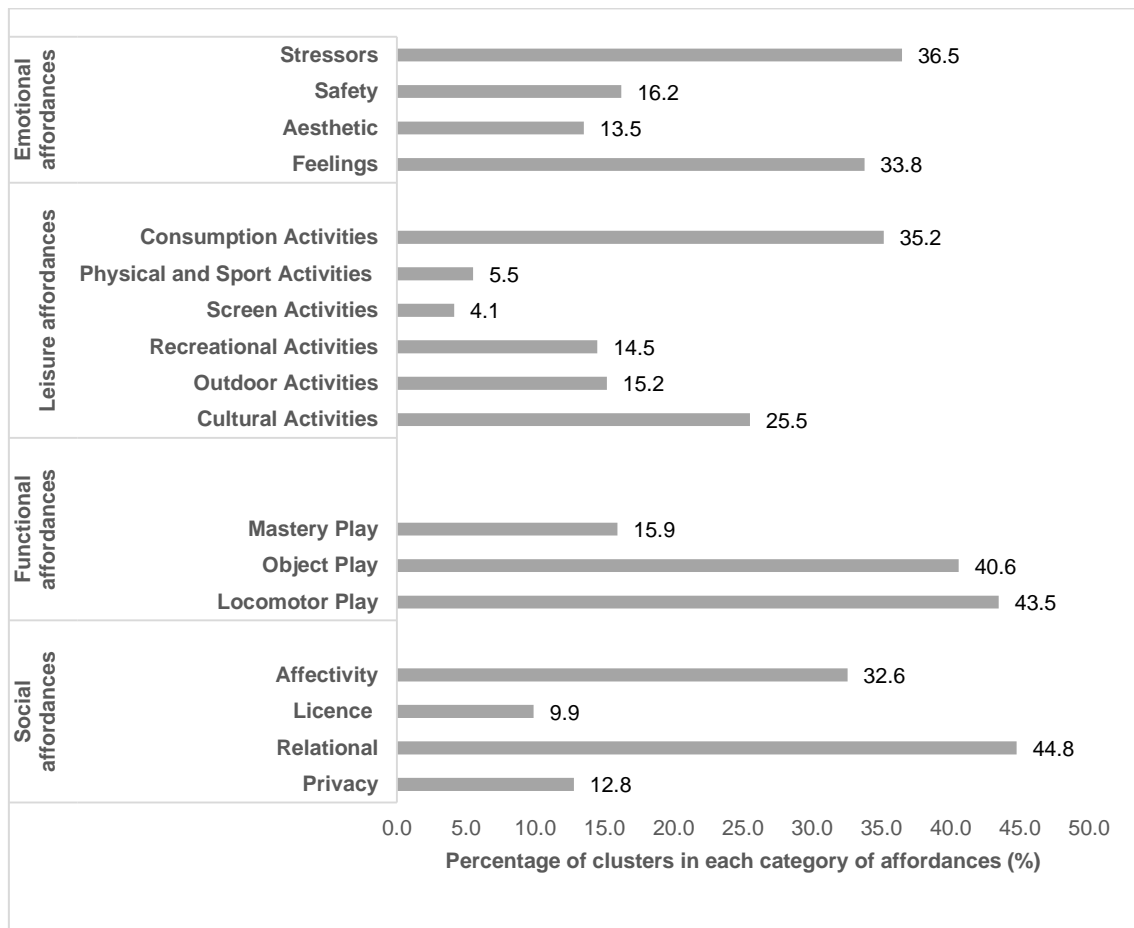


Figure 17-Clusters of affordances in “LBS” group

Considering LM group (Figure 18), in social category of affordances, affordances that integrate the “affectivity” and “relational” clusters were more frequently actualized, with values of 31.8% and 46.7%, respectively. In functional category of affordances, affordances that integrate “object play” and “locomotor play” were more frequently actualized, with values of 59.5% and 37.1%. Regarding leisure category of affordances, affordances that integrate the “consumption and “cultural activities” clusters were more predominant, with 25.9% and 37.7%, respectively. As for emotional category of affordances, the most predominant clusters were “stressors” (33.6%) and “feelings” (30.3%).

Across the three groups, clusters which were more expressive were “affectivity” and “relational” in social affordances; “locomotor play” and “object play” in functional affordances;

“consumption activities” and “cultural activities” (and “recreational activities” in LH) in leisure affordances; and “stressors” and “feelings” in emotional affordances.

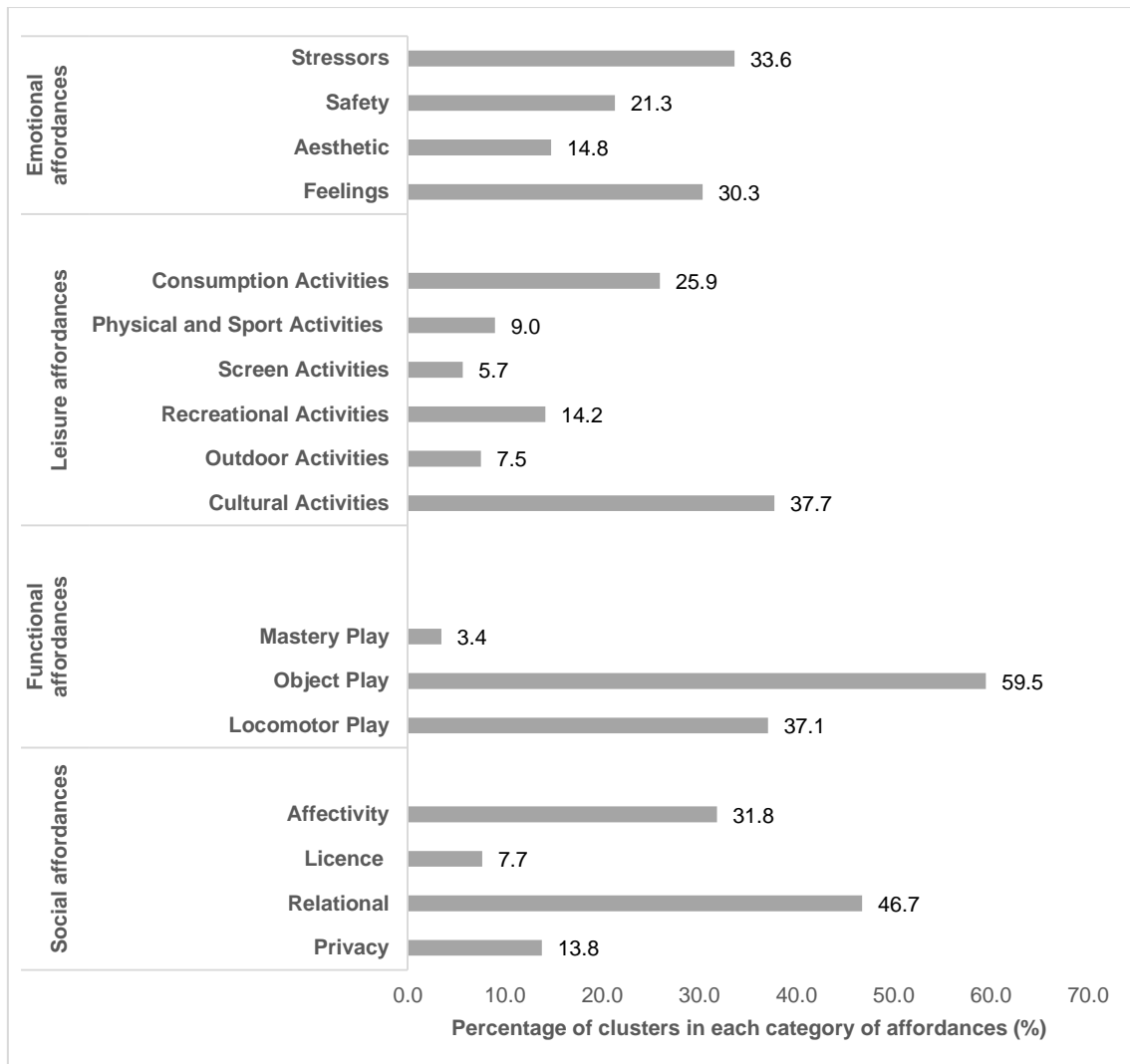


Figure 18-Clusters of affordances in “LM” group

4.4.5. Likeability degree of meaningful places in “LH” , “LBS” and “LM” research groups

In the three research groups most places were found by participants to be pleasant, with values of 77.4%, 84% and 87.4% for LH, LBS and LM groups, respectively. In LH group, 11.6% of places were considered unpleasant and 11% simultaneously unpleasant and pleasant. These values were of 8.9% and 7.1% for LBS, according each of the previous likeability category; and of 9.3% and 3.3% for the LM group. Overall the majority of meaningful places where affordances were actualized was considered by participants as pleasant.

4.4.6. Territorial distance and territorial range to meaningful places in “LH”, “LBS” and “LM” groups

Territorial distance in the three research groups varies from 1.4Km to 2.7 Km, and distance travelled independently by participants (territorial range) from 1.3 Km to 2.2 Km (Table 14) The longest territorial distance and range children have to travel when going to meaningful places is in LH group followed by LM and LBS groups. The biggest discrepancy in between both variables happens in the LH group. In both LBS and LM groups, territorial distance and territorial range are practically coincident.

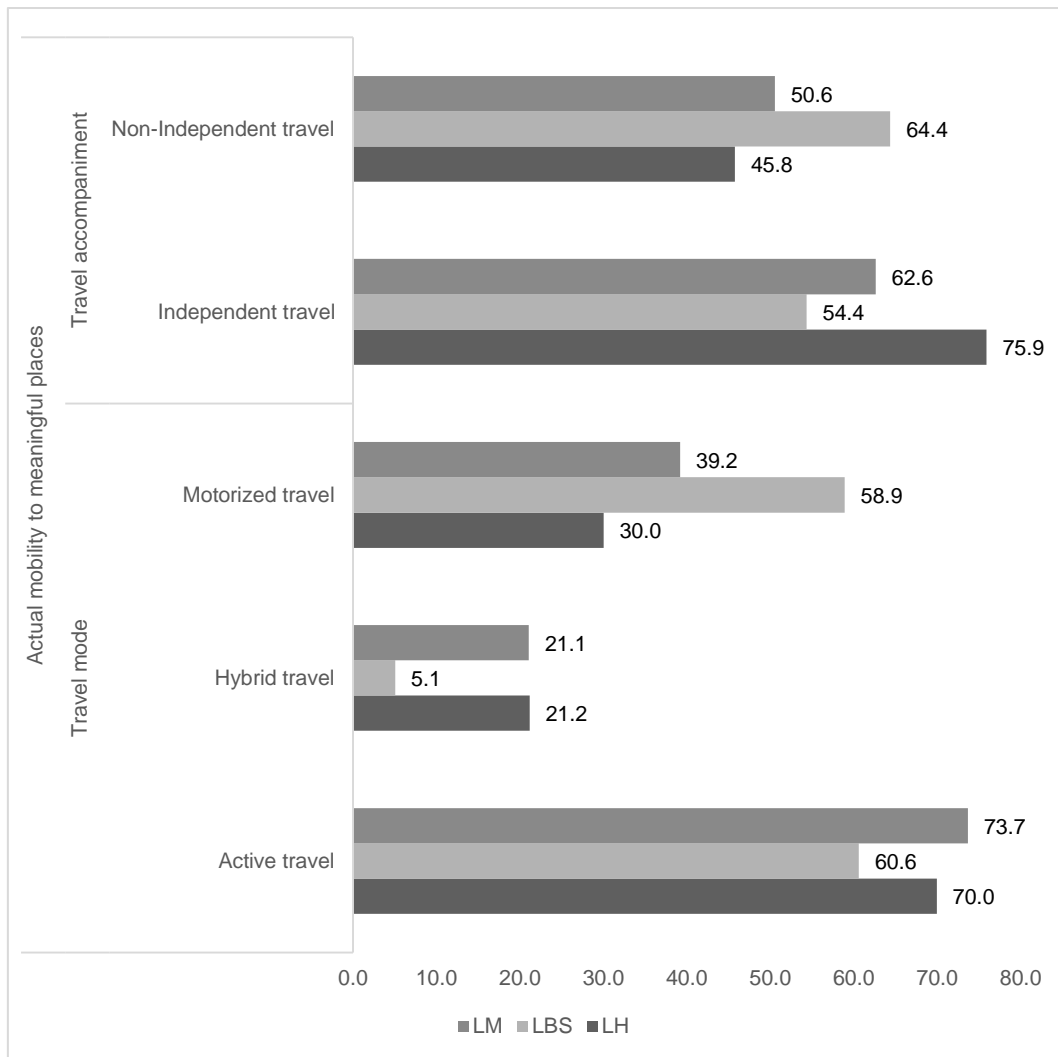
Table 14-Territorial distance and territorial range to meaningful places in “LH”, “LBS” and “LM” groups

Research samples	Territorial distance to meaningful places		Territorial range to meaningful places	
LH	2.7 Km	<i>M</i> =2.710 <i>SD</i> =3.278	2.2 Km	<i>M</i> =2.256 <i>SD</i> =3.026
LBS	1.4 Km	<i>M</i> =1.376 <i>SD</i> =1.538	1.3 Km	<i>M</i> =1.326 <i>SD</i> =1.539
LM	1.8 Km	<i>M</i> =1.839 <i>SD</i> =2.455	1.9 Km	<i>M</i> =1.855 <i>SD</i> =2.488

4.4.7. Actual mobility to meaningful places in “LH”, “LBS” and “LM” groups

In each group, active travel was always more frequently used to access meaningful places than the other two modes of travel, with, 70%, 60.6% and 73.7% in the LH, LBS and LM groups, respectively (Figure 19). In terms of travel accompaniment, meaningful places are more frequently visited autonomously (independent travel) in the LH and LM groups, with 75.9%, 62.6%, accordingly (Figure 19). Specifically for the LBS group, non-independent travel mode (64.4%) was more frequent than independent travel (54.4%). This finding is in consonance with the value found in motorized travel for LBS group (58.9%) because non-independent travel in children and young people is usually associated with being driven to places.

When comparing LH, LBS and LM groups, the use of public transportation (hybrid) when travelling to meaningful places was lowest in the “LBS” group with a value of 5.1%; motorized travel was more frequently used by participants from LBS group (58.9%); independent travel with a value of 75.9% was more prevalent in LH; and active travel was more frequent in LM group (73.7%).



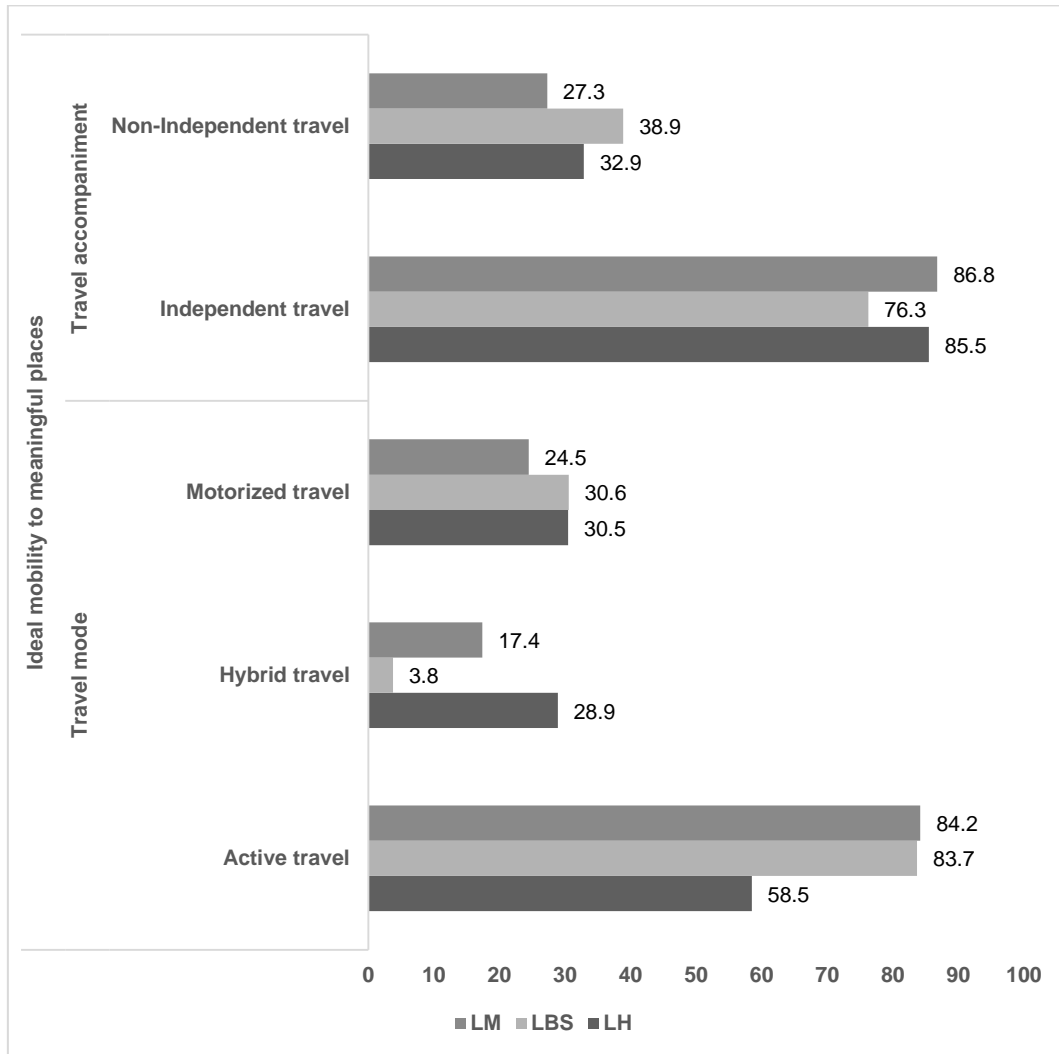
Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 19-Actual mobility to meaningful places in “LH”, “LBS” and “LM” research groups. Percent of actual travel modes and actual travel types of accompaniment (%)

4.4.8. Ideal mobility to meaningful places in “LH”, “LBS” and “LM” groups

In LBS and LM groups the desire to use active travel, in an ideal scenario, when going to meaningful places is clearly demonstrated with percentages of 83.7% and 84.2% in each group, respectively (Figure 20). Ideal active travel values are higher than those reported in actual mobility to meaningful places, as demonstrated previously. In the LH group, ideally active travel would be less used than in the real situation, with 58.5% (ideal) *versus* 70% (actual active travel, see Figure 19). This is probably explained by the fact that in this group hybrid travel would ideally increase to 28.9% when compared with the use of this travel mode in daily mobility (21.2%, see Figure 19). Additionally, by comparing actual with ideal motorized travel mode, a decrease in all three groups is found (see Figure 19 and Figure 20). Concerning ideal travel accompaniment to meaningful places (Figure 20), in the three groups it was found a consensual and overwhelming preference for autonomous travelling. The highest value was

found in LM (86.8%), seconded by LH (85.5%) and LBS (76.3%). These percentages are superior to those found in independent travel on actual mobility (see Figure 19). Moreover, it was found that ideally non-independent travel to meaningful places would decrease below 40% in the three groups (Figure 20) than to what was found in actual mobility, above 45% (Figure 19).



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 20-Ideal mobility to meaningful places in “LH”, “LBS” and “LM” research groups. Percent of ideal travel modes and ideal travel types of accompaniment (%)

4.4.9. Characterization of urban space typologies used by children as meaningful places across LH, LBS and LM

The use of urban space typologies by children when actualizing affordances is demonstrated below on Table 15. In LH, participants use more frequently green spaces (26.9%) followed by housing space (18.5%); as it occurs with LBS group, with values of 20.3% and 17.4%. Regarding LM group, the urban spaces mostly used by participants were housing space (15.7%) followed by recreational and leisure ones (14.8%) and green spaces (14.3%).

By cross-reading percent values in the three groups, green space, commercial space, housing space and school stand out as consistent meaningful urban typologies for children to actualize affordances, whereas all other five typologies, for the exception of recreational and leisure space in LM and waterfront space in LBS, have a reduced expression of under 10% (street, square, exterior play and sports space, neighbourhood space and other)

When comparing in between the three research groups, descriptive findings show differences across three research groups. In our view, some of those relevant dissimilarities which we chose to underline may be due to geographic characteristics of places, to mobility behavioral specificities and to sociocultural differences. In LH, green space was more used than in the other two groups; in LBS, water front space was more used than in the other two groups. In LM, recreational and leisure spaces are more used than in the other two groups.

Table 15-Percentage of urban space typologies used by children as meaningful places across the three research groups (%)

URBAN SPACE TYPOLOGIES	RESEARCH GROUPS		
	LH	LBS	LM
Street	6.5	5.9	6.4
Square	2.5	.5	4.2
Green space	26.9	20.3	14.3
Exterior play and sports space	4.2	4.5	4.6
Waterfront space	2.5	13.9	7.9
Commercial space	10.0	11.2	11.8
Recreational and leisure space	7.6	7.2	14.8
School	11.1	13.6	11.1
Housing space	18.5	17.4	15.7
Neighbourhood space	6.3	3.3	3.3
Other	3.9	2.2	6.0

4.5. Section B- Synthesis of results

There are characterizing aspects which are specific to each research group, namely, the fact that geographical locations of each group are different; high socioeconomic status shared in LM participants, whereas in LH and LBS exists a shared heterogeneous socioeconomic status; and specific urbanizing features in each group. The main goal of this section was to establish comparisons and differences on mobility, affordances and urban space use across LH, LBS and LM groups, underlying results that reflect communalities and differences among them.

In LH, the most expressive affordances were being with friends, followed by being myself, and shopping. In LBS, this trend was shopping, being with friends and cinema. As for LM, being with friends comes first seconded by being myself, cinema and shopping. Hence,

being with friends, being myself, and shopping constituted a common ground of affordances in the three groups.

Regarding social affordances, being with friends, followed by being myself constituted those that across the three groups displayed highest frequencies of actualization. As for functional affordances, those that stand out are riding a bike, playing ball games, skating, running and going on the swings. In leisure affordances, shopping and cinema constituted those displayed highest frequencies of actualization. As for emotional affordances, “fun” was actualized more frequently in the three groups. Across the three groups, most expressive clusters were “affectivity” and “relational” in social affordances; “locomotor play” and “object play” in functional affordances; “consumption activities” and “cultural activities” (and “recreational activities” in LH) in leisure affordances; and “stressors” and “feelings” in emotional affordances.

Overall, most functional and leisure affordances were found to be child led and it was found an increase reaching an overwhelming majority on the frequency of child-led affordances in an ideal setting. Also, in the three groups, the majority of meaningful places was considered as pleasant.

Territorial distance in the three groups varies from 1.4Km to 2.7 Km, and territorial range from 1.3 Km to 2.2 Km. The longest territorial distance and range children have to travel when going to meaningful places is in LH followed by LM and LBS . In each group, active travel was always more frequently used to access meaningful places than the other two modes of travel, with, 70%, 60.6% and 73.7% in the LH, LBS and LM, respectively. The use of public transportation (hybrid) when travelling to meaningful places was lowest in LBS; motorized travel was more frequently used by participants from LBS; independent travel with a value of 75.9% was more prevalent in LH; and active travel was more frequent in LM (73.7%).

In LBS and LM, desire to use active travel, in an ideal scenario, when going to meaningful places is clearly demonstrated with percentages of 83.7% and 84.2%, respectively. In LH, ideally active travel would be less used than in the real situation, probably because hybrid travel ideally increased when compared with this daily value. Additionally, by comparing actual with ideal motorized, a decrease was found in all three groups. Concerning ideal travel accompaniment to meaningful places in the three groups, it was found a consensual and overwhelming preference for autonomous travelling, and these values are superior to those found in independent travel on actual mobility. Moreover, it was found that ideally non-independent travel would drastically decrease compared with non-independent travel in actual mobility.

In the three groups, green space, commercial space, housing space and school stand out as most frequent meaningful urban typologies for children to actualize affordances, whereas all other five typologies (street, square, exterior play and sports space, neighbourhood space and other) for the exception of “recreational and leisure spaces” in LM, and “waterfront space” in LBS have a reduced expression of under 10%. Also, in LH, green space was more used than in

the other two groups; in LBS, water front space was more used than in the other two groups. In LM, recreational and leisure spaces are more used than in the other two groups.

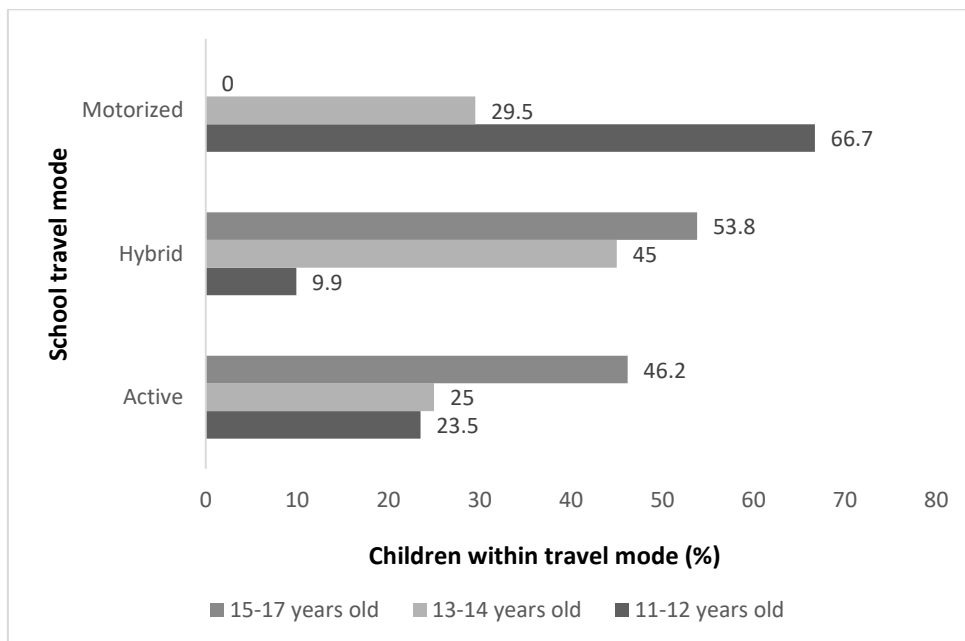
4.6. Section C- Interplay of variables on the landscapes of children’s transactional behaviour

4.6.1. School-home mobility in “L” group

4.6.1.1. Age groups and actual school-home mobility

There is a significant association between age groups and travel modes from home to school (*Fisher’s test, $p < .001$*), as described in Figure 21. Considering active travel mode (walking or cycling), this value rises as participants’ age increases (23.5%, 25% and 46.2%, for 11-12 years old, 13-14 years old and 15-17 years old, respectively). As for hybrid travel (public transportation), this value also rises with participants’ age (9.9%, 45% and 53.8%, according each of the previous mentioned age groups). Regarding motorized travel, conversely, and as expected, these values decrease as participants’ age increases (66.7%; 29.5% and 0% from younger to older age groups). As for independent travel in the school-home journey, it was found to significantly increase as participants’ age rises, with values of 29.3%, 65.1% and 84.6%, in the 11-12, 13-14 and 15-17 years old groups, respectively ($\chi^2(2) = 23.39, p < .001$).

Hence, in the school-home journey, for young age groups (11-12 years old) motorized travel is very expressive, hybrid travel practically inexistent and active travel is scarce; as age increases to 13-14 years old, motorized travel decreases significantly to 29.5% and simultaneously hybrid travel increases to 45%; in older age groups (15-17 years old), motorized travel is non-existent, and active and hybrid travel modes are dominant; independent travelling is practiced by only 29.3% of younger children (11-12 years old), however rises significantly to 65.1% and to 84.6% of participants when children are aged between 13-14 and 15-17 years old, respectively.



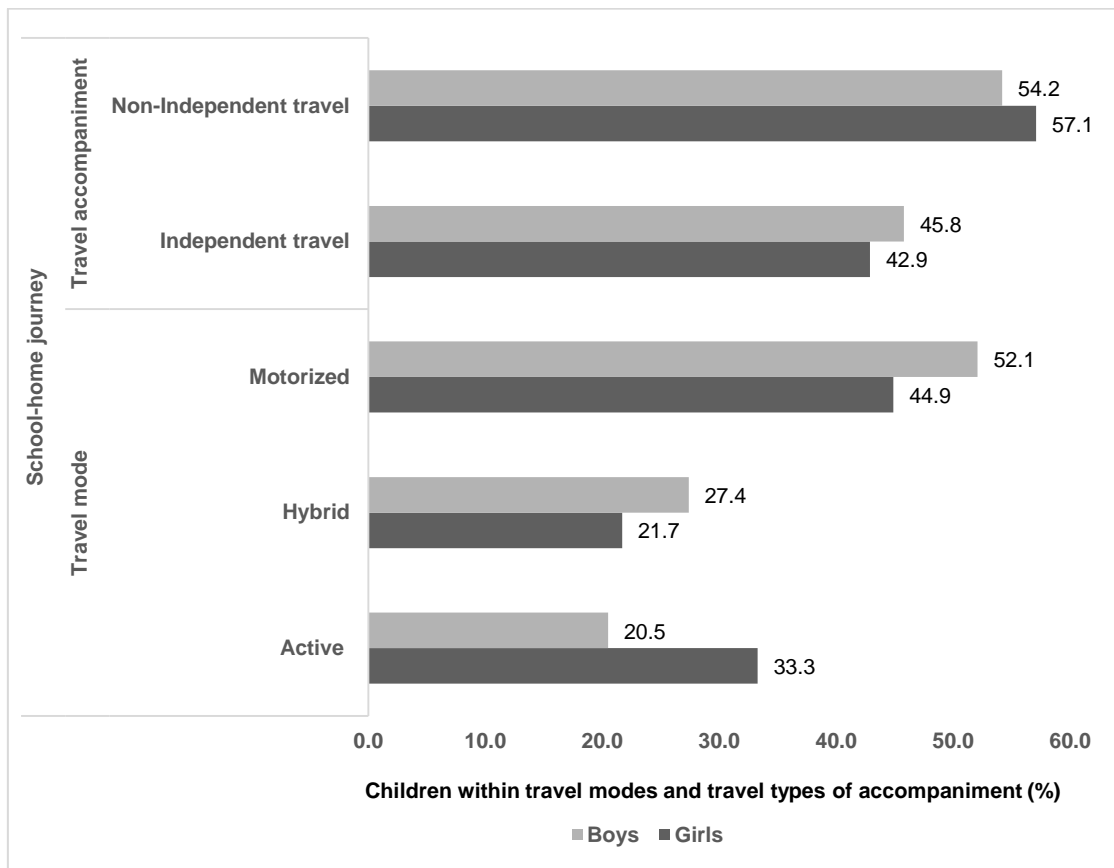
Note: The answers on travel modes and travel types of accompaniment are single choice and therefore they are mutually exclusive

Figure 21-School-home actual travel mode according age group in “L” group

In this section results only focused on overall research group (“L”) are dealt. Descriptive results on the previous topic for the three individual research groups (“LH”, “LBS” and “LM”) are available in **Appendix 4** (Tables. 1, 2, 3).

4.6.1.2. Gender and actual school-home mobility

Results indicate that there was no statistical significance relationship between gender and children’s actual school-home travel mode ($p >.05$) and travel accompaniment ($p >.05$). Therefore gender does not appear as an influential variable in terms of actual school-home mobility in “L” research group. However, descriptive findings (Figure 22) indicate that more girls (33.3%) than boys (20.5%) travel actively from school to home. For further consultation, descriptive results on the previous topic for the three individual research groups (“LH”, “LBS” and “LM”) are available in **Appendix 4** (Tables 4, 5, 6).



Note: The answers on travel modes and travel types of accompaniment are single choice and therefore they are mutually exclusive
Figure 22-Actual school- home mobility according gender in “L” research group

4.6.1.3. School-home distance and actual school-home mobility

There was a significant effect of school distance on children's mode of travel from school to home in "L" research group [*Welch's F*(2, 72.92) = 8.65, $p < .001$]. Post hoc comparisons indicated that significant differences were found on the mean school-home distances travelled actively and by hybrid travel mode, and between those on active and motorized travel modes. However, no significant differences on mean distances were found between hybrid and motorized travel modes. The mean distance travelled actively is significantly smaller ($M=1125$, $SD=2113$) than mean distances using hybrid travel mode ($M=3174$, $SD=2450$) ($p=.001$) and motorized travel mode ($M=2578$, $SD=2062$) ($p=.003$). These results indicate that participants' active travel from school to home takes place if school-home mean distance is around 1.1Km. This is particularly relevant when taking in consideration that mean distance between school and home was found to be 2.3Km.

In terms of school-home travel accompaniment, no significant differences were found on the mean distance travelled independently and non-independently. These results show that school-home distance is not influential on the choice of travel accompaniment in this journey.

4.6.1.4. Actual and Ideal school-home mobility

Significant differences were found between children's actual and ideal school-home mobility (Table 16). In reality, a small percentage of children in the "L" research group travel actively from home to school (27%), and nearly half of the children report travelling autonomously in this journey (44.3%). By considering independent travel associated with active travel (since children are not allowed to legally drive cars) the previous two results may be found incoherent. However, descriptive analysis found that public transportation (hybrid travel) was used by 24.6% of participants (

Table 17). Hybrid travel may afford independent travel, and if that is the case here, value of active travel would in fact be very similar to those of independent travel, decreasing in about 24.6% value of non-active travel and increasing this same percentage on value of active travel. Ideally, more children would like to travel actively from school to home (66 %,) and 85% of them would like to do this journey independently (

Table 17). Again, this discrepancy between ideal active and independent travel is explained if we consider percentages of ideal hybrid travel (12.7%). Hence, considering descriptive based results (

Table 17) and those from the *McNemar* test (Table 16) it is possible to affirm that the vast majority of children in "L" research group would like to be more active, decrease car transportation, and be more autonomous in the school-home journey.

Table 16-Actual vs. Ideal school-home mobility in "L" sample

			Real mobility	Ideal mobility	Statistical significance
School-home journey	Travel mode	Active travel	27.0	66.0	p < .001
		Non-Active travel	73.0	34.0	
	Travel accompaniment	Independent travel	44.3	85.0	p < .001
		Non-Independent travel	55.7	15.0	

Note: The answers on travel modes and travel types of accompaniment are single choice and therefore they are mutually exclusive

Table 17-Actual and Ideal school-home mobility in "L" sample

			Real mobility	Ideal mobility
School-home journey	Travel mode	Active travel	26.8	65.5
		Hybrid travel	24.6	12.7
		Motorized travel	48.6	21.8
	Travel accompaniment	Independent travel	44.4	84.6
		Non-Independent travel	55.6	15.4

Note: The answers on travel modes and travel types of accompaniment are single choice and therefore they are mutually exclusive

4.6.2. Interplay of mobility, affordances and urban space considering meaningful places as multidimensional (AP) in "L" group

4.6.2.1. Age and actual mobility to meaningful places

Bellow in Figure 23, it is possible to visualize the influence of age on actual mobility to meaningful places.

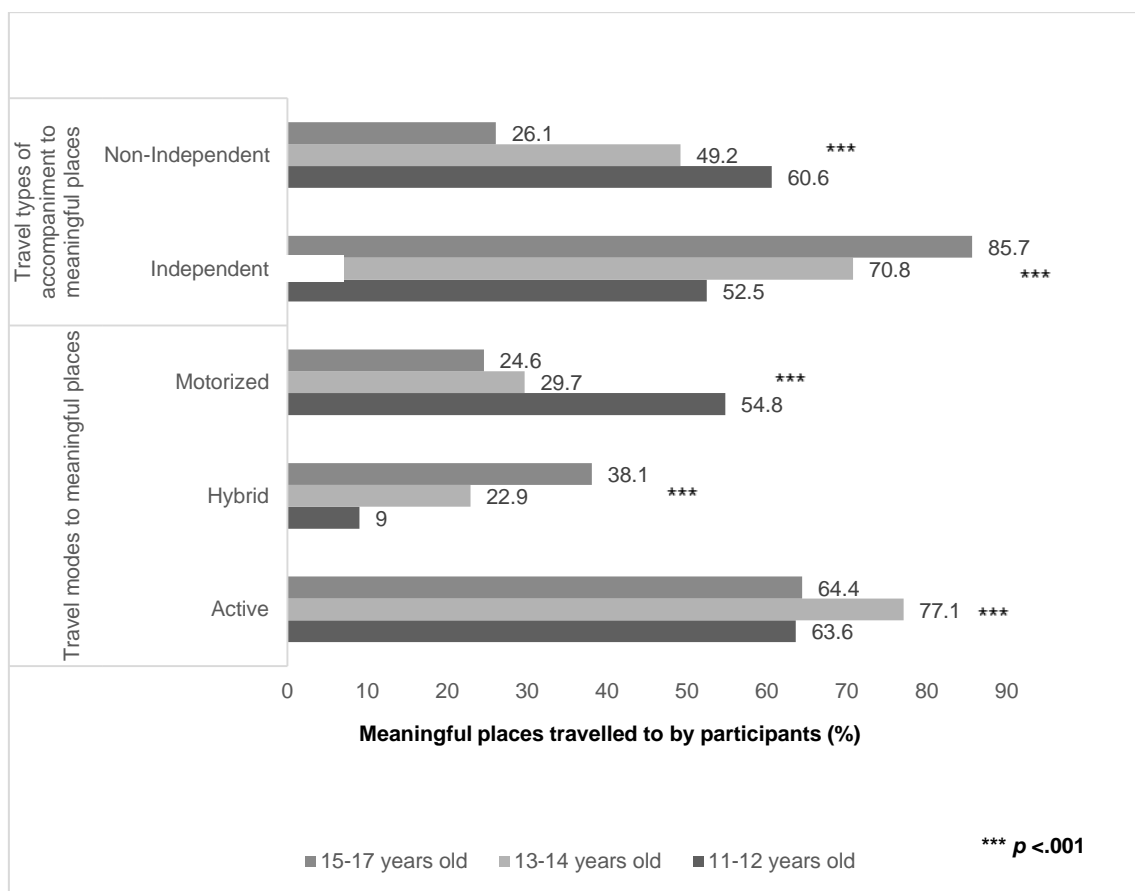
In all age groups active travel was the most frequently mode used to access meaningful places. For children aged 11-12 years old, active travel mode was of 63.6%, followed by motorized and hybrid travel modes, with values of 54.8% and 9%, respectively. Likewise, for children aged 13-14 years old, the trend is the same as in the previous case, with values of 77.1%, 29.7% and 22.9%. In the case of participants aged 15-17 years old, active travel was found to be of 64.4%, tailed by hybrid travel with 38.1% and motorized travel with 24.6%. There was a significant association between age groups and travel modes. Children aged 13-14 years old more frequently used active travel mode to meaningful places when compared with participants from the other two age groups ($\chi^2(2) = 24.18, p < .001$). Children aged 15-17 years old significantly used more hybrid travel mode to meaningful places when compared with participants from the other two age groups ($\chi^2(2) = 80.75, p < .001$). Children aged 11-12 years old used motorized travel more often than children from the other two groups to access meaningful places ($\chi^2(2) = 88.01, p < .001$).

As for the relationship between age and travel type of accompaniment to meaningful places, travelling autonomously or in the company of other children (independent travel) was the most frequently used for the 13-14 years old and 15-17 years old age group; whereas for the youngest age group of children (11-12 years old) more often they travelled to meaningful

places in the company of adults. However, in this age group independent travel was of 52.5% and non-independent travel was of 60.6%. For the 13-14 years old age group independent travel was of 70.8%, whereas non-independent travel represented 49.2%. Not surprisingly, this discrepancy between independent and non-independent travel modes is overwhelming for the 15-17 years old age group, with values of 85.7% and 26.1%, respectively.

Moreover, it were found statistical significant differences between the three age groups in terms of independent travel ($\chi^2(2) = 71.69, p < .001$) and non-independent travel ($\chi^2(2) = 60.00, p < .001$) to meaningful places. More specifically, older children travel autonomously more frequently to meaningful places and less often in company of adults than younger children do.

Descriptive results on age and actual mobility for the three individual research groups (“LH”, “LBS” and “LM”) are available in **Appendix 4** (Tables 7, 8, 9).



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

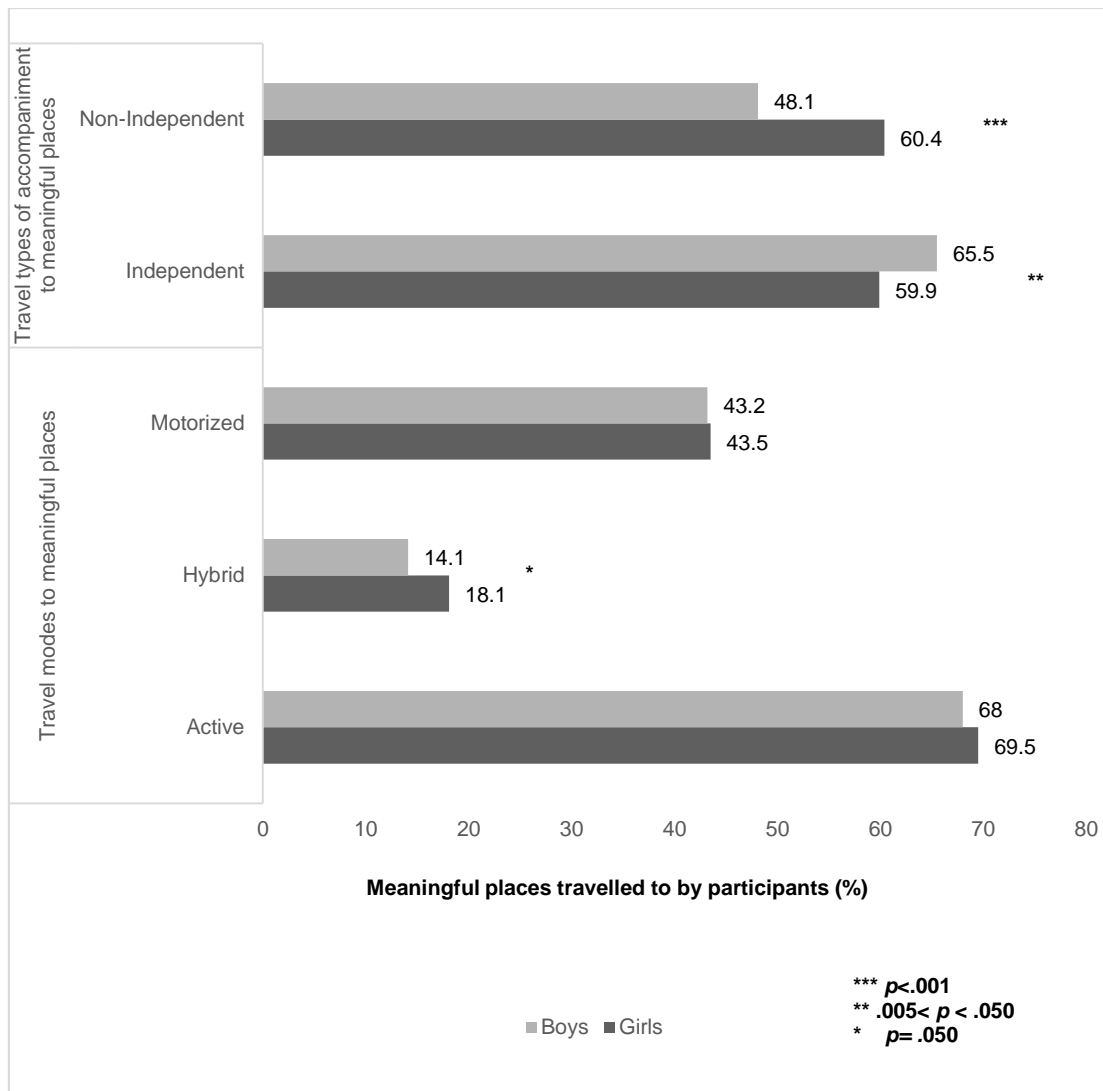
Figure 23-Actual mobility to meaningful places according age in “L” group

4.6.2.2. Gender and actual mobility to meaningful places

Gender was only found to be an influential variable when considering the option of hybrid (public transportation) to meaningful places (hybrid). Herein, and although this difference was not very significant, more frequently girls (18.1%) used public transportation than boys (14.1%) when travelling to meaningful places ($\chi^2(1) = 3.83, p = .050$).

In terms of travel accompaniment to meaningful places, significant differences were found between girls and boys. Specifically, more frequently boys (65.5%) than girls (59.9%) travelled independently (by themselves or in company of friends) to these places ($\chi^2(1) = 4.69, p = .030$); and more frequently girls (60.4%) than boys (48.1%) travelled accompanied by adults (non-independently) to meaningful places ($\chi^2(1) = 22.27, p < .001$). Bellow, in Figure 24 it is possible to visualize the previous information on the influence of gender in actual mobility to meaningful places.

Descriptive results on gender and actual mobility for the three individual research groups (“LH”, “LBS” and “LM”) are available in **Appendix 4** (Table 10, 11, 12).



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 24-Actual mobility to meaningful places according gender in “L” group

4.6.2.3. Actual mobility and territorial distance to meaningful places

In Figure 25, comparisons between travel mode and distance to meaningful places and travel accompaniment and distances to meaningful places are shown.

Significant differences were found when comparing mean distances travelled when adopting active travel and mean distances travelled when not using active travel [$t(529) = 9.82$, $p < .001$]. Mean distance for active travel was of 1.3Km ($M=1.337$, $SD=1.806$), whereas for other modes of travel this value increased to 3Km ($M=3.018$, $SD=3.255$). Significant differences were found when comparing mean distances travelled when adopting motorized travel and mean distances travelled when not using motorized travel [$t(1027) = 5.63$, $p < .001$]. Mean distance for motorized travel was of 2.3Km ($M=2.312$, $SD=2.818$), whereas for other modes of travel such value decreased to 1.5Km ($M=1.517$, $SD=2.125$). Significant differences were found when comparing mean distances travelled when adopting hybrid travel and mean distances travelled when not using hybrid travel mode. [$t(246) = 7.37$, $p < .001$]. Mean distance for hybrid travel was of 3.3Km ($M=3.335$, $SD=3.334$), whereas for other modes of travel this value decreased to 1.6Km ($M=1.579$, $SD=2.171$).

These results indicate that places for the actualization of affordances which are located within a mean range from home of 1.3Km are mostly accessed by children using active travel modes. It is interesting to find that when territorial distance to meaningful places becomes the furthest (over 3km), travel mode mostly used is public transport (hybrid) and not private car one (motorized).

When comparing mean distances travelled with types of accompaniment to meaningful places, no significant differences were found. Territorial distance to meaningful places did not influence children's travel accompaniment possibilities to meaningful places, more specifically when comparing independent travel with other types of travel accompaniment and when comparing non-independent travel with other types of travel accompaniment. Therefore, mean distances travelled autonomously and non-independently (in company of an adult) were very similar, 1.8Km ($M=1803$, $SD=2437$) and 1.9Km ($M=1905$, $SD=2530$), respectively.

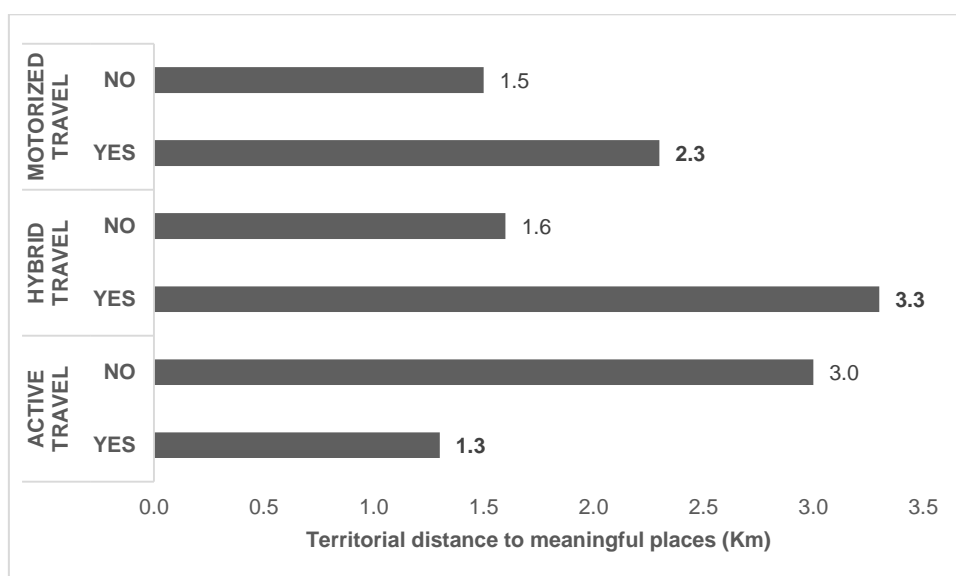
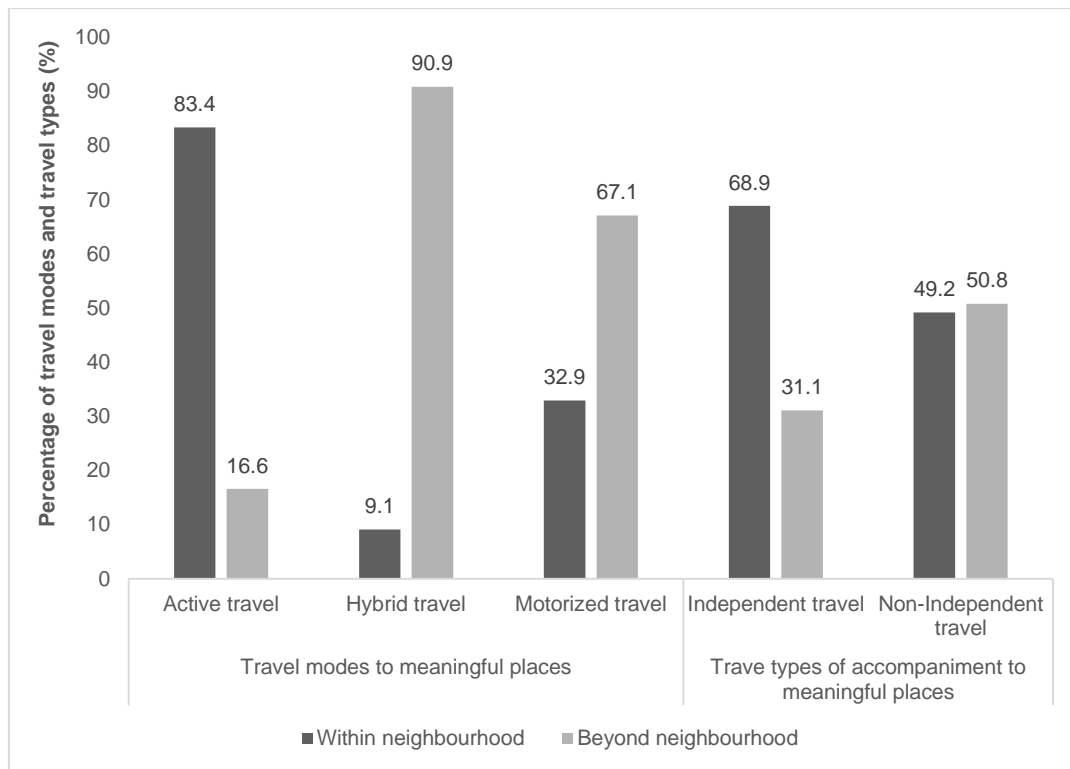


Figure 25-Mode of travel according distance to meaningful places

4.6.2.4. Neighbourhood area and actual mobility

Bellow in Figure 26, frequency of travel modes and travel types of accompaniment within and beyond the neighbourhood in L research group are presented.

Most active travel (83.4%) and independent travel (68.9%) occurs within neighbourhood area (500 meters buffer around participants' home), whereas the majority of hybrid travel (90.9%) and most of motorized travel (67.1%) takes place beyond the neighbourhood area. Frequency of non-independent travel occurs similarly within and beyond the neighbourhood area, 49.2% and 50.8%, respectively.



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 26-Actual mobility to meaningful places within and beyond neighbourhood area in L group

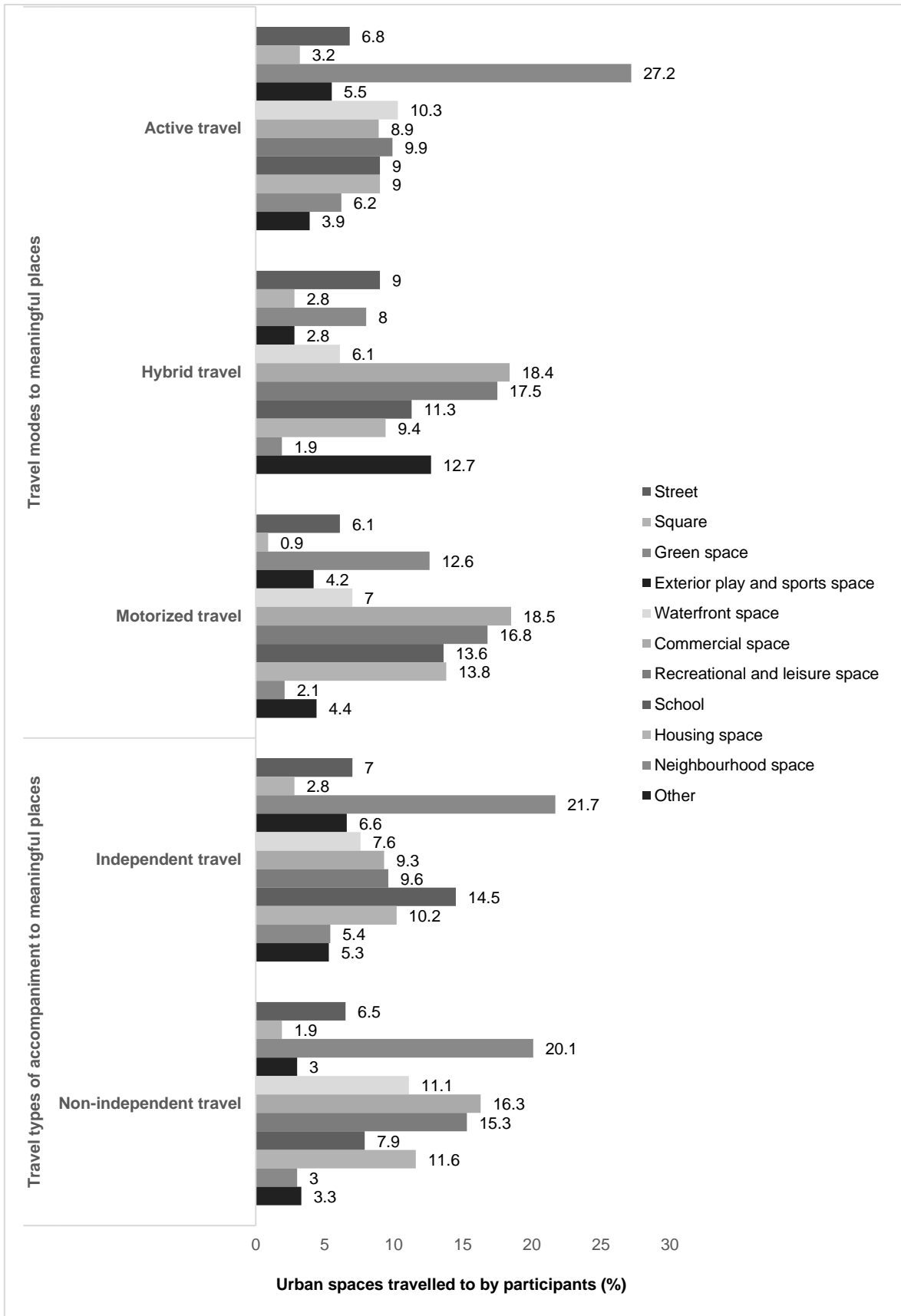
4.6.2.5. Actual mobility and urban space typology in L group

Bellow in Figure 27 it is presented frequency of travel modes and travel types of accompaniment across eleven urban space typologies in L group.

Active travel was more frequent in green spaces (27.2%), and it was also the travel mode more used by participants when travelling to meaningful places. Hybrid and motorized travel were more frequently practiced when travelling to commercial spaces (18.4%, 18.5%, respectively) and to recreational and leisure spaces (17.5%, 16.8%, respectively). Independent travel was more frequently adopted when moving to green spaces and to school, with 21.7% and 14.5%, accordingly. Non-independent travel was more frequently used when going to green spaces (20.1%), commercial spaces (16.3%) and to waterfront spaces (15.3%).

Active (27.2%), independent (21.7%), and non-independent (20.1%) travelling are more frequently used when travelling to green spaces; whereas hybrid, motorized and non-

independent travel, with values ranging approximately between 15% to 18% are more often used when going to commercial spaces and recreational and leisure spaces.



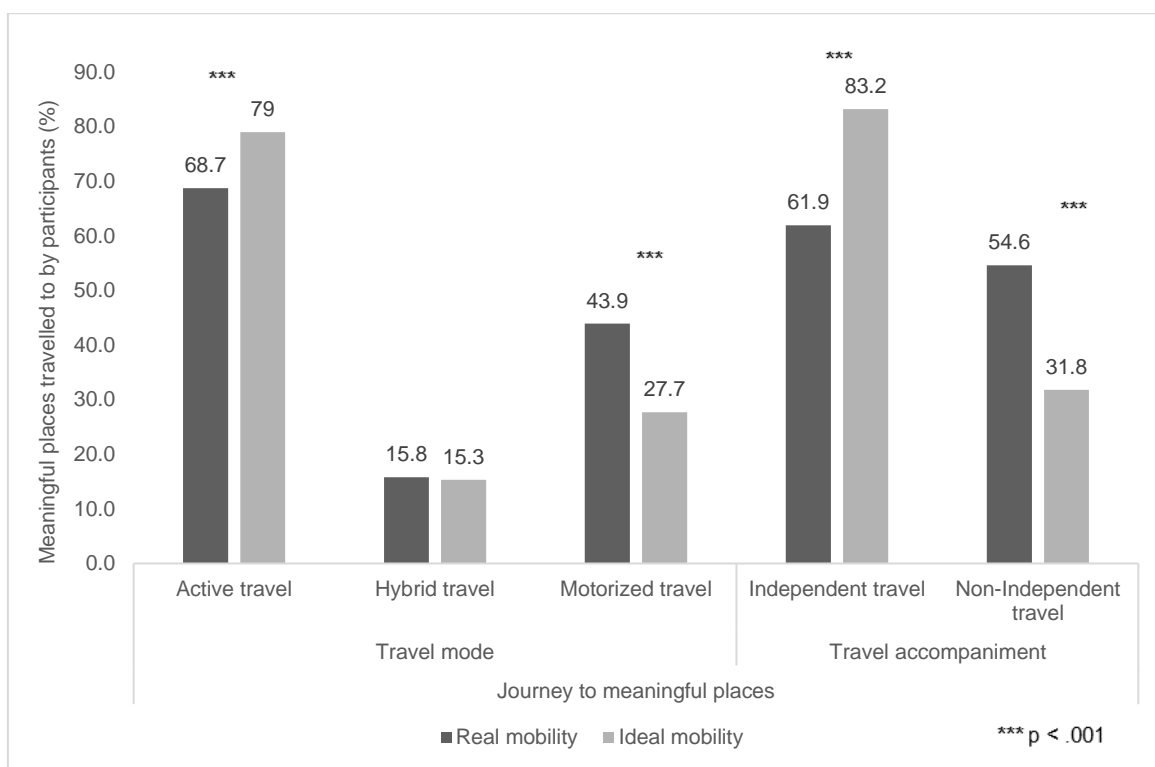
Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 27-Actual mobility to meaningful places across urban space typologies

4.6.2.6. Actual and Ideal mobility to meaningful places

When comparing participants' real and ideal mobility to meaningful places, it is very clear that children would like to be more frequently active, less frequently using motorized travel and more frequently autonomous (Figure 28). In terms of travel modes, the McNemar's test showed significant differences on active travel to the same meaningful places, in both real and ideal situations, with an increase from 68.7% to 79%, accordingly ($p < .001$). The opposite trend was found in motorized travel mode when accessing the same meaningful places, diminishing from 43.9% in reality to an ideal of 27.7%. No significant differences were found on the use of public transportation to the same meaningful places, on real and ideal scenarios.

As for real and ideal travel accompaniment to the same meaningful places, significant differences were found on both types of accompaniment ($p < .001$). More specifically, it was found an increase from 61.9% to 83.2% when going alone or with friends to the same meaningful places, and a decrease from 54.6% to 31.8% when going with adults to the same meaningful places.



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 28-Actual vs. Ideal mobility to meaningful places. Percent of meaningful places travelled to by participants

4.6.3. Interplay of mobility, affordances and urban space considering four categories of meaningful places (SP, FP, LP and EP) in “L” group

4.6.3.1. Territorial distance across categories of meaningful places

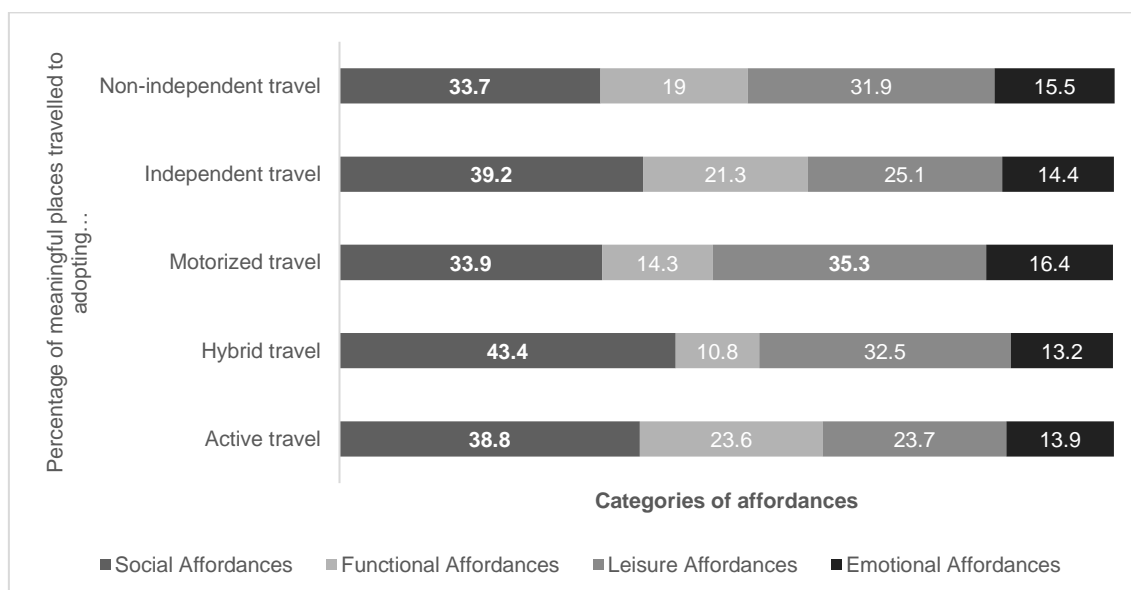
Territorial distance was shorter for emotional meaningful places with a value of 1.4 Km (M=1.353 SD=1.986), increasing to 1.9 Km when going to functional meaningful places (M=1.876 SD=2.323) and to social meaningful places (M=1.926 SD=2.701), and reaching the furthest when moving to leisure meaningful places, 2.2 Km (M=2.181 SD=2.552).

4.6.3.2. Actual mobility and categories of affordances

Descriptive findings on travel modes and travel types of accompaniment to meaningful places for the actualization of social, functional leisure and emotional types of affordances, in L group, are depicted below (Figure 29).

Motorized travel is more frequently used when going to leisure meaningful places (35.3%), although this value is very close to the second most frequent one, when going to social meaningful places (33.9%). All other travel modes and types of accompaniment occur more frequently when participants travel to places where social affordances are actualized (social meaningful places), followed by travelling to leisure meaningful places.

Considering travel modes, it was when children used public transportation (hybrid travel) that more social meaningful places were travelled to (43.4%), followed by use of active (38.8%) and motorized (33.9%) travel. As for travel accompaniment, more social affordances were actualized when participants travelled autonomously (39.2%) than when accompanied by adults (33.7%). Information about actual mobility and categories of affordances across LH, LBS and LM groups is available on **Appendix 5** (Figures 14, 15, 16).



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Figure 29-Children’s actual mobility to places for actualization of specific categories of affordances in “L” group

4.6.3.3. Neighborhood area and categories of affordances

In “L” research group, it was found that neighbourhood area is most prevalent in social affordances, since nearly half of them in the whole research group were actualized there (42.9%). The values for the other three categories of affordances within neighborhood area are very similar, between 18 to 20 percent. These results suggest that neighborhood area is socially meaningful but not so much functionally, leisurely and emotionally (Figure 30).

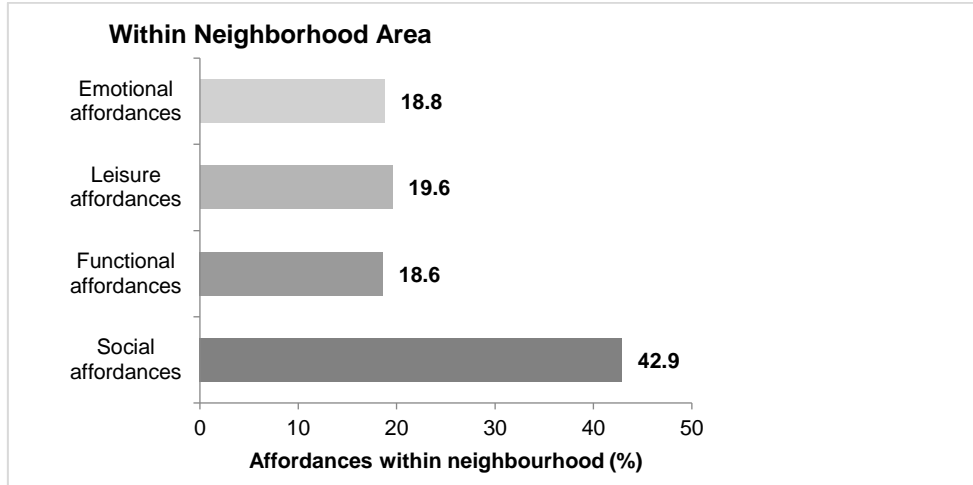


Figure 30-Expression of affordances by categories within neighbourhood area in “L” research group

4.6.3.4. Urban space typologies and categories of affordances

As it can be visualized bellow in Figure 31, in seven out of eleven urban typologies, street, square, green space, school, housing space, neighbourhood space and other spaces, allowed for more social affordances to be actualized than the other three categories of affordances. The values of actualized affordances in these seven typologies ranged between 35.6% and 55.8%. In “commercial spaces” and “recreational and leisure spaces”, the category of affordances actualized more often was “leisure” with 70.7% and 75.5%, respectively.

More in detail, in school, square, housing space and neighbourhood space, over 50% of the actualized affordances in each of these typologies were social. In streets, the percentage of actualized social affordances was 40.5%, and in green spaces this value was of 35.6%, seconded by 29.2% of functional affordances.

In exterior play and sports spaces and waterfront spaces over 50% of the affordances actualized were functional.

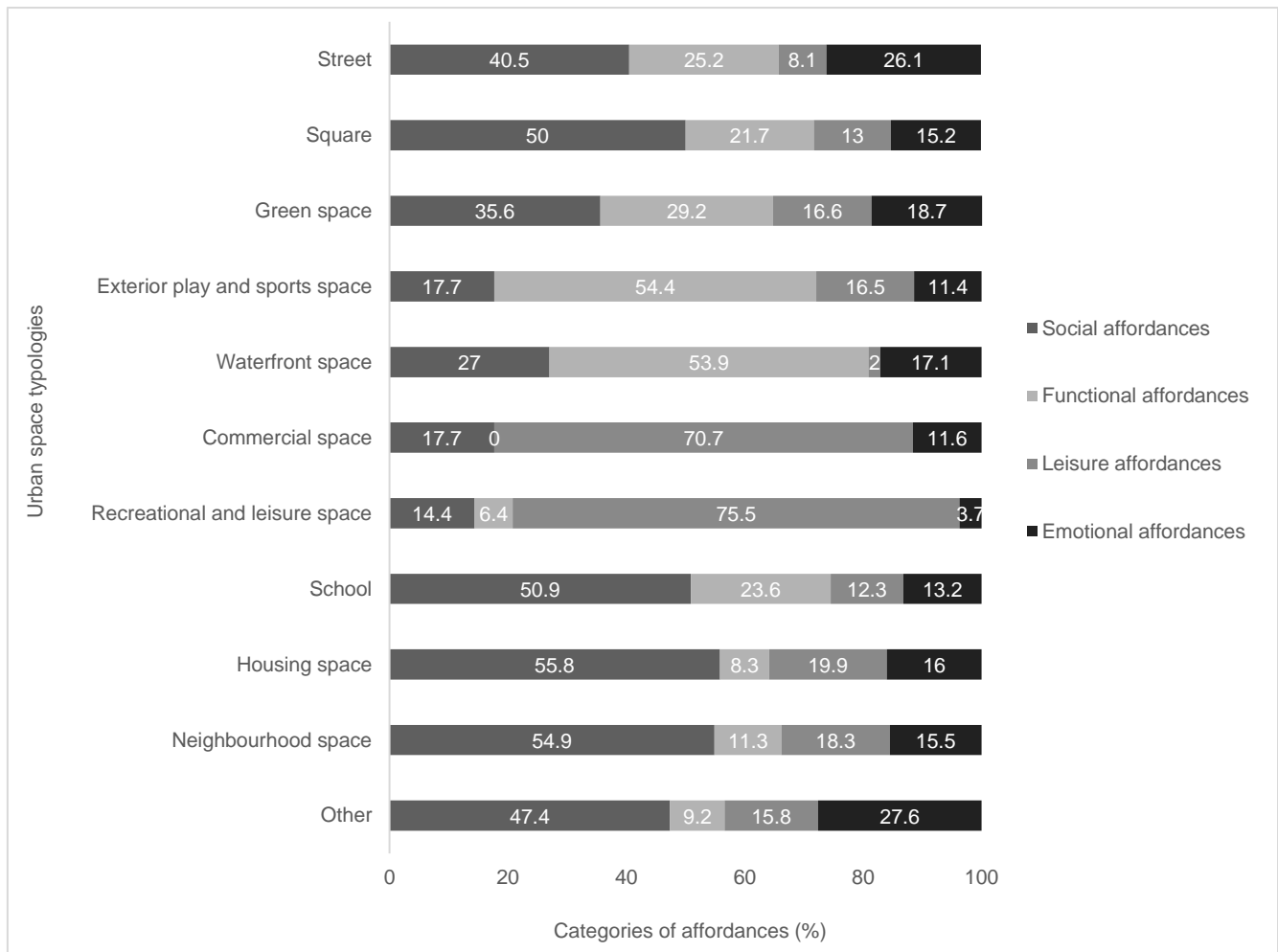


Figure 31-Actualization of different categories of affordances across urban space typologies in L group

4.7. Section C- Synthesis of results

In this section, the main goal was to capture an understanding of children's transactional behavior in the urban metropolitan area of Lisbon based on analysis of interrelationships between variables expressed in the research questions previously formulated in the methodological chapter. Therefore, it was essential to focus on the interplay of different variables that arise from children's urban mobility and place transactions in the overall research group ("L").

Participants' active travel from school to home takes place if school-home mean distance is around 1.1Km. This is particularly relevant when taking in consideration that mean distance between school and home was found to be 2.3Km. Conversely, school-home distance is not influential on the choice of travel accompaniment in this journey. In the school-home journey, for young age groups (11-12 years old) motorized travel is very expressive, hybrid travel practically inexistent and active travel is scarce; as age increases to 13-14 years old, motorized travel decreases and simultaneously hybrid travel increases; in older age groups (15-17 years old), motorized travel is non-existent, and active and hybrid travel modes are dominant; independent travelling is most frequently in participants aged between 13-14 and 15-

17 years old. Gender was not found to significantly influence children's actual school-home mobility. However, descriptive findings indicate that more girls than boys travel actively from school to home. In reality, a small percentage of children travel actively from home to school, and nearly half of the children report travelling autonomously in this journey. The vast majority of children would like to be more active, decrease car transportation, and be more autonomous in the school-home journey.

Active travel and independent travel occurs mostly within neighbourhood area, whereas the majority of hybrid travel and most of motorized travel takes place beyond the neighbourhood area. However, within a mean distance of 1.3 Km from home, active travel was still very much used as travel mode. In all age groups active travel was the most frequently mode used to access meaningful places. When comparing age groups, children aged 13-14 years old more frequently used active travel; whereas children aged 15-17 years old significantly used more hybrid travel mode; and the younger group used motorized travel more often. Also, older children travel autonomously more frequently to meaningful places and less often in company of adults than younger children do. More frequently girls used public transportation than boys when travelling to meaningful places, although this difference was not very significant ($\chi^2(1) = 3.83, p = .050$). In terms of travel accompaniment to meaningful places, more frequently boys than girls travelled independently (by themselves or in company of friends) to these places; and more frequently girls than boys travelled accompanied by adults ($p < .050$). Ideally, it is very clear that children would like to be more frequently active, less frequently using motorized travel and more frequently autonomous.

Socially meaningful places were located at a mean territorial distance of 1.9 Km. All travel modes and travel types of accompaniment, except in the case of motorized travel, were more frequently used when travelling to this type of places. Motorized travel was more frequently used when going to leisure meaningful places which were located at the furthest territorial distance (2.2 Km). Also, it was when children used hybrid travel that more social meaningful places were travelled to, followed by use of active and motorized travel. Additionally, more social affordances were actualized when participants travelled autonomously than when accompanied by adults. Neighbourhood area was most prevalent in social affordances, since nearly half of them in the whole research group were actualized there. These results suggest that neighborhood area is socially meaningful but not so much functionally, leisurely and emotionally.

Street, square, green space, school, housing space, neighbourhood space and other spaces, allowed for more social affordances to be actualized than the other three categories of affordances. In "commercial spaces" and "recreational and leisure spaces", the category of affordances actualized more often was "leisure" with 70.7% and 75.5%, respectively. In exterior play and sports spaces and waterfront spaces, over 50% of the affordances actualized were functional.

Active, independent, and non-independent travelling are more frequently used when travelling to green spaces; whereas hybrid, motorized and non-independent travel are more

often used when going to commercial spaces and recreational an leisure spaces more frequently afford.

5. CHAPTER 5- DISCUSSION

“Pelo percurso, pelos caminhos, temos a revelação da existência, como se a direcção dos passos revelasse uma musculatura existencial, uma musculatura associada a hábitos, uma musculatura de hábitos. Neste sentido, de um modo directo e linear, mudar de movimentos é mudar de vida; No limite, alargar movimentos e os percursos é alargar a experiência; ... (p.122)... Existir é como passear ao acaso por um espaço que se vai transformando num tempo - anos de vida - e nesse passeio o indivíduo aproxima-se do que lhe agrada e afasta-se do que lhe desagrada. Eis, mais ou menos, o que é estar vivo. Quando se consegue. (p. 125)”

(Gonçalo M. Tavares in *“Atlas do Corpo e da Imaginação”*, 2013)

5.1. Introductory remark

The main goal of this research was to capture a broader and more comprehensive understanding of children's mobility and transactional behavior in the urban environment. In order to accomplish the above, three perspectives on transactional behavior of children in the urban environment were adopted.

Firstly, it was necessary to focus on the descriptive landscapes of children's transactional behavior, as a way to characterize crucial axes relevant to child-place interaction and transversal to this study, mobility, affordances and urban space. In this way, it was essential to focus on the three different geographical areas (west "LH", coastal "LBS" and eastern "LM") as a whole ("L"). Although, there are differences and asymmetries between them, it is also true that they share a cultural trend of children's daily mobility and use of places in urban territories with similar degrees of urbanization located around and within Portuguese main and largest cities.

Secondly, a focus on comparative landscapes of children's transactional behavior was conducted. There are characterizing aspects which are specific to each research group, namely, the fact that geographical locations of each group are different; high socioeconomic status shared in LM participants, whereas in LH and LBS exists a shared heterogeneous socioeconomic status; and specific urbanizing features in each group. In this manner, it was essential to establish comparisons and differences on mobility, affordances and urban space use across LH, LBS and LM groups, underlying results that reflect communalities and differences among them.

Thirdly, in order to capture the interplay of different variables that arise from children's urban mobility and place transactions, it was fundamental to return to the overall research group (L group). Herein, it was discussed the analysis of interrelationships between variables that were handled previously on the framework of descriptive and comparative landscapes of children's transactional behavior.

This critical discussion is structured in two sections. In the first one, main findings across the three analysis on landscapes of children's transactional behavior in urban space (descriptive, comparative and interplay) were summoned together in themes. Then, they were contextualized in the light of research results and theoretical proposals from the author's previous studies on children's independent mobility in urban environment (Cordovil et al., 2015; Lopes et al., 2014), as well as incorporating relevant work and ideas of others. In the second one, and stemming from conceptual thinking elaborated across the work developed in this thesis, a hypothetical theoretical model of Child-Place interactions ("Child-City Transactional Model") is presented.

5.2. Critical discussion

5.2.1. School-home mobility

In the metropolitan area of Lisbon, Participants' active travel from school to home takes place if school-home mean distance is around 1.1Km. This is particularly relevant when taking in consideration that mean distance between school and home was found to be 2.3Km. Although the threshold school-home distance for active travel is less than what it was found in a recent study which identified distances of 1.4 Km for children at 10 years of age, 1.6 Km at 11 years of age and 3 km at 14 years of age (Chillón, Panter, Corder, Jones, & Van Sluijs, 2015), in our study motorized travel and non-independent travel is adopted by most participants in such journey. Therefore, it is not surprising that in the other aspect of mobility (travel type of accompaniment), conversely to travel modes, school-home distance was not influential on the choice of travel accompaniment in this journey. In the region of Helsinki mean school-home distance is of 1.8Km and, similarly to our results, it was found that longer home-school distances decreased the likelihood of children and young people using active travel; and that within 1 km of school –home distance, majority of participants used active travel forms (Broberg & Sarjala, 2015). Our results on school-home travel modes are similar to those found in previous independent mobility studies in Portugal (Cordovil et al., 2015), where only 21% of primary school children and 45% of secondary school children come home from school actively and independently.

A lot of studies, when addressing environmental fears that hinder children's freedom to roam around in the environment, focus on parental perception of these fears (Alparone & Pacilli, 2012; Lopes et al., 2014; Miretta Prezza, Alparone, Cristallo, & Luigi, 2005; Rudner, 2012; Santos, Pizarro, Mota, & Marques, 2013; Zubrick et al., 2010). Most of this studies show that traffic fears and stranger danger are the most frequent among parents. Other studies focus on children and young people's fears when they are experiencing the outside environment by themselves (Johansson, Hasselberg, & Laflamme, 2009, 2010). In the present research, the majority of the study's participants does not perceive any environmental fears in the school-home journey. Moreover, perceived environmental fears, namely, traveling alone and .being out when it is getting dark, were only positively referred by a maximum of 12.9% of participants. Traffic fears and stranger danger had even a weaker expression with values not superior to 5.3% of participants who positively reported on them. These results go along with Finnish children and youths who expressed very few fears in the home-school journey (80% of participants did not express any of the nine inquired fears) in a similar study to ours (M Kytä et al., 2012). Our findings suggest that most urban children in Lisbon region, when returning home from school don't find the outside environment threatening. However, one could also conjecture that most of them do not find the environment threatening because they return home mostly using motorized travel.

For young age groups (11-12 years old) motorized travel is very expressive, hybrid travel practically inexistent and active travel is scarce; as age increases to 13-14 years old,

motorized travel decreases and simultaneously hybrid travel increases; in older age groups (15-17 years old), motorized travel is non-existent, and active and hybrid travel modes are dominant. These results contrast with those found in England (Ben Shaw et al., 2012), where most primary and secondary children walked to school. More precisely, and only a third of primary school children were chauffeured to school and this value dropped to 16% on secondary school children. However, in the same study, results on hybrid travel mode (public transport) are similar to ours, since very few primary children adopted public transportation (hybrid travel), increasing to a quarter of secondary school children who used it. As for impact of age in travel type of accompaniment from school to home, in our study it was found that independent travelling is most frequently in participants aged between 13-14 and 15-17 years old. Likewise, in a previous Portuguese study, we found an increase on the percentage of children who travel independently from school to home as their age increases, more specifically, from 13 to 15 years old this value rises from 79.1% to 85.5% (Cordovil et al., 2015). Conversely, in Sweden, from 10 years old onwards almost 90% of children report travelling autonomously in the school-home journey (Pia Björklid & Gummesson, 2013).

Descriptive findings indicate that more girls than boys travel actively from school to home. However, these differences as those in terms of independent travel were not significant, and therefore gender was not found to influence school-home mobility. In reality, only 26.8% of children travel actively from home to school, and nearly half of the children report travelling autonomously in this journey. These results go along with a previous national study on children's independent mobility in Portugal, where it was found no significant differences on the percentage of boys and girls that travel actively and independently to and from school (Cordovil et al., 2015). However, in the city of Lisbon, for secondary school children, more boys (41.5%) than girls (22.2%) go to school actively and independently (Lopes et al., 2014). In line with our present findings, an Australian research (Garrard, 2009) found similar rates of active commuting to school between boys and girls across most age levels (9-16 years old). Likewise, in Finland, no gender differences were found in independent travelling from and to school in primary and secondary school children (Kyttä, Hirvonen, Rudner, Pirjola, & Laatikainen, 2015). Contrastingly, in other studies gender differences were found, with more boys than girls travelling actively and independently in the school-home trajectory (Baines & Blatchford, 2012; B. Brown, Mackett, Gong, Kitazawa, & Paskins, 2008). It seems that when there are gender differences in active and independent travelling between home and school and vice versa, boys are allowed more autonomy than girls. In this sense our descriptive results, although not significant come as a surprise. In this case it may be that active travel is not so much associated with independent travel but more dependent on school-home distance threshold for active travel.

5.2.2. Mobility to meaningful places

In L group, active travel (68.8%) was the most frequently used travel mode to meaningful places used by participants, followed by motorized travel (43.4%) and hybrid travel,

with 16.1% (public transport). In terms of travel accompaniment, meaningful places are more frequently visited autonomously, with a value of 62.7% (independent travel), whereas non-independent travel (with adults) is used less often (54%). Likewise, in a recent study on children's and young people's mobility and different urban forms (Sarjala, Broberg, & Hynynen, 2015), using SoftGIS methodology, most places were reached using active travel, followed public transportation and non-active travel (car or moped). Also, in this same research, when children went to meaningful places, this was more frequently done in company of friends, followed by going alone, and tailed by going with adults. This last type of accompaniment being seldom reported with a value of 7%. Moreover, in a study that used web-map based surveys, and in another using a mix-methods combination, it was concluded that Finnish children enjoy a great degree of independent and active travelling in the outdoor urban environment, allowing them to establish multi-dimensional place interactions (Broberg, Kyttä, & Fagerholm, 2013; Fagerholm & Broberg, 2011). In this sense, and although the trend of our results are similar to those of the above mentioned studies, independent and active mobility to meaningful places in Portuguese urban children and youths is very much reduced when compared with Finnish children. In a recent study on children's independent mobility, Kyttä et al. (2015) found out that around 80% of Finnish children in the inner-city are allowed to go on their own to leisure meaningful places

Territorial distance in the three groups (LH, LBS and LM) varies from 1.4Km to 2.7 Km, and territorial range (mean distance travelled autonomously to meaningful places) from 1.3 Km to 2.2 Km. Considering the whole research group (L), mean territorial distance was 1.9 Km and territorial range was 1.8 Km. These results contrast with those found in Kyttä et al. (2012), where average territorial range was 2.8 Km. The longest territorial distance and range children have to travel when going to meaningful places is in LH, followed by LM and LBS .

In each group, active travel was always more frequently used than the other two modes of travel, with, 70%, 60.6% and 73.7% in the LH, LBS and LM, respectively. In LM, active travel was the highest and it may be because this part of the city's built environment was largely created from scratch in 1998, on the occasion of Expo 98, with an urban planning more focused towards pedestrianized mobility. The use of public transportation (hybrid) when travelling to meaningful places was lowest in LBS, probably due to the availability of inefficient public transport system. Motorized travel was more frequently used by participants from LBS, and possibly this is related to the fact that in LBS, territorial distance and range are the furthest. As for independent travel, this was more frequently used by LH participants, with a value of 75.9%. This predominance of independent travel in LH is possibly associated with the fact that values for active travel were of 70% and hybrid travel of 21.2%. If we consider both types of these travel modes afford children to move independently and LH values for motorized travel (30%) and for non-independent travel (45.8%), then, it is not surprising LH percentage for independent travel. According to Broberg (2015), active travel and independent mobility are two concepts which are interconnected as distinct behavioral aspects of children's mobility, in the sense that for children and young people autonomy of movement from parents usually implies

independence from car transportation. Another recent study conducted recently reinforces this idea because autonomous adolescents' travel within and beyond perceived neighbourhood was associated with increased active travel (Stewart et al., 2015).

In L group, across all age groups active travel was the most frequently mode used to access meaningful places. When comparing age groups, children aged 13-14 years old significantly used more often active travel; whereas children aged 15-17 years old significantly used more hybrid travel mode; and the younger group used motorized travel more often. It is interesting to underline that older children prefer hybrid travel mode to meaningful places, probably because it allows for them to move autonomously to further places. As has been mentioned previously, mean distance for hybrid travel was the furthest one (3.3 km) among the three travel modes to meaningful places contemplated in our research. Equally, in a *SoftGISchildren* study about the effect of built environment features on independent mobility and physical activity, it was found that children aged 11 years old travelled significantly more often to meaningful places adopting active travel modes; whereas older children (aged 14) used public transportation and motorized car travel (Broberg, Salminen, et al., 2013).

In our study, older children travelled autonomously more frequently to meaningful places and less often in company of adults than younger children do. Conversely, Broberg, Kytä, et al. (2013) found no significant differences in terms of type of accompaniment when reaching meaningful places between the younger and older group of children. More frequently girls used public transportation than boys when travelling to meaningful places, although this difference was not very significant. In terms of travel accompaniment to meaningful places, more frequently boys than girls travelled independently (by themselves or in company of friends) to these places; and more frequently girls than boys travelled accompanied by adults. These findings are somewhat similar to those found by Broberg, Kytä, et al. (2013) showing that boys more significantly than girls travelled alone to meaningful places; however, the opposite takes place when travelling with friends to places where affordances were actualized; and to those of another study where girls were more likely to travel to meaningful places, namely, park, sports facilities, cinema, shopping centre and local shops, accompanied by an adult (Brown et al., 2008).

5.2.2.1. Wider perspective on mobility in school-home journey and in journey to meaningful places

Our findings on these topics lead us to propose two relevant considerations. In terms of the school-home-journey, actions should be undertaken in order to increase levels of independent and active mobility for the younger ages. This journey constitutes a very important part of children's daily life and low levels of independent and active mobility in this itinerary jeopardize children's ability to experience public existing space with their moving bodies, withholding perception and actualization of multi-dimensional affordances and hindering spatial representation of places. In terms of journey to other meaningful places, it is important to carry on raising existing moderate-high levels of independent and active mobility, and increase

territorial range. When comparing these figures with those of Northern European reality, namely with Finnish children and youth (Kyttä, Broberg, & Kahila, 2012), Portuguese standards are still low, namely for younger children. Moreover, in a recent international comparative study conducted on 16 countries, children's independent mobility in Finland was found to be the highest (Shaw et al., 2015), whereas Portugal shared with Italy 14th rank position. These two countries are in the Europe's tail on children's independent mobility.

Unfortunately, for most Portuguese children living in urban areas the city is still an obscure giant place, where a dominant motorized car culture impairs a wholesome bodily experience of public spaces and contributes to the exclusion of the body in movement.

As children's independent mobility increases and territorial range expands, children autonomously and progressively rediscover old places and discover new places, reshaping old affordances and actualizing new ones, expanding their landscapes of affordances. Overtime in this iterative process, children become specialists of space. Also, different spaces only become linked places if they are perceived and act upon through active and autonomous corporal spatiality.

5.2.3. Meaningful places and landscapes of affordances

In Lisbon metropolitan area, a total of 1777 meaningful places were identified in the three research groups (LH, LBS and LM, see Figure 32), or in "L" group, 145 of them were home places corresponding to the total number of research participants' and 1632 corresponding to affordances distributed in four expressional categories (social, functional, leisure and emotional). Mean number of meaningful places (affordances) by participant was of 12.26. Former research conducted by Kyttä et al. (2012) and Broberg, Salminen, & Kyttä (2013), both in larger sets of participants, adopted SoftGIS methodology, and obtained a mean number of meaningful places per participant of 7 and 6, respectively, whereas in our SoftGISchildren survey mean number was of 12. Boys marked 54% of all affordances. In terms of age groups, the highest percentage of affordances was reported by participants' age group of 11-12 years old seconded by 13-14 years old, and 15-17 years old. These results probably go along with the fact that more boys than girls participated in this study; and that there were more children from 11-12 years old group integrating the study sample than in the other two age groups. Similarly, in a study where 12343 affordances were localized, younger participants marked a mean of 9 places per child and the older a mean of 7.5 (Broberg, Kyttä, et al., 2013).

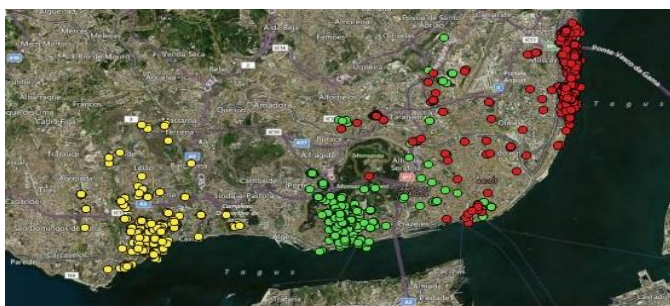


Figure 32-Number of meaningful places in Lisbon Metropolitan Area: yellow points represent 581 in LBS; green points represent 432 in LH and red points represent 764 in LM

In L group, participants marked more social affordances (social meaningful places) followed by leisure, functional and emotional affordances. This trend is the same for boys and girls. When considering participants' age, the 11-12 years old and 13-14 years old groups also marked more social affordances followed by leisure, functional and emotional ones. These findings contrast with those by Sarjala et al. (2015) where most places marked by 5th and 8th graders were considered functional, followed by emotional and social ones.

For the specific case of the oldest age group, youths marked more social affordances, followed by leisure, emotional and functional ones. As shown before, the oldest age group travels more frequently to meaningful places using hybrid travel. Also, when using public transportation, more affordances from social categories are actualized, followed by leisure, emotional and functional. This trend of localized meaningful places is exactly the same as the one for the oldest age group. Moreover, it is not surprising that functional affordances, which are intertwined with physical activity play, were least frequent in the oldest children and social affordances most expressive. A possible explanation is that older children, as we have found in this study, are more autonomous when travelling to meaningful places; also they may be more resourceful as to establish social interactions as a consequence of specific developmental needs in this particular stage of life. In this way, being less dependent on parental chauffeuring, enables young people to be more available to travel independently to meaningful places and, consequently, actualize social affordances. Adolescent behavior is very much characterized by social interaction among peers and social isolation (Clark & Uzzell, 2002) and by a decrease in physical activity play (Pellegrini & Smith, 1998). Therefore, as age groups increased, the frequency of social affordances marked by participants also raised.

In L group, territorial distance was shorter for emotional meaningful places with a mean value of 1.4 Km increasing to 1.9 Km when going to functional meaningful places and to social meaningful places, and reaching the furthest (2.2 Km) when moving to leisure meaningful places. Consequently, it is not surprising that when children have to travel to the furthest distances as it is the case for leisure places, car motorized travel is adopted. This idea is supported by Broberg (2015) in her doctoral thesis about multiple settings of children's independent mobility. Interestingly, in present work, emotional places were one of the least mapped by children, although they were the ones which were located at the closest distance from home, and also those with the lowest frequency of actualization when participants adopted active travel. This leads us to suggest that in fact emotional places, as they were operationalized in this thesis, are less recurrent in young people's daily life in the urban realm.

Socially meaningful places were located at a mean territorial distance of 1.9 Km. All travel modes and travel types of accompaniment, except in the case of motorized travel, were more frequently used when travelling to this type of places. Motorized travel was more frequently used when going to leisure meaningful places which were located at the furthest territorial distance (2.2 Km). However, the values of actualized leisure and social affordances when travelling to places using car transportation are not very discrepant, 33.9% and 35.3%, respectively. Also, it was when children used hybrid travel and independent travel that within

travel modes and travel types of accompaniment, social meaningful places were mostly travelled to. This information on transport use to social meaningful places may be relevant for municipalities when planning places with a specific purpose of interaction and to promote independent mobility of children and young people when travelling to these places.

In the metropolitan area of Lisbon (L group), within social categories of affordances, those with a higher expression of actualization were “being with friends” (20.1%), “being myself” (13.5%), “being with adults” (8.8%), “being with animals” (8.8%) and “being in peace and quiet” (6.8%). As for the functional category, most actualized affordances were “playing ball games” (13.9%), “riding a bike” (13.9%), “running” (13.3%) and “skating” (11%). As for leisure category, most actualized affordances were “shopping” (18.8%), “cinema” (16.4%), “going out for a meal” (9.7%), “show/concert/disco” (6.9%) and “sports” (6.4%). As for emotional type of affordances, those that were mostly expressive were “fun” (12%), “calm” (10%), “noisy” (8.8%), and “dangerous” (8.4%). Some of these findings are similar to those presented in a seminal SoftGISchildren research in the city of Turku, in Finland, conducted by Kyttä et al. (2012) with 1387 participants aged between 10 and 15 years old. These researchers found that most frequent social affordances were “meeting with friends”, “being yourself” and “being in peace and quiet”; as highest values of functional affordances these were “bicycling”; “playing ball games”; “running”; “computer” ; “shopping” and “playing sports” as most frequent leisure affordances; and within emotional category the affordances were “safe”, “good place to be” and “peaceful”. In a study aimed at understanding effects of urban built environment on the promotion of child friendly settings, Broberg, Kyttä, et al. (2013) set out from the affordances identified by children and youths in the city of Turku in the previous study of 2012. When comparing actualized meaningful places found in our research, in Lisbon region, and those from the city of Turku, it seems that social, functional and leisure experiences of Portuguese and Finnish children and youth are transversal in spite of country cultural specificities.

In order to explore with more detail trends on the actualization of meaningful places within each expressional category, by analyzing clustering of affordances, we found participants in L group selected, more often, social places that allowed for “relational” (47.3%) and “affectivity” (30.7%) transactional experiences; functional places which afforded playing with objects (47.9%) and locomotor play (43.1%); leisure places where participants engaged in cultural (30.5%) and consumption (28.5%) types of activities; and emotional places where experience of stressors (34.4%) and of feelings (31.6%) took place. Prevalence of social affordances within “relational” cluster reinforce Clark & Uzzell (2002) findings on neighborhood, school and town center as contexts that promote social interactivity and social withdrawal. Moreover, social interactions in the home, school and neighbourhood environments are fundamental for the development of place identity and learning of social roles (Proshansky, Fabian, & Kaminoff, 1983)

Specifically, on functional and leisure affordances, action level and activity level experiences, respectively, are central to operationalization of these two concepts (Kyttä et al., 2012). Stemming from this, and to understand if the actions or activities selected by participants

were child-led or adult led, in both real and ideal contexts, we added this type of question to the SoftGISchildren survey “Cidade Ideal : Um jogo de imaginação gráfica!”. Overall, most functional and leisure affordances were found to be child led. In contrast, many scholars report that children’s free play and leisure is at risk due to adult interference and guidance (Gill, 2007; Ginsburg, 2007; Stuart Lester & Russell, 2010, 2014). In this sense, Mackett (2013) refers to a shift from free play to organized activities. Nevertheless, it seems that children and young people desire to be in total ruling of their own free and leisure time. These findings go along with previous findings reported on this thesis on ideal mobility from school to home and from home to meaningful places.

Regarding how participants feel about places where affordances were actualized, it was found across the three groups that the majority of meaningful places was considered as pleasant. In this sense, it is likely that most affordances which were selected and mapped indicate a positive, or pleasant experience of the urban geographies. This place likeability was similarly found in the study of the built environment influence on child-friendly settings (Broberg, Kytta, et al., 2013).

5.2.3.1. Wider perspective on meaningful places and landscapes of affordances

The use of SoftGISchildren “Cidade Ideal: um jogo de imaginação gráfica!” survey proved to be very effective on the number of obtained multidimensional affordances located in diverse urban settings. In every one of the 11 urban typologies considered, there were affordances of all expressional categories (social, functional, leisure and emotional); and simultaneously, in every one of these typologies there were actualized affordances within each specific expressional categories. These findings recuperate innovate perspectives of authors such as Gibson (1979), introducing the concept of “affordance”; Heft (1988) devising a functional taxonomy of children’s outdoors environment; and Kytta et al. (2012) including social, functional emotional and leisure expressional categories of affordances in a seminal research using SoftGISchildren methodology.

In this sense, we consider that diversity of sociophysical settings with different layers of interaction seems to be important for the actualization of multidimensional affordances. These landscapes of affordances provide transactional richness and complexity between the child and the environment, allowing children to actively create layers of multidimensional meanings to places. This interpretation resonates with the perspective sustained by Lim & Barton (2010) concluding that children’s sense of place is developed as they actively create multidimensional affordances; enabling them to devise layers of functionalities and meanings in each place interaction.

Social actualized affordances create social meaningful places which are promoters of young people’s independent mobility. This information on social properties of places and on transport use to social meaningful places are relevant for municipalities when planning spaces with a specific purpose of interaction, and to promote independent mobility of children and

young people across urban space. Most functional and leisure affordances were actualized by children and youths within the field of free action (M. Kytä, 2004), due to the inexistence of direct adult interference.

Prevalence of social affordances within “relational” cluster reinforce Clark & Uzzell (2002) findings on neighborhood, school and town center as contexts that promote social interactivity and social withdrawal. Moreover, social interactions in the home, school and neighbourhood environments are fundamental for the development of place identity and learning of social roles (Proshansky et al., 1983). Clustering of affordances in each expressional category, namely, on social affordances may be pertinent for future consideration about psychological impact of places that promote social interaction.

5.2.4. Neighbourhood built environment

Neighbourhood area of 500 m has been found important in another study as an area for children and young people to move around freely (Fagerholm & Broberg, 2011). In the whole research group (L) active (83.4%) and independent (68.9%) travel occurs mostly within neighbourhood area (500 m around participants' home), whereas the majority of hybrid travel (90.9%) and most of motorized travel (67.1%) takes place beyond the neighbourhood area. However, in our research, we found significant differences in mean travelled distances from home to meaningful places between travel modes, with 1.3 Km for active travel, 2.3 Km for car travel and 3.3 Km for public transportation. Thus, the threshold for active travelling from home to places where affordances are actualized is 1.3 Km. Both information, on active travel within neighbourhood and threshold for active travel is relevant for the effect of planning urban environments that allow for active transport and independent mobility. Distance is a crucial factor to take in consideration when studying links between mobility and built environment (Broberg & Sarjala, 2015).

In L group, neighbourhood area, defined by a buffer of 500 m around each participant's home, was most prevalent in social affordances, since nearly half of them, within the four categories, were actualized there. Hence, we suggest that neighbourhood area is meaningful for social interaction but not as much functionally, leisurely and emotionally, whereas beyond neighbourhood areas seem more capacitated to promote functional, leisure and emotional affordances. In one hand, these findings contrast with those from a study that analyzed measures of affordances actualized by adolescents in the home, neighbourhood, school and town centre, where it was found that the three environments, except home, afforded social and retreat behavior (Clark & Uzzell, 2002). In the other hand, in this same study, it was found that within the neighbourhood most affordances for retreat were actualized. This particular finding is similar to ours of the neighbourhood as socially meaningful.

In the current study, the most expressive affordances found across the whole urban built environment (within and beyond neighbourhood) in LH group were “being with friends” (8.7%), followed by “being myself” (4.6%), and “shopping” (4.3%). In LBS group, this trend was “shopping” (6.8%), “being with friends” (6.2%) and “cinema” (5.7%). As for LM, “being with

friends" (6.9%) comes first seconded by "being myself" (5.1%), "cinema" (4.6%) and "shopping" (4.5%). Hence, "being with friends", "being myself", and "shopping" constituted a common meaningfully expressive ground of affordances in the three groups. These findings go along with other findings from one of the previous studies on children's independent mobility and degree of urbanization conducted in Portugal (Lopes et al., 2014). Herein, it was found that within activity places children travelled to independently on their leisure time, "going to a friend's home" was among those mostly reported; also, within activity places which were travelled by children and young people accompanied by adults on leisure time, "going to shops" was together with visiting relatives, or grown-ups, the most expressive meaningful places.

The neighbourhood being socially meaningful; the relationship between different types of travel modes, specifically, active and hybrid, and independent and non-independent travel and frequency of actualized social affordances; and expressiveness of social affordances across the three groups, reinforces the idea in this study of built environment as a determinant sociophysical context for children and young people's social experience to take place. Conversely, in a similar *SoftGISchildren* study involving children and adolescents from the Helsinki region, researchers found out that urban environment mostly affords functional (38%) and emotional (34%) affordances, with only 28% of social actualized affordances (Sarjala et al., 2015).

5.2.4.1. Wider perspective on neighbourhood built environment

We propose neighbourhood area as meaningful for social interaction and for independent and active travel of children and young people, whereas beyond neighbourhood areas (0.5Km to 1.9 Km) seem more capacitated to promote functional, leisure and emotional affordances, and hybrid and motorized travel. These results reinforce the idea of the neighbourhood built environment as a determinant sociophysical context for children and young people's social experience and mobility to take place.

It could be argued that neighbourhood built environment is not providing multidimensional transactional experience for active and independent children and young people because frequencies of functional, leisure and emotional affordances which were actualized was low in comparison to the value of social affordances. However, one has to consider that study participants in this particular stage of their lives, pre-adolescence and adolescence, are attuned with social activity as part of an internal and external social construction of childhood and place identity. Similarly, Chatterjee (2005) underlines the role of different types of affordances, such as emotional, cognitive and social, in the development of children's sense of place.

It is very positive that within these 500 meters, children largely enjoy independent and active mobility to meaningful places where a high frequency of social affordances are perceived and actualized. Environments characterized with high levels of independent mobility and a numerous affordances, where one correlates with the other, were designated as "*Bullerby*" (Kyttä, 2004). Subsequent research on this topic (Broberg, Kyttä, et al., 2013) concluded there are certain structures of built environment, like green areas, that although were not associated

with independent mobility, and as a consequence are not considered “Bullerby” environment, they were important to actualize functional affordances and increased the likeability of emotional places. Basically, green structures were meaningful for children as a child-friendly structure.

In our study, yielded on these two previous cited research about environmental child friendliness, and based on our results, we claim neighbourhood built environment as a child friendly structure, a “*social Bullerby structure*”.

5.2.5. Interplay of affordances and urban space typologies

In the metropolitan area of Lisbon (L), urban space typologies mostly used for the actualization of affordances were “green space” (19.3%), “housing space”. (16.9%), “school” (11.9%), “commercial space” (11.1%) and “recreational and leisure space” (10.6%); and “other”. From a health perspective, it is consensual among researchers and health specialists the positive associations between good health and well-being and use of green spaces. Green space provides all rounded health benefits such as relaxation, positive emotionality towards the self and the surrounding environment, and inner peace (Irvine, Warber, Devine-Wright, & Gaston, 2013). Moreover, residential proximity to well looked after green areas was found to be beneficial for children’s mental health (Markevych, 2015). Hence, in the present study, it was very positive that children and young people visited more often green spaces. This typology afforded a higher actualization of social affordances in comparisons with the other three categories. Therefore, green spaces afforded social interactivity which is fundamental for children’s and young people’s social and emotional development, and to establish a good sense of place and a positive place identity.

In the three groups (LH, LBS and LM), green space, commercial space, housing space and school stand out as most frequent meaningful urban typologies for children to actualize affordances (see Figure 33, Figure 34 and Figure 35), whereas all other five typologies (street, square, exterior play and sports space, neighbourhood space and other) for the exception of “recreational and leisure spaces” in LM, and “waterfront space” in LBS have a reduced expression of under 10%. Sarjala et al. (2015) composed six types of built environments which enabled a morphological characterization of the Helsinki metropolitan region and found out that children’s and youth’s meaningful places were most frequently located in green settings (46.6%), followed by single-family residential settings (17.3%), apartment residential settings (15.5%); traffic oriented settings (10%); big commercial settings (6.5%) and mixed use business settings (4.1%). These results share a certain communality with ours, namely, regarding green spatial settings, commercial spatial settings and residential spatial settings. This last one if we consider that in our study, over 40% of social affordances and nearly 20% of each other categories were actualized in the neighbourhood area (500 meters from home). Similarly, in another study conducted in the city of Turku, in Finland with 10-11 years old children, 80% of children’s daily mobility occurred in residential, commercial and traffic environments.



Figure 33-Example of actualized affordances in different urban space typologies in LBS group: housing space (red symbols); green space (green symbols); commercial space (purple symbols); school space (yellow symbols)

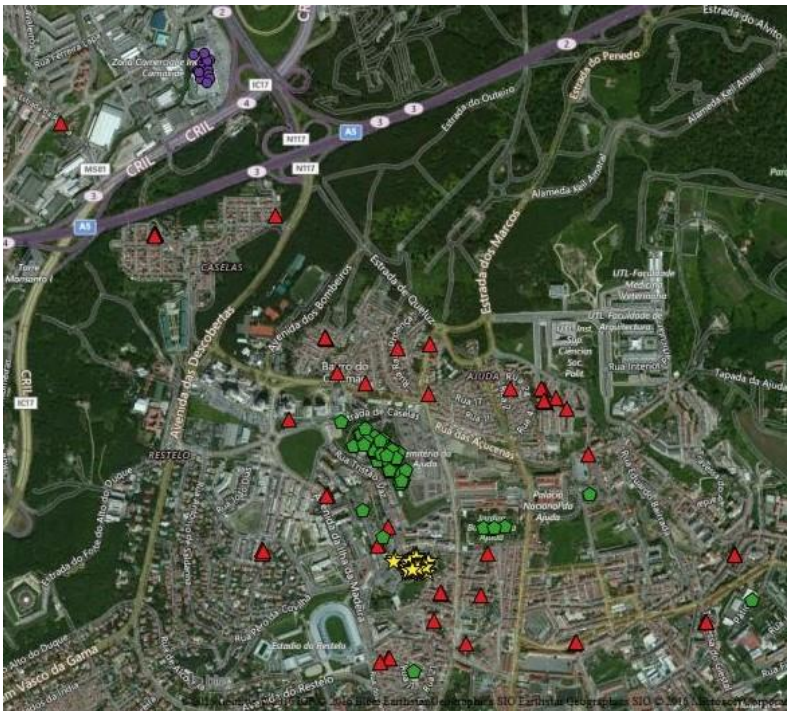


Figure 34-Example of actualized affordances in different urban space typologies in LH group: housing space (red symbols); green space (green symbols); commercial space (purple symbols); school space (yellow symbols)

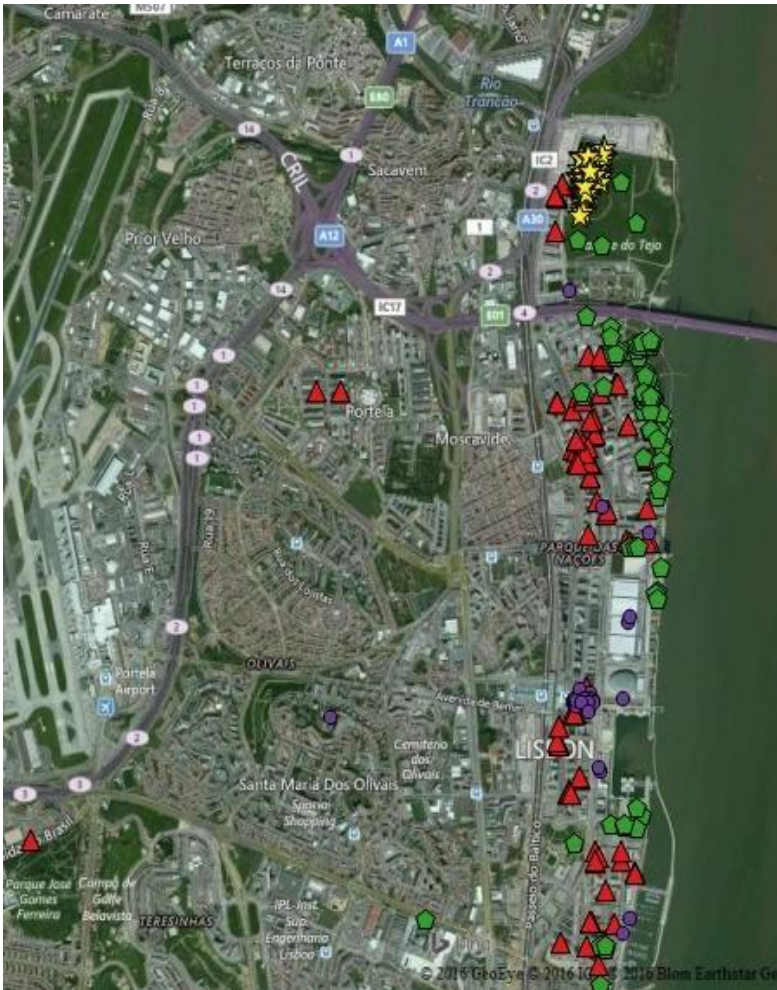


Figure 35-Example of actualized affordances in different urban space typologies in LM group: housing space (red symbols); green space (green symbols); commercial space (purple symbols); school space (yellow symbols)

Descriptive differences in the three research groups were found, more specifically, in LH, green space was more often used; in LBS, water front space was more frequently actualized; and in LM, recreational and leisure spaces is more regularly adopted. Some possible justifications for these singularities may be suggested. In the case of LH, green spaces mostly accessed are in the proximity of school and the other in the proximity of the river. The latter are indeed very popular gardens used as privileged leisure places in this part of the city of Lisbon for children and youths which attend nearby schools, residents and tourists. In the LBS group, it is not surprising that waterfront area is very much used as meaningful places, in the sense that within this urban sphere located in Oeiras municipality, it constitutes a part of the walkable sea-front and beach areas. As for LM group, if we consider that recreational and leisure activities probably include spending money to access them (i.e.: going to the cinema; or going to a concert) it may be that this particular group of participants, due to high socioeconomic status, has more possibilities to experience a type of leisure that requires financial affordability.

Green space and house space is more predominant for the oldest age group; commercial space for the 13-14 years old age group; and school for the youngest age group.

Conversely, other researchers when analyzing links between urban structure and children's and youth's actualization of affordances found no differences in terms of settings where affordances were located; although structure of the environment was determined through density, where high density areas correspond to areas where less green is available; and low density areas where greenery is abundant (Broberg, Kytta, et al., 2013). However, in this same study and when considering "housing density", the affordances of younger children were found to be more concentrated in residential areas, whereas the affordances of older children mainly located on commercial or central spaces.

On the one hand, these results contrast with ours, in the sense that for oldest children affordances tend to be concentrate in green space and the house space. On the other hand, there is similarity as children from the intermediate age group were found to congregate affordances in commercial spaces. In our study, the fact that older children prefer the home and green space typologies goes along with Clark & Uzzell (2002) results on the home being privileged environment for adolescents to engage in social retreat behaviours and the outside settings as simultaneously affording social interaction and social withdrawal.

As for gender differences in the use of urban spaces, we found that girls' frequent use of "commercial space" was higher than boys'; and boys' frequent use of "exterior play and sports" space was higher than girls'. As it is the case of our research, commercial spaces (i.e.: shopping center) correspond to densely built environments, whereas exterior play and sports spaces are usually located within or nearer green areas. Similarly to our findings, in the previous mentioned study (Broberg, Kytta, et al., 2013), girls marked more affordances in more dense, and less green settings than boys. In children aged 10-11 years old, living in an urban center in the UK it was found that boys had a wider freedom of movement to travel autonomously in their neighbourhood and visit meaningful places, and demonstrated higher levels of physical activity than girls did (Page, Cooper, Griew, Davis, & Hillsdon, 2009). Conversely, Clark & Uzzell (2002) found no gender differences in the adolescents use of meaningful places across home, neighbourhood, school and town center for social interaction and retreat experiences via the actualization of social affordances.

Boys use more frequently exterior play and sports spaces than girls. In this typology and in waterfront spaces, over 50% of the affordances actualized were functional, lead us to suggest that their levels of physical activity may be higher than those enjoyed by girls. In a systematic review, access to sports and recreational facilities and time outdoors is one of the most consistent associated correlate for physical activity in children and youths (Sterdt, Liersch, & Walter, 2014). Likewise, access to recreational facilities and parks was also found to be a strong associated correlate for children's physical activity (Ding, Sallis, Kerr, Lee, & Rosenberg, 2011). It could also be argued that this difference between boys and girls use of exterior play and sports spaces, supports the idea that boys are being given more opportunities to play outdoors than girls. Very recently, the United Nations Committee for the Child's Right has issued General Comment 17 on the on the right of the child to rest, leisure, play, recreational activities, cultural life and the arts (article 31 of CRC), where explicit concern is referred on girls

often having less time and freedom than boys to enjoy their rights to play, rest, leisure and recreation, especially in adolescence (UNICEF, 2014).

In “commercial spaces” and “recreational and leisure spaces”, the category of affordances actualized more often was “leisure” with 70.7% and 75.5%, respectively. This does not come as a surprise because in our study most leisure affordances available for participants’ choice require an indoor setting to be perceived and actualized. Another interesting find we can add here is that commercial spaces and recreational and leisure spaces more frequently afforded hybrid, motorized and non-independent travel. This finding is coherent with what we stated earlier, indicating that territorial distance to leisure meaningful places is the furthest of the four categories, with a value of 2.2 Km, which is superior to mean distance threshold for active travel (1.3 Km). Correspondingly, to places such as shopping centres, children and young people do not travel actively or independently (Broberg, Salminen, et al., 2013).

We also found that active, independent, but also non-independent travelling are more frequently used when travelling to green spaces. Partially, along these lines, Sarjala et al. (2015) found public transportation as most frequently adopted to reach mixed –use business districts, and passive travel mode when travelling to big commercial areas and to green areas. Likewise, Kytä et al. (2012) found an association between green spaces and non-active transport and long territorial distance. These last findings are very distinct than ours, since green spaces are mostly located within children’s and young people’s walking distance.

Across the three research groups, street, square, green space, school, housing space, neighbourhood space and other spaces, allowed for more social affordances to be actualized than the other three categories. These results, mainly the one considering green space, contrasts with the predominance of functional affordances in green areas (Broberg, Kytä, et al., 2013). Also, our findings reinforce the pervasiveness and relevance of “social meaningful places” for children and young people’s daily life in distinct urban settings.

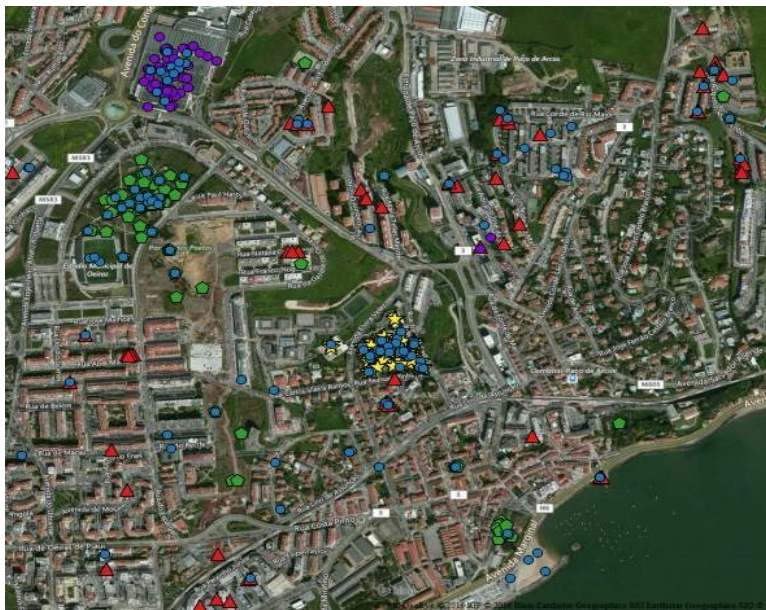


Figure 36-Example of social affordances expressivity in different urban space typologies in LBS group: social affordances (blue symbols); housing space (red symbols); green space (green symbols); commercial space (purple symbols); school space (yellow symbols)



Figure 37-Example of social affordances expressivity in different urban space typologies in LH group: social affordances (blue symbols); housing space (red symbols); green space (green symbols); school space (yellow symbols)



Figure 38-Example of social affordances expressivity in different urban space typologies in LM group: social affordances (blue symbols); housing space (red symbols); green space (green symbols); commercial space (purple symbols); school space (yellow symbols).

5.2.5.1. Wider perspective on the interplay of affordances and urban space typologies

Different urban typologies are privileged spaces for multidimensional affordances to be actualized and therefore essential for the transition of *space* to *place* occur. Tuan (1983) sustains that abstract space becomes place as it is progressively experimented and practiced in daily life. Also, our findings reinforce the pervasiveness and relevance of “social meaningful places” for children and young people’s daily life in distinct urban settings. These spaces are also fundamental for children and young people mediated through social affordances co-create their place identity and a positive relationship with surrounding sociophysical structures.

Adopting a posthumanism perspective, Lester (2014) sustains that life is an entanglement of lines of movement, where the body moves to affect and be affected by other bodies and materials, in a continuous flow where bodies and environment are entangled in each other, co-creating an endless web of intra-actions. For this author, play arises as one of many other forms of intra-activity where “time, space, bodies, materials and meanings come in to co-existence and are iteratively reconfigured through each intra-action to generate more powerful collective pleasurable state” (Lester, 2013; Lester, 2014). Set on this conceptual ground, we perspective children and young people in the city as specialists of space, “*spatialists*”¹⁵, because their body is connected with the surrounding environment through an intra-relating web of transactional possibilities, which come to life as multidimensional affordances. Overtime, through iterative reconfiguration of multidimensional affordances, children and environment co-create each other as *time, space, bodies, materials and meanings come in to co-existence and are iteratively reconfigured through each intra-action* (Lester, 2014); and this process we address to it as “*spatialism*”.

5.2.6. Differences across three research groups

The highest number of affordances (711; 43.6%) was expressed by LM participants, followed by LBS (529; 32.4%) and LH (392; 24%). Consequently mean number of affordances by participant was higher in LM (14.42). The longest territorial distance and range children have to travel when going to meaningful places is in LH, followed by LM and LBS.

In each group, active travel was always more frequently used than the other two modes of travel, with, 70%, 60.6% and 73.7% in the LH, LBS and LM, respectively.

In LM, active travel was the highest and it may be because this part of the city’s built environment was largely created from scratch in 1998, on the occasion of Expo 98, with an urban planning more focused towards pedestrianized mobility.

The use of public transportation (hybrid) when travelling to meaningful places was lowest in LBS, probably due to the availability of inefficient public transport system.

¹⁵ The designation “Spatialists” was imported from the name attributed to the collective responsible for the front cover, maquette and images of the book “*Atlas do Corpo e da Imaginação*”, by Gonçalo M. Tavares, Editorial Caminho, 2013. The “Spatialists” are situated in a hybrid territory between contemporary art and architecture. “*Spazialismo*” was an art movement founded by an Italian artist called Lúcio Fontana, in the late forties.

Motorized travel was more frequently used by participants from LBS, and possibly this is related to the fact that in LBS, territorial distance and range are the furthest.

As for independent travel, this was more frequently used by LH participants, with a value of 75.9%. This predominance of independent travel in LH is possibly associated with the fact that values for active travel were of 70% and hybrid travel of 21.2%. If we consider that both types of these travel modes afford children to move independently; and if we consider LH values for motorized travel (30%) and non-independent travel (45.8%), then it is not surprising LH percentage for independent travel. According to Broberg (2015), active travel and independent mobility are two concepts which are interconnected as distinct behavioral aspects of children's mobility, in the sense that for children and young people autonomy of movement from parents usually implies independence from car transportation. Another recent study conducted recently reinforces this idea because autonomous adolescents' travel within and beyond perceive neighbourhood was associated with increased active travel (Stewart et al., 2015)

In the current study, the most expressive affordances found across the whole urban built environment (within and beyond neighbourhood) in LH group were "being with friends" (8.7%), followed by "being myself" (4.6%), and "shopping" (4.3%). In LBS group, this trend was "shopping" (6.8%), "being with friends" (6.2%) and "cinema" (5.7%). As for LM, "being with friends" (6.9%) comes first seconded by "being myself" (5.1%), "cinema" (4.6%) and "shopping" (4.5%). Across the three groups "being with friends" is the most expressive affordance. This communality may be explained by the fact that as pre-adolescents and adolescents, social interaction with peers is an essential need in terms of development as is an essential element of childhood cultures. Correspondingly, in a study portraying several aspects of friendships in adolescence, it is reinforced that friendships are of central importance in development; play a triggering role on the initiation of sexual life with the opposite sex; promote distance and independence from parents; and for expressing self-identity (Claes & Poirier, 1993). Also, in an ethnographic based study, Found out that children go to places to engage in social activity and to participate, for instance, children would go to different settings, such as, playgrounds, street, stair cases of buildings, to play, hang out and make friends (Lim & Barton, 2010).

Descriptive differences in the three research groups were found, more specifically, in LH, green space was more often used; in LBS, water front space was more frequently actualized; and in LM, recreational and leisure spaces is more regularly adopted. Some possible justifications for these singularities may be suggested. In the case of LH, green spaces mostly accessed are in the proximity of school and the other in the proximity of the river. The latter are indeed very popular gardens used as privileged leisure places in this part of the city of Lisbon for children and youths which attend nearby schools, residents and tourists. In the LBS group, it is not surprising that waterfront area is very much used as meaningful places, in the sense that within this urban sphere located in Oeiras municipality, it constitutes a part of the walkable sea-front and beach areas. As for LM group, if we consider that recreational and leisure activities probably include spending money to access them (i.e.: going to the cinema; or

going to a concert) it may be that this particular group of participants, due to high socioeconomic status, has more possibilities to experience a type of leisure that requires financial affordability.

5.2.6.1. Wider perspective on differences between the three research groups

The three research groups share a cultural trend of children's daily mobility and use of places in urban territories with similar degrees of urbanization located around and within Portuguese main and largest cities. In a previous study conducted in Portugal on the influence of urbanization degree in children's independent mobility, it was found differences on mobility licenses to independently cross the road and cycle, on school-home travel and on number of weekend leisure activities between the city, small town and village environments (Lopes et al., 2014). Likewise, Kytta (2002) found differences on the affordances availability in between communities with different degrees of urbanization. In this way, it is not surprising that in contexts where there is a similar degree of urbanization, as in the present study, some results are the same (i.e.: the expressiveness of social affordances and most frequent travel mode to meaningful places). It is our opinion that communalities found in the three research groups may result from a shared cultural trend.

In spite of cultural mutuality, there are differences and asymmetries between the three research groups which are expressed in terms of geographic locations, built environment and socio economic status. It is our opinion that these specificities of each group may explain differences in terms of mobility to meaningful places; types of urban space typologies where affordances were actualized; and different categories of affordances. Concurrently, Rissotto & Tonucci (2002) report that areal characteristics influence children's freedom to roam autonomously, correlating with economic, social and cultural difference between families of such areas.

5.2.7. Children's ideal city

Ideally, the vast majority of children would like to be more active, decrease car transportation, and be more autonomous in the school-home journey. Similarly desires were reported in proposals co-created with children in children's councils and planning participation sessions, in Italy, where children would like their cities to afford them with more autonomy, freedom of movement and play possibilities among other requests (Tonucci & Rissotto, 2001).

Ideally, it is very clear that children would like to be more frequently active, less frequently using motorized travel and more frequently autonomous when going to meaningful places. These results are the same as in the three groups (LH, LBS and LM), except in terms of ideal active travel versus real active travel in LH, where the latter value is superior to the former, probably because hybrid travel ideally increased when compared with daily hybrid travel value. This ideal increase on hybrid travel may be related to the fact that territorial distance and territorial range in LH is the longest from the three groups. Children and young people

aspirations for urban built environment, in terms of an increase of independent and active mobility and decrease of car transportation is in consonance with policy recommendations for child-friendly neighbourhood planning, namely, availability of walkable open spaces, traffic free, to be used as children and young people like (Eisinger, 2012; UN General Assembly, 1989)

It was found an increase reaching an overwhelming majority on the frequency of child-led affordances in an ideal setting. This means that children and young people most of the time enjoy freedom and autonomy in leisure activities and while playing.

5.2.7.1. Wider perspective on children's ideal city

The drive and wish for autonomy of movement, autonomy of play and autonomy of leisure in an ideal city is fully embodied on children's and youth's lives and, in our opinion, it represents a quest for child-friendly settings and structures, which are in consonance with healthier and more active and more pleasurable lifestyles. Children and young people desire a better city for everyone and they are capable of being active consultants in providing relevant information about their perceptions of the real and ideal city (as it was the case of this study), as well as their desires, if put in to action by urban planners, would create healthier and happier cities.

A city where people can roam freely and actively, and establish multidimensional transactions is a city that offers their citizens an interactional richness where play, leisure, social and emotional affordances are available for actualization, reshaping and re-creation across different urban spaces. These transactional experiences that co-emerge within people and public spaces result in "placemaking"¹⁶ experiences in urban built environment where people collectively and collaboratively recreate or reshape public spaces, maximizing shared value. This perspective of the city was previously designated as a "*Playgroundian City*" (Lopes & Neto, 2014).

Stevens (2007) in his book, "The Ludic City", explains that the city sociophysical environment creates conditions for play because it has the capacity of re-linking objects under non-conventional relationships, and of potentiating recognition of irrational, pleasurable, unpredictable, spontaneous, reciprocal, non-hierarchical and non-instrumental relationships. The way children and young people act upon the elements of a city, very frequently, reveals a non-instrumental, highly creative and extra-ordinary character. This action-perception process generates meaningful landscapes of affordances in the urban realm for children and young people. Such subversive and transgressed forms of life are nuclear for the co-emergence of the city's ludic essence.

Turning the whole city in to a challenging physical, social and symbolic giant playground requires municipalities and city councils to include citizens, namely, children and young people, in the participatory public processes of urban planning. The use of *SoftGISchildren* methodology for this purpose is appropriate and recommended.

¹⁶ What is Placemaking?- Accessed at http://www.pps.org/reference/what_is_placemaking/ in 15/07/206.

5.2.8. Preview of hypothetical child-city transactional model

The hypothetical “Child-City Transactional model” (Figure 39) stemmed from the work developed across this PhD study on the interplay of mobility, affordances and urban space and it attempts to congregate the interdisciplinary theoretical and methodological identity of this thesis. Additionally, it represents the author’s conceptual thought on child-place interaction after having gone through the process of writing this thesis. It is important to underline that conceptual model here depicted is only a preview. A deeper and more critical analysis of theoretical structure is required, as is the testing of the model in future research works in order to validate its application.

The central theoretical premises of the proposed model were defined as:

- Place experience allows for perceivers and actors to capture a multi-range of significant properties or meanings in the sociophysical environment (social, emotional, functional, cultural and symbolic) which are displayed as multi-dimensional affordances.
- The content of multi-dimensional affordances reveals content of significant properties or layered functionalities of environmental features, as consequence of place experience.
- Place experience is a transactional process and depends simultaneously on the nature of the environmental feature and on the perceiver’s attributes.

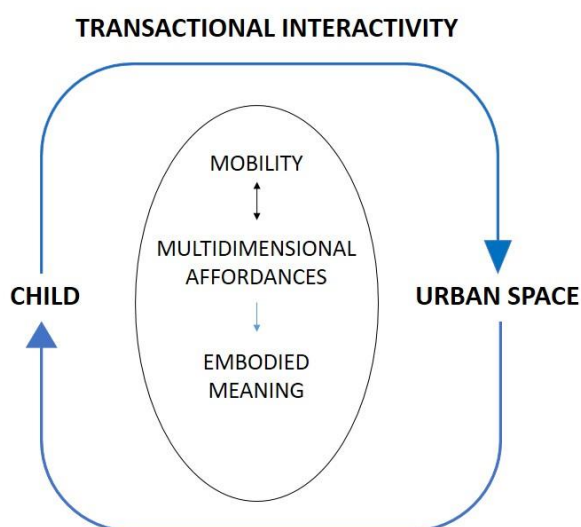


Figure 39-Hypothetical Child-City Transactional Model

Transactional dimensions of interactions are given by the specific expressional category given to the affordances. This is the reason why it is considered the concept “*multidimensional affordances*”, since it includes any expressional category of affordances. A particular category of affordances corresponds to a particular type of the child-place transactional relationship in

the sociophysical environment, constituted by a specific urban space typology where the affordance is actualized.

In the case, of this thesis work, categories of transactional interactions were designated as *Social Interactivity*, *Emotional Interactivity*, *Action-Functional Interactivity* and *Activity-Functional Interactivity*. *Functional Interactivity* is twofold in consonance with Kyttä and colleagues perspective on the functional meaningful places (Kyttä et al., 2012), where action level refers to affordances included in Heft's functional taxonomy of children's environments (i.e.: *climbing*, meaning a place where I climb); whereas activity level refers to a more general activity (i.e.: *going to the cinema*, meaning a place where I go to the cinema). For *social and emotional interactivity*, the affordances that integrate this concept are those related with social and emotional experience that takes place in the spatial environment (i.e.: *being with friends*, meaning a place where I am with friends; *calm*, meaning a place where I am calm, respectively).

In every type of transactional interactivity, which is designated by the operationalization of a specific expressional category of affordances, mobility and affordances are interdependent actions corresponding to key features of the model, where the latter is a compulsory condition for the transactional relationship between child and public space occur. Public space corresponds to a broader spectrum that congregates different types of urban environments with specific form and function (e.g.: street, square, green spaces, exterior play and sports spaces).¹⁷ Therefore, each child-place transactional relationship is always specific to an affordance that is perceived and or actualized in a type of public space. Concurrently, this affordance provides an embodied meaning of place for the child. Also, it is possible that a specific type of public space comprehends different single affordances, as well as different types of transactional interactivities, in other words, multidimensional affordances.

Hence, the child affects the environment and it is affected by it in an iterative creative cycle, where previous transactional interactivities give way to new transactional interactivities.

5.3. Research limitations

Although this study is noteworthy on a complex analysis of child-place interactions, it has also some limitations which should be considered when analyzing research results:

- The urban space typology was created by the researcher and although it was based on taxonomies which were reported in other works, it was not preliminarily tested and it is not validated. However, it is also true to say that it was specially devised for the effect of classifying meaningful places identified by participants across the three research groups.
- The process of classifying meaningful places was performed by the researcher. This might have resulted that those meaningful places that were not clearly visible and identified in the web map as a distinctive category, may have had another classification if done by another observer. To compensate this possible misreading of place typology,

¹⁷ A typology of urban open space was specifically devised for the purpose of this thesis. In the methodology chapter there is one section dedicated to this topic.

this places were classified as “other” within the typology used. Also, percentage of these “other” places is only of 4.3% within a total of 11 typologies, in whole research group.

- Participants were asked to select affordances and localize them on the web map in the place where these interactions occurred. Also, it was not asked for participants to take in consideration different types of urban typologies when locating affordances. This means that some of the places which were marked on the web map may have been located in a nearby area, without really considering a specific urban space typology. Consequently, it is possible to have existed place discrepancies between real intentioned place and digital typology classification. Also, some participants may have been locating affordances in a certain place in the map but in reality they may have taken place elsewhere. Nevertheless, these limitations could not have been overcome due to the nature of the research work and to the data collection instrument that was used. In spite of these setbacks, 1777 meaningful places were located, and although this is a much inferior number when compared with similar Finnish studies, it offers statistical reliability that compensates possible discrepancies.
- The clustering of affordances on each of the expressional categories (social, functional, leisure and emotional) was devised based on criteria defined by the author. In this sense, other criteria for each category of affordances could have been selected. However, each of the four criteria was coherently justified and applied within those terms.
- In the LM (Lisbon Modern) sample, the data collection survey used was supported by a more recent and advance *SoftGISchildren* software because the company (Mapita Inc.) who provided it periodically release updated software. This last version of the software was more user-friendly because it allowed participants to type in road names, or areas which were then focused on the web-map. This might have allowed participants more quickly find locations to mark meaningful places and, as a consequence mark identify more meaningful places. In fact, “LM” participants marked more places than participants in the other two groups.
- Data collection on “LH” group took place in the period between end of October and start of November 2014, whereas in LBS and LM groups, collection took place in May 2014 and February 2015, respectively. Also, it is possible that because data collection in LH group occurred near to the beginning of winter, children may have localized less meaningful places than in the other two groups, due to the fact that in this time of the year, in Portugal, they spend less time outdoors, as a consequence of a cultural habit.
- Additionally, another reason that may have contributed for differences in numbers of meaningful places per group is the internet connection speed. Although internet connection was usually efficient in data collection sessions, sometimes it may have been slower. That and the fact that some computers were less efficient than other may have caused in certain occasions technical difficulties to locate meaningful places and

use the survey tool. Nevertheless, participants in LM group more frequently travelled independently to meaningful places than those in the other two groups. It could be suggested that freedom in mobility experience may have helped participants to more easily locate places and mark affordances.

- Socioeconomic status was indirectly inferred from schools being public and private. Participants from “LH” and “LBS” groups were considered as having a shared heterogeneous socio-economic background, whereas “LM” participants were considered as having a dominant high socio-economic background. Consequently, socioeconomic status was used to define a research group characteristic and not an individual characteristic of participants. However, group socioeconomic status was not used as an independent variable in the inferential statistics used in this research. It was only used as a possible explanation on some considerations which were done when interpreting results, namely on differences found in the three research groups in terms of affordances and categories of affordances.
- Most statistical analyzes used in this research were based on descriptive statistics and just when analyzing specific relations between variables it was adopted inferential one. Although we believe that for the exploratory-descriptive kind of study this approach proved to be effective, we do realize that certain data assumptions which were made must be read bearing this statistical limitation. In this sense, often when elaborating about a certain finding it is adopted the expression “may”, or “might”.

5.4. Research innovations and future research

We believe that some aspects of the work developed across this thesis are innovative and groundbreaking for the study of children’s movement in the urban realm. Next, a few considerations on these aspects will be addressed, together with some proposals of future directions on research using *SoftGISchildren* methodology:

- To the best of our knowledge, this is the first investigation conducted in Portugal using *SoftGISchildren* methodology to study children’s independent mobility and child-place interactions in the environment; and, internationally, the first time where clustering of affordances within expressional category was implemented. Future research, should explore clustering of affordances and validate, or redefine the clustering typology in *SoftGISchildren* studies.
- As far as we know, this specific methodological gear that results from a combination of *SoftGIS* subjective data layer with an Urban Space Typology data layer created for the purpose of this research, has not yet been used in Portugal. However, a very recent noteworthy study conducted in Finland on children’s mobility and different types of urban built environment has used *SoftGISchildren* survey and a typology of six built urban forms (Sarjala et al., 2015). This is not surprising because it was in Finland that *SoftGISchildren* methodology was devised, as it was mentioned on the introduction of this thesis.

Nevertheless, the urban space taxonomy created for the purpose of our research includes 11 different types of built environments. Such specification allows for a more extensive analysis of children's transactions in the city, more in line with the dynamical approach to the concept of "behavioral-settings", which was first conceptualized by Roger Barker and Herbert Wright in the 50's and further developed by subsequent scholars within the field of environmental psychology, as we have previously mentioned across the introduction of this thesis. Future research should explore the use of such urban space typology, or redefine it accordingly in *SoftGISchildren* studies.

- To the best of our knowledge, it is the first time in a research work using *SoftGISchildren* methods, that the web-map questionnaire has been used to analyze children's actual mobility vs. ideal mobility to meaningful places, and child-led vs. adult led functional and leisure affordances. It is, undoubtedly, crucial to capture children's perceptions of their life in the city based on daily mobility and place transactions; but simultaneously being able to capture children's desires for a better city it is, undeniably, relevant and opens the possibilities for further research on these two inter-related temporal aspects of children's lives, present and future. Web-map based surveys may be used in future research to capture children's perspective of an ideal child-friendly city, focusing on consulting participants on their opinion about physical aspects of built environment such as physical elements and structures and urban space typologies, on actualized affordances as the place is currently, and on perceived affordances after suggested changes (i.e. localize a meaningful place; if you were to change the physical structure of this place what would you do? Nothing; Make it more challenging; Replace it with another urban form; What would you do here after the changes?).
- In the methodology chapter of this thesis, when testing the Beta version of the *SoftGISchildren* survey, it was adopted, as far to what concerns us, an innovative approach in data collection procedure. One child, individually, completed the survey in the presence of the researcher. This allowed the child to be supported all the way by the researcher generating conditions for the child to share with the researcher verbal information associated with choices that were being done as completion of the survey took place. Another interesting possibility for future research would be using *SoftGIS* children survey associated to a longitudinal ethnographic, phenomenological approach to study participants' perceptual changes on meaningful places over time. On this suggestion, the same mapping survey could be used by a group of children from a particular neighbourhood so that collectively meaningful places would be localized and discussed in terms of layered meanings over a period of time.
- In the methodology chapter of this thesis, it was described a process of testing the reliability of *SoftGISchildren* survey. Four children completed the same survey twice, in individual sessions with the research's presence, separated one/two week(s) apart. As far as we know, such validation has never been done. We believe such procedure contributes

to reinforce children as competent actors and citizens, who are able to share valuable information with adults about daily life in the urban sphere.

- In this thesis children were considered as active participants and competent citizens on both data collection procedure and throughout the course of research. Although participants completed a web-map based survey, such software created conditions for participants to recall their urban daily life, mobility to important places, and interactions in those same places. *SoftGISchildren* “Cidade Ideal: Um jogo de imaginação gráfica!” served as a child-friendly platform enabling participants to actively voice valuable insights about the city based on their perception of the sociophysical environment and action on urban spaces.
- This PhD study shares a diversified theoretical and conceptual background yielded on the child-place relationship. It was devised an interdisciplinary mosaic composed by Environmental Psychology as nuclear field connected bilaterally with different areas of study, namely, Ecological Psychology, Bioecological Model for Human Development, Urban Planning, Urban Design, Sociology of Childhood and Children’s Geographies. In this way, it co-emerged a perspective on child-place relationship which ensures that such phenomena can be perspective through different lenses of knowledge, and maybe, even more important, it allows for authors of a specific field to perspective the phenomena with other lenses, without losing its own scientific background.

In our opinion, future research, as we have demonstrated previously, should explore deeply the use of clustering of affordances and urban space typology; integrate functionalities in the web-map survey to allow children to graphically imagine child-friendly structures and settings; and move towards a combination of *SoftGISchildren* methodology with other data collection methods, such as, semi-structured interview; mobility diaries, GPS data, accelerometers, photovoice; neighbourhood walking; etc.

We believe this would provide an even more ecological comprehensive view of child-place interactions and reveal other layers of meaning on the city and on its places for children.

5.5. Practical implications

Our research studies showed that in urban metropolitan areas mobility and place interaction for children and youth are promising within an area of 500 meters around the child’s home. Nevertheless, these results are still over casted by those found in Northern Europeans countries, where children’s well-being correlates with children’s high level of independent mobility(Shaw et al., 2015).

Hence, it is urgent to enhance children’s autonomous mobility and widen actualization of multidimensional affordances across vaster areas in the urban realm. The use of *SoftGISchildren* applications is indeed very promising. This kind of research allows the empowerment of children as active-participants, providing relevant information about their perceptions and experiences in the urban spheres. *SoftGISchildren* is a child-friendly methodology that can and should be constituted as a municipal platform for to initiate the cycle of children’s public participation in processes of urban planning. Also, and subsequently, it is a

means for local administrations access relevant data, to co-create public policies with children and youths that are child, youth and play friendly, under the auspice of articles 12 and 31 of Convention on the Rights of the Child (CRC).

It is fundamental that municipalities and specialized technicians considerer children's and youth's perspective and needs on the city's problems; their answers and solutions, which are frequently innovative and inclusive for all members of population Tonucci & Rissotto (2001). Adults, architects, and urban planners should co work with children and youths in reconceptualising the "City" as a "*Democratic Playground*"; thus in spaces that progressively become places for mobility; autonomy, play, solidarity and cooperation.

5.6. Conclusions

Two published studies on children's independent mobility in Portugal constituted the prologue of this investigation, and thus were integrated in this thesis as first handprint of children's and young people's mobility and place interaction in the urban territory. Child and parental written questionnaires were adopted in these two studies. It was concluded that children's independent mobility was very much restricted in the inner-city area of Lisbon due to a dominant motorized car culture and country specific cultural factors; and that complementary qualitative research was necessary towards a deeper comprehension of the phenomena.

Hence, the main goal of this PhD study was set to discuss child-place relationships by exploring interplay of mobility, affordances and use of urban spaces by children and youth in the metropolitan area of Lisbon. Inspired by seminal work developed by Kyttä et al. (2012) revealing children's behavioral patterns and meaningful places, *SoftGISchildren* methodology was adopted.

This methodology allowed for children and young people who participate in the research to be active participants in a child-friendly reliable data collection procedure based on their own daily mobility and place experiences in the environment. Thus, a cross-sectional exploratory and descriptive research was carried and specific methodological design was devised allowing the operationalization of an integrative research analysis framework hinged on descriptive, comparative and inferential analysis of children's transactional behavior in urban space.

Combination of *SoftGISchildren* subjective experiential data with an urban space typology, specially conceived for the purpose of this study; and the operationalization of the specific research analysis framework demonstrated to be effective by providing a more comprehensive reading of children's functional, social, leisure and emotional geographies in the urban realm. Our findings reinforce the pervasiveness and relevance of "social meaningful places" for children and young people's daily life in distinct urban settings.

REFERENCES

- Alparone, F. R., & Pacilli, M. G. (2012). On children's independent mobility: the interplay of demographic, environmental, and psychosocial factors. *Children's Geographies*, 10(1), 109–122.
- Altman, E., & Rogoff, B. (1987). World views in psychology: Trait, interactional, organismic, and transactional perspectives. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 1, pp. 7–40). New York: Wiley. <http://doi.org/citeulike-article-id:4045038>
- Arez, C., & Neto, C. (1999). The study of independent mobility and perception of the physical environment in rural and urban children. In *IPA Congress*. Lisbon.
- Baines, E., & Blatchford, P. (2012). *Children's independent mobility and travel to school*. London.
- Barker, R. G. (1963). On the nature of the environment. *Journal of Social Issues*, 19(4), 17–38.
- Barker, R. G. (1968). *Ecological Psychology: Concepts and Methods for Studying the Environment of Human Behavior*. (Stanford U). Stanford, CA.
- Barker, R. G., & Wright, H. F. (1951). *One Boy's Day* (Harper and). New York.
- Barker, R. G., & Wright, H. F. (1955). *MIDWEST and ITS CHILDREN: The Psychological Ecology of an American Town*. New York: Row, Peterson and Company.
- Bhosale, J., Duncan, S., Schofield, G., Page, A., & Cooper, A. (2015). A pilot study exploring the measurement of intergenerational differences in independent mobility. *Journal of Transport & Health*, 2(4), 522–528. <http://doi.org/10.1016/j.jth.2015.08.004>
- Björklid, P., & Gummesson, M. (2013). *Children's Independent Mobility in Sweden*. Stockholm.
- Björklid, P., & Nordstrom, M. (2004). Children's Outdoor Environment- A Reality with Diferent Interpretations. An International Comparative Study. Retrieved from http://people.su.se/~mnord/BU_PROJEKTBEKRIVNING_6_maj_2003-1.pdf
- Bonnes, M., & Bonaiuto, M. (2002). Environmental Psychology: From Spatial-Physical Environment to Sustainable Development. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 28–54). New York: John Wiley & Sons, Inc.
- Bonnes, M., & Nenci, A. M. (n.d.). Ecological Psychology. In Honorary Theme Editor(s) (Ed.), *Encyclopedia of Life Support Systems (EOLSS)* (Developed). Paris, France: Eolss Publishers. Retrieved from <http://www.eolss.net>
- Bonnes, M., & Secchiarioli, G. (1995). *Environmental Psychology: A Psycho-social Introduction*. SAGE Publications. Retrieved from <https://books.google.pt/books?id=WzwWUxhiEZIC>
- Brandão, P. (2008). *A identidade dos lugares e a sua representação colectiva. Base de orientação para a concepção, qualificação e gestão do espaço público. Série Política de Cidades 3*. Lisboa: DGOTDU.
- Brandstädter, J. (2006). Action Perspectives on Human Development. In R. M. Lerner (Ed.), *Handbook of Child Psychology- Theoretical Models of Human Development- Vol. 1* (6th ed., pp. 516–568). New Jersey: John Wiley & Sons, Inc.
- Broberg, A. (2015). *They'll never walk alone? The multiple settings of children's active transportation and independent mobility*. Aalto University.
- Broberg, A., Kytä, M., & Fagerholm, N. (2013). Child-friendly urban structures: Bullerby revisited. *Journal of Environmental Psychology*, 35, 110–120. <http://doi.org/10.1016/j.jenvp.2013.06.001>
- Broberg, A., Salminen, S., & Kytä, M. (2013). Physical environmental characteristics promoting independent and active transport to children's meaningful places. *Applied Geography*, 38, 43–52. <http://doi.org/10.1016/j.apgeog.2012.11.014>
- Broberg, A., & Sarjala, S. (2015). School travel mode choice and the characteristics of the urban built environment: The case of Helsinki, Finland. *Transport Policy*, 37, 1–10. <http://doi.org/10.1016/j.tranpol.2014.10.011>
- Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and*

- Design*. (Harvard Un). Cambridge, MA.
- Bronfenbrenner, U. (1989). Ecological systems theory. In R. Vasta (Ed.), *Six Theories on Child Development* (pp. 185–246). Greenwich, CT: JAI Press.
- Bronfenbrenner, U. (1993). Ecology of Cognitive Development: Research Models and Fugitive Findings. In R. H. Wozniak & K. W. Fischer (Eds.), *Development in Context. Acting and Thinking in Specific Environments* (pp. 3–44). Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education*, 3, 1643–1647.
- Bronfenbrenner, U. (2005). The Bioecological Theory of Human Development. In U. Bronfenbrenner (Ed.), *Making human beings human. Bioecological perspectives on human development* (pp. 3–15). Thousand Oaks, CA: SAGE Publications, Inc.
- Bronfenbrenner, U., & Evans, G. W. (2000). Developmental Science in the 21 [sup st] Century: Emerging Questions, Theoretical Models, Research Designs and Empirical Findings. *Social Development*, 9(1), 115–125. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=4407933&site=ehost-live&scope=site>
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In R. M. Lerner (Ed.), *Handbook of Child Psychology- Theoretical Models of Human Development- Vol. 1* (5th ed., pp. 993–1028). New Jersey: John Wiley & Sons, Inc.
- Bronfenbrenner, U., & Morris, P. A. (2006). The Bioecological Model of Human Development. In R. M. Lerner (Ed.), *Handbook of Child Psychology- Theoretical Models of Human Development- Vol. 1* (6th ed., pp. 793–828). New Jersey: John Wiley & Sons, Inc.
- Brown, B., Mackett, R., Gong, Y., Kitazawa, K., & Paskins, J. (2008). Gender differences in children's pathways to independent mobility. *Children's Geographies*, 6 ((4), 385–401.
- Brown, G. (2012). An empirical evaluation of the spatial accuracy of public participation GIS (PPGIS) data. *Applied Geography*, 34, 289–294. <http://doi.org/10.1016/j.apgeog.2011.12.004>
- Brown, G., & Kyttä, M. (2014). Key issues and research priorities for public participation GIS (PPGIS): A synthesis based on empirical research. *Applied Geography*, 46, 122–136. <http://doi.org/10.1016/j.apgeog.2013.11.004>
- Brown, G., & Reed, P. (2009). Public Participation GIS: A New Method for Use in National Forest Planning. *Forest Science*, 55(2), 166–182. Retrieved from <http://www.ingentaconnect.com/content/saf/fs/2009/00000055/00000002/art00007>
- Brown, G., & Weber, D. (2011). Public Participation GIS: A new method for use in national park planning. *Landscape and Urban Planning*, 102, 1–15.
- Carr, S., Francis, M., Rivlin, L., & Stone, A. (1992). *Public Space*. New York: Cambridge University Press.
- Castonguay, G., & Jutras, S. (2009). Children's appreciation of outdoor places in a poor neighborhood. *Journal of Environmental Psychology*, 29(1), 101–109. Retrieved from <http://www.sciencedirect.com/science/article/B6WJ8-4SH6BCY-1/2/11c72128323bb1a57141be703ffbaa6c>
- Chatterjee, S. (2005). Children's Friendship with Place: A Conceptual Inquiry. *Children, Youth and Environments*, 15(1), 1–26.
- Chillón, P., Panter, J., Corder, K., Jones, A. P., & Van Sluijs, E. M. F. (2015). A longitudinal study of the distance that young people walk to school. *Health & Place*, 31, 133–137. <http://doi.org/10.1016/j.healthplace.2014.10.013>
- Christensen, P., & James, A. (Eds.). (2008). *Research with Children: Perspectives and Practices* (2d ed.). London: Falmer.
- Christensen, P., & Mikkelsen, M. R. (2013). "There is Nothing Here for Us..!" How Girls Create Meaningful Places of Their Own Through Movement. *Children & Society*, 27(3), 197–207. <http://doi.org/10.1111/j.1099-0860.2011.00413.x>

- Claes, M., & Poirier, L. (1993). Characteristics and functions of friendship in adolescence. *La Psychiatrie de L'enfant*, 36(1), 289–308. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/8362017>
- Clark, C., & Uzzell, D. L. (2002). The Affordances of the Home, Neighbourhood, School and Town Centre for Adolescents. *Journal of Environmental Psychology*, 22(1-2), 95–108. <http://doi.org/10.1006/jevp.2001.0242>
- Cordovil, R., Lopes, F., Arez, C., Tojo, A., Moreno, D., Shruballs, S., ... Neto, C. (2012). Independência de Mobilidade das crianças portuguesas. In R. Mendes, J. Barreiros, & O. Vasconcelos (Eds.), *Estudos em Desenvolvimento Motor da Criança V*. Coimbra: Escola Superior de Educação de Coimbra.
- Cordovil, R., Lopes, F., & Neto, C. (2012). Children's independent mobility in Portugal: a shift from walking to driving. In *26th ICCP World Play Conference*. Tallin.
- Cordovil, R., Lopes, F., & Neto, C. (2015). Children's (in)dependent mobility in Portugal. *Journal of Science and Medicine in Sport*, 18, 299–303. <http://doi.org/10.1016/j.jsams.2014.04.013>
- Corsaro, W. A. (2011). *Sociologia da Infância* (2ª ed.). Artmed.
- Corsaro, W. A., & Eder, D. (1990). Children's Peer Cultures. *Annual Review of Sociology*, 16(1), 197–220. <http://doi.org/10.1146/annurev.so.16.080190.001213>
- Cosco, N. G., Moore, R. C., & Islam, M. Z. (2010). Behavior mapping: a method for linking preschool physical activity and outdoor design. *Medicine and Science in Sports and Exercise*, 42(3), 513–9. <http://doi.org/10.1249/MSS.0b013e3181cea27a>
- Costall, A. (1995). Socializing Affordances. *Theory & Psychology*, 5(4), 467–481. <http://doi.org/10.1177/0959354395054001>
- Delicado, A., & Alves, N. de A. (2010). Children, internet cultures and online social networks. In S. Octobre & R. Sirota (Eds.), *Colloque Enfance et cultures: regards des sciences humaines et sociales*. Paris. Retrieved from http://www.crinternet.ics.ul.pt/icscriancas/content/documents/delicado_almeidaalves.pdf
- Ding, D., Sallis, J. F., Kerr, J., Lee, S., & Rosenberg, D. E. (2011). Neighborhood Environment and Physical Activity Among Youth: A Review. *American Journal of Preventive Medicine*, 41(4), 442–455. <http://doi.org/10.1016/j.amepre.2011.06.036>
- Eisinger, A. (HCU H. U. (2012). *Agenda for Child-friendly Neighbourhood Planning-Policy Recommendations for European Cities to support children and young people*. Stuttgart.
- Fagerholm, N., & Broberg, A. (2011). Mapping and characterising children 's daily mobility in urban residential areas in Turku , Finland. *Fennia-International Journal of Geography*, 189, (2), 31–46.
- Francis, M. (1987). Urban Open Spaces. In E. H. Zube & G. T. Moore (Eds.), *Advances in Environment, Behavior, and Design, Vol. 1* (pp. 71–106). New York: Plenum Press.
- Francis, M. (2003). *Urban Open Space: Designing For User Needs*. Island Press. Retrieved from <https://books.google.pt/books?id=r4vm8owZFbgC>
- Franck, K. A. (2000). Loose Fit: Spaces of Possibility and Imagination. In *Metropolis 2000 - Which Perspectives? Cities, Social Life and Sustainable Development: IAPS 16 Conference Proceedings on CD-Rom*. Paris, France.
- Franck, K. A., & Stevens, Q. (Eds.). (2007). *Loose Space: Possibility and Diversity in Urban Life*. New York: Routledge. Retrieved from http://www.amazon.com/Loose-Space-Possibility-Diversity-Urban/dp/0415701171/ref=asap_bc?ie=UTF8
- Garrard, J. . (2009). *Active Transport: children and young people. An overview of recent evidence*. Melbourne.
- Gaver, W. W. (1996). Situating Action II: Affordances for Interaction: The Social Is Material for Design. *Ecological Psychology*, 8(2), 111–129. Retrieved from http://www.tandfonline.com/doi/abs/10.1207/s15326969eco0802_2
- Gibson, E. J., & Pick, A. D. (2000). *An Ecological Approach to Perceptual Learning and Development*. New York: Oxford University Press, Inc.
- Gibson, J. J. (1966). *The senses considered as perceptual systems*. Boston: Houghton Mifflin.

- Gibson, J. J. (1979). *The ecological Approach to Visual Perception*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.
- Gibson, J. J. (2014). The Theory of Affordances (1979). In J. J. Gieseeking, W. Mangold, C. Katz, S. Low, & S. Saegert (Eds.), *The People, Place, and Space Reader*. New York: Taylor & Francis. Retrieved from <https://books.google.pt/books?id=JdWWAwAAQBAJ>
- Gill, T. (2007). *No fear-Growing up in a risk averse society*. London: Calouste Gulbenkian Foundation.
- Ginsburg, K. R. (2007). The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds. *Pediatrics*, 119(1), 182–191. <http://doi.org/10.1542/peds.2006-2697>
- Goheen, P. G. (1998). Public space and the geography of the modern city. *Progress in Human Geography*, 22(4), 479–496. <http://doi.org/10.1191/030913298672729084>
- Golledge, R. G. (2002). The Open Door of GIS. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 244–255). New York: John Wiley & Sons, Inc.
- Graumann, C. F. (2002). The phenomenological approach to people-environment studies. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of environmental psychology* (pp. 95–113). New York: John Wiley & Sons, Inc.
- Grave, L., Rosado, A. R., Cardoso, C., Barreiras, D., & Serra, M. da G. (2011). *Carta Municipal do Espaço Público: caracterização da rede dos espaços exteriores de vivência colectiva*. Lisboa.
- Gunther, H. (2003). Mobilidade e affordance como cerne dos estudos Pessoa-Ambiente. *Estudos de Psicologia*, 8(2), 237–280.
- Habermas, J. (1984). The Theory of Communicative Action. In *Reason and the Rationalization of Society*. Cambridge: Polity Press.
- Hart, R. (1979). *Children's experience of place*. New York: Irvington Publishers, Inc.
- Hart, R. (1992). *Children's participation: from tokenism to citizenship*. Florence: UNICEF.
- Hart, R., & Moore, G. T. (1973). The Development of Spatial Cognition: A Review. In R. M. Downs & D. Stea (Eds.), *Image and Environment: Cognitive Mapping and Spatial Behavior*. Chicago: Aldine Publishing Company.
- Heft, H. (1988a). Affordances of children' environments: A functional approach to environmental description. *Children's Environments Quarterly*, 5(3), 29–37.
- Heft, H. (1988b). THE RECIPROCITY OF PERCEIVER AND ENVIRONMENT - THE EVOLUTION OF GIBSON,JAMES,J. ECOLOGICAL PSYCHOLOGY - LOMBARDO,TJ. *Journal of Environmental Psychology*, 8(4), 325–334. [http://doi.org/10.1016/s0272-4944\(88\)80038-0](http://doi.org/10.1016/s0272-4944(88)80038-0)
- Heft, H. (2003). Affordances, dynamic experience, and the challenge of reification. *Ecological Psychology*, 15(2), 149–180. Retrieved from <Go to ISI>://000185903000004
- Heft, H. (2012). Foundations of an Ecological Approach to Psychology. In S. D. Clayton (Ed.), *The Oxford Handbook of Environmental and Conservation Psychology* (pp. 11–40). New York: Oxford University Press.
- Heft, H. (2013). Environment, cognition, and culture: Reconsidering the cognitive map. *Journal of Environmental Psychology*, 33, 14–25. <http://doi.org/10.1016/j.jenvp.2012.09.002>
- Hillman, M., Adam, J., & Whitelegg, J. (1990). *One false move... A study of children's independent mobility*. London: Policy Studies Institute.
- Holt, K. S. (1975). Movement and Child Development. In *Spastics International Medical Publications*. London: Heinemann Medical Books.
- Hughes, B. (2002). *A Playworker's Taxonomy of Play Types* (2nd ed.). London: Playlink.
- Irvine, K. N., Warber, S. L., Devine-Wright, P., & Gaston, K. J. (2013). Understanding urban green space as a health resource: a qualitative comparison of visit motivation and derived effects among park users in Sheffield, UK. *International Journal of Environmental*

- Research and Public Health*, 10(1), 417–42. <http://doi.org/10.3390/ijerph10010417>
- JAMES, A. (2007). Giving Voice to Children's Voices: Practices and Problems, Pitfalls and Potentials. *American Anthropologist*, 109(2), 261–272. <http://doi.org/10.1525/aa.2007.109.2.261>
- Johansson, K., Hasselberg, M., & Laflamme, L. (2009). Exploring the neighborhood: a web-based survey on the prevalence and determinants of fear among young adolescent girls and boys. *International Journal of Adolescent Medicine and Health*, 21(3), 347–59. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20014638>
- Johansson, K., Hasselberg, M., & Laflamme, L. (2010). Young adolescents' independent mobility, related factors and association with transport to school. A cross-sectional study. *BMC Public Health*, 10(1), 635. <http://doi.org/10.1186/1471-2458-10-635>
- Jorgenson, J., & Sullivan, T. (2009). *Accessing Children's Perspectives Through Participatory Photo Interviews*. 2009 (Vol. 11). Retrieved from <http://www.qualitative-research.net/index.php/fqs/article/view/447/2890>
- Kahila, M., & Kytta, M. (2010). Softgis as a bridge-builder in collaborative urban planning. In S. Wallin, L. Horelli, & J. Saad-Sulonen (Eds.), *DIGITAL TOOLS IN PARTICIPATORY PLANNING* (Aalto Univ, pp. 13–36). Espoo: Centre for Urban and Regional Studies Publications.
- Kaufmann, L., & Clément, F. (2007). How Culture Comes to Mind: From Social Affordances to Cultural Analogies. *Intellectica*, 2(46), 1–30.
- Korpela, K., Kytta, M., & Hartig, T. (2002). Restorative experience, self-regulation, and children's place preferences. *Journal of Environmental Psychology*, 22(4), 387–398. <http://doi.org/10.1006/jevp.2002.0277>
- Krebs, R. J. (2002). A criança e o esporte: reflexões sustentadas pela Teoria dos Sistemas Ecológicos. In 9º Congresso de Educação Física e Desportos dos Países de Língua Portuguesa-Cultura e contemporaneidade na educação física e no desporto. E agora? São Luís.
- Kytta, M. (2002). Affordances of children's environments in the context of cities, small towns, suburbs and rural villages in Finland and Belarus. *Journal of Environmental Psychology*, 22(1-2), 109–123. <http://doi.org/10.1006/jevp.2001.0249>
- Kytta, M. (2003). *Children in Outdoor Contexts. Affordances and Independent Mobility in the Assessment of Environmental Child Friendliness*. Helsinki University of Technology. Helsinki University of Technology, Espoo.
- Kytta, M. (2004). The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *Journal of Environmental Psychology*, 24(2), 179–198. [http://doi.org/10.1016/s0272-4944\(03\)00073-2](http://doi.org/10.1016/s0272-4944(03)00073-2)
- Kytta, M. (2011). The inhabitant-friendly, health promoting urban structure. In *An international conference on Research into Inclusive Outdoor Environments for All* (pp. 11–18). Edinburgh: University of Edinburgh.
- Kytta, M., Broberg, A. K., & Kahila, M. (2012). Urban Environment and Children's Active Lifestyle: SoftGIS Revealing Children's Behavioral Patterns and Meaningful Places. *American Journal of Health Promotion*.
- Kytta, M., Hirvonen, J., Rudner, J., Pirjola, I., & Laatikainen, T. (2015). The last free-range children? Children's independent mobility in Finland in the 1990s and 2010s. *Journal of Transport Geography*, 47, 1–12. <http://doi.org/10.1016/j.jtrangeo.2015.07.004>
- Kytta, M., & Kahila, M. (2011). SoftGIS Methodology: Building bridges in urban planning. *GIM International*, 25(3).
- Lansdown, G. (2001). *Promoting children's participation in democratic decision-making* (UNICEF). Florence: Innocenti Research Centre.
- Lansky, S., de Gouvêa, M. C. S., & Gomes, A. M. R. (2014). Cartografia das infâncias em região de fronteira em belo horizonte. *Educação & Sociedade*, 35(128), 717–740.
- Lauwers, H., Meire, J., Vanderstede, W., & Van Gils, J. (2005). Methods in the making. Some methodological implications of considering children as actors. In *Changing perspectives in*

child and childhood research: time and place/space b. children's voices -CHILDHOODS 2005. Oslo: Childhoods.

- Lester, S. (2013). Playing in a Deleuzian Playground. In E. Ryall, W. Russell, & M. Maclean (Eds.), *Philosophy of Play*. London: Routledge.
- Lester, S. (2014). Bringing play to life and life to play. In *19th IPA World Conference*. Istanbul.
- Lester, S., & Russell, W. (2010). *Children's right to play: an examination of the importance of play in the lives of children worldwide* (No. 57). The Hague, The Netherlands.
- Lester, S., & Russell, W. (2014). Turning the World Upside Down: Playing as the Deliberate Creation of Uncertainty. *Children*, 1(2), 241–260. <http://doi.org/10.3390/children1020241>
- Lim, M., & Barton, A. C. (2010). Exploring insideness in urban children's sense of place. *Journal of Environmental Psychology*, 30(3), 328–337. Retrieved from <http://www.sciencedirect.com/science/article/B6WJ8-4YMPXBN-2/2/6193e969fdcf0247d67fdad8aef296db>
- Lopes, F. (2009). *Putos do Pombal: uma nova narrativa social?* University of Aveiro. Retrieved from <http://ria.ua.pt/handle/10773/1067>
- Lopes, F., Cordovil, R., Moreno, D., Pires, C., Sardeira, M., & Neto, C. (2011). Independência de mobilidade em crianças de meios urbanos distintos. In P. Mouroço, O. Vasconcelos, J. Barreiros, & R. Matos (Eds.), *Estudos em Desenvolvimento Motor da Criança IV* (pp. 275–284). Leiria: ESECS-IPL.
- Lopes, F., Cordovil, R., & Neto, C. (2014). Children's independent mobility in Portugal: effects of urbanization degree and motorized modes of travel. *Journal of Transport Geography*, 41, 210–219. <http://doi.org/10.1016/j.jtrangeo.2014.10.002>
- Lopes, F., & Neto, C. (2013). Independência de mobilidade das crianças nas cidades: a diversidade metodológica e as políticas públicas. In M. Carvalhal, E. Coelho, J. Barreiros, & O. Vasconcelos (Eds.), *Estudos em desenvolvimento motor da criança VI* (pp. 183–187). Vila Real: UTAD.
- Lopes, F., & Neto, C. (2014). A criança e a cidade: a importância da (re)conciliação com a autonomia. In R. Cordovil & J. Barreiros (Eds.), *Desenvolvimento Motor na Infância* (Edições FM, pp. 265–292). Cruz Quebrada: Faculdade de Motricidade Humana.
- Lynch, K. (1984). *Good city form*. Cambridge, MA: MIT Press.
- Machado, Z. (2008). *A criança, a cidade e os espaços de jogo. Estudo da independência de mobilidade, rotinas de vida cotidiana e percepção do espaço urbano em crianças de 10 e 12 anos de idade*. Faculdade de Motricidade Humana-Universidade Técnica de Lisboa, Lisboa.
- Mackett, R., Brown, B., Gong, Y., Kitazawa, K., & Paskins, J. (2007). Children's local travel behaviour - how the environment influences, controls and facilitates it. *11th World Conference on Transport Research*. Berkeley, California.
- Mackett, R. L. (2013). Children's travel behaviour and its health implications. *Transport Policy*, 26, 66–72. <http://doi.org/10.1016/j.tranpol.2012.01.002>
- Mapita. (2015). Maptionnaire. Retrieved July 11, 2015, from <https://maptionnaire.com/>
- Marcus, C. C., & Francis, C. (Eds.). (1998). *People Places: Design Guidelines for Urban Open Space* (2nd ed.). New York: John Wiley & Sons, Inc.
- Markevych, I. (2015). *Satellite-derived data on greenness and access to green spaces are related to children's health indicators*. Ludwig Maximilian University of Munich.
- Maver, J. A., Mead, B. J., Oglesby, C. A., Shrader, R. A., & Widule, C. J. (1968). *Introduction to human movement*. (H. P. Smith, Ed.). Massachusetts: ADDISON-WESLEY PUBLISHING COMPANY.
- Meire, J. (2004). Perils, pleasures and parents: children aged 10 to 13 on their growing autonomous mobility. In *2º Child in the City Congress*. London.
- Mikkelsen, M., & Christensen, P. (2009). Is Children's Independent Mobility Really Independent? A Study of Children's Mobility Combining Ethnography and GPS/Mobile Phone Technologies. *Mobilities*, 4(1), 37–58. <http://doi.org/citeulike-article-id:10786340>

doi: 10.1080/17450100802657954

- Min, B., & Lee, J. (2006). Children's neighborhood place as a psychological and behavioral domain. *Journal of Environmental Psychology*, 26(1), 51–71. <http://doi.org/10.1016/j.jenvp.2006.04.003>
- Moore, R. (n.d.). Moving. Retrieved June 16, 2015, from <http://naturalearning.org/sites/default/files/MooreMoving.pdf>
- Moore, R. (1986). *Childhood's domain. Play and place in child development*. London: Croom Helm.
- Moore, R., & Young, D. (1978). Childhood Outdoors: Toward a Social Ecology of the Landscape. In I. Altman & W. J. F. (Eds.), *Children and the Environment* (pp. 83–130). New York: Plenum.
- Moreno, D. N. (2009). *Jogo de Actividade Física e a Influência de Variáveis Biossociais na Vida Quotidiana de Crianças em Meio Urbano. Ciências da Motricidade*. Universidade Técnica de Lisboa: Faculdade de Motricidade Humana, Lisboa.
- Neal, Z. (2010). Seeking common ground: three perspectives on public space. *Proceedings of the ICE - Urban Design and Planning*, 163(2), 59–66.
- Neisser, U. (1994). Multiple systems: A new approach to cognitive theory. *European Journal of Cognitive Psychology*, 6(3), 225–241. <http://doi.org/10.1080/09541449408520146>
- Neto, C. (2001). Aprendizagem, desenvolvimento e jogo de actividade física. In *Aprendizagem Motora: Problemas e Contextos* (pp. 193–220). Lisboa: Edições FMH.
- Neto, C. (2006). *O Jogo e o Tempo Livre nas Rotinas de Vida Quotidiana de Crianças e Jovens*. Retrieved from http://www.drealg.min-edu.pt/upload/docs/ea/dsapoe_pes_art_7.pdf
- Neto, C., & Marques, A. (2007). Physical activity play and independent mobility in childhood. In *24th World Play Conference*. Brno.
- O'Brien, M., Jones, D., Sloan, D., & Rustin, M. (2000). Children's Independent Spatial Mobility in the Urban Public Realm. *Childhood*, 7(3), 257–277. <http://doi.org/10.1177/0907568200007003002>
- Oxford University. (2015). Oxford English Dictionary Online.
- Page, A. S., Cooper, A. R., Griew, P., Davis, L., & Hillsdon, M. (2009). Independent mobility in relation to weekday and weekend physical activity in children aged 10-11 years: The PEACH Project. *The International Journal of Behavioral Nutrition and Physical Activity*, 6(1), 2. <http://doi.org/10.1186/1479-5868-6-2>
- Pellegrini, A. D., & Smith, P. K. (1998). Physical activity play: The nature and function of a neglected aspect of play. *Child Development*, 69(3), 577–598. Retrieved from <Go to ISI>://000074836900003
- Pickering, J. (2000). On the Proper Treatment of Affordance: Formality or Mutuality? *Ecological Psychology*, 12(1), 71–77. http://doi.org/10.1207/S15326969ECO1201_8
- Pocewicz, A., Nielsen-Pincus, M., Brown, G., & Schnitzer, R. (2012). An Evaluation of Internet Versus Paper-based Methods for Public Participation Geographic Information Systems (PPGIS). *Transactions in GIS*, 16(1), 39–53. <http://doi.org/10.1111/j.1467-9671.2011.01287.x>
- Pordata, & Statistics Portugal. (2011). Census 2011. Retrieved from <http://www.pordata.pt/Municipios/Populacao+residente+segundo+os+Censos+total+e+por+grandes+grupos+etarios-22>
- Prezza, M., Alparone, F. R., Cristallo, C., & Luigi, S. (2005). Parental perception of social risk and of positive potentiality of outdoor autonomy for children: The development of two instruments. *Journal of Environmental Psychology*, 25(4), 437–453. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0272494405000721>
- Prezza, M., Stefania, P., Morabito, C., Cinzia, S., Alparone, F. R., & Guiliani, M. V. (2001). The influence of psychosocial and urban factors on children's independent mobility and relationship to peer frequentation. *Journal of Community and Applied Social Psychology*,

- Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1983). Place-identity: Physical world socialization of the self. *Journal of Environmental Psychology*, 3(1), 57–83. [http://doi.org/10.1016/S0272-4944\(83\)80021-8](http://doi.org/10.1016/S0272-4944(83)80021-8)
- Rantanen, H., & Kahila, M. (2009). The SoftGIS approach to local knowledge. *Journal of Environmental Management*, 90(6), 1981–90. <http://doi.org/10.1016/j.jenvman.2007.08.025>
- Reed, E. S. (1993). The Intention to Use a Specific Affordance: A Conceptual Framework for Psychology. In R. H. Wozniak & K. . Fischer (Eds.), *Development in Context. Acting and Thinking in Specific Environments*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Rietveld, E., & Kiverstein, J. (2014). A Rich Landscape of Affordances. *Ecological Psychology*, 26(4), 325–352. <http://doi.org/10.1080/10407413.2014.958035>
- Rissotto, A., & Tonucci, F. (2002). Freedom of movement and environmental knowledge in elementary school children. *Journal of Environmental Psychology*, 22(1-2), 65–77. Retrieved from <http://www.sciencedirect.com/science/article/B6WJ8-462T8K3-7/2/0b32ccb6cfec0c4ef2cec637010e3e5>
- Rudner, J. (2012). Public knowing of risk and children's independent mobility. *Progress in Planning*, 78(1), 1–53. <http://doi.org/http://dx.doi.org/10.1016/j.progress.2012.04.001>
- Sandalack, B. A., & Uribe, F. A. (2010). Open Space Typology as a Framework for Design of the Public Realm. In R. Barelkowski (Ed.), *The Faces of Urbanized Space* (pp. 35–74).
- Santos, M. P., Pizarro, A. N., Mota, J., & Marques, E. A. (2013). Parental physical activity, safety perceptions and children's independent mobility. *BMC Public Health*, 13(1), 584. <http://doi.org/10.1186/1471-2458-13-584>
- Sarjala, S.-M., Broberg, A., & Hynynen, A. (2015). Children and youth transport in different urban morphological types. *Journal of Transport and Land Use*. <http://doi.org/10.5198/jtlu.2015.803>
- Sarmento, M. J. (2002). AS CULTURAS DA INFÂNCIA NAS ENCRUZILHADAS DA 2ª MODERNIDADE. Retrieved January 17, 2013, from http://cedic.iec.uminho.pt/Textos_de_Trabalho/textos/encruzilhadas.pdf
- Schmidt, R. C. (2007). Scaffolds for Social Meaning. *Ecological Psychology*, 19(2), 137–151. <http://doi.org/10.1080/10407410701332064>
- Shaw, B., Bicket, M., Elliott, B., Fagan-Watson, B., Mocca, E., & Hillman, M. (2015). *Children's independent mobility. An International Comparison and Recommendations for Action*. London.
- Shaw, B., Watson, B., Frauendienst, B., Redecker, A., Jones, T., & Hillman, M. (2012). *Children's Independent Mobility: a comparative study in England and Germany (1971-2010)*. London.
- Sieber, R. (2006). Public Participation Geographic Information Systems: A Literature Review and Framework. *Annals of the Association of American Geographers*, 96(3), 491–507. <http://doi.org/10.1111/j.1467-8306.2006.00702.x>
- Soares, N. F. (2006). A investigação participativa no grupo social da infância. *Currículo Sem Fronteiras*, 6(1), 25–40.
- Sterdt, E., Liersch, S., & Walter, U. (2014). Correlates of physical activity of children and adolescents: A systematic review of reviews. *Health Education Journal*, 73(1), 72–89. <http://doi.org/10.1177/0017896912469578>
- Stevens, Q. (2007). *The Ludic City*. Oxon: Routledge.
- Stewart, T., Duncan, S., Chaix, B., Kestens, Y., Schipperijn, J., & Schofield, G. (2015). A novel assessment of adolescent mobility: a pilot study. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1), 18. <http://doi.org/10.1186/s12966-015-0176-6>
- Stokols, D., & Altman, I. (1987). Introduction. In D. Stokols & I. Altman (Eds.), *Handbook of Environmental Psychology* (pp. 1–4). New York: John Wiley & Sons.
- Talen, E. (2000). Bottom-Up GIS. *Journal of the American Planning Association*, 66(3), 279–

294. <http://doi.org/10.1080/01944360008976107>

- Thompson, C. W. (2002). Urban open space in the 21st century. *Landscape and Urban Planning*, 60, 59–72. [http://doi.org/10.1016/S0169-2046\(02\)00059-2](http://doi.org/10.1016/S0169-2046(02)00059-2)
- Tillberg Mattsson, K. (2002). Children's (in)dependent mobility and parents' chauffeuring in the town and the countryside. *Tijdschrift Voor Economische En Sociale Geografie*, 93(4), 443–453. <http://doi.org/10.1111/1467-9663.00215>
- Tonnelat, S. (2010). The sociology of urban public spaces. In H. Wanga, M. Savy, & G. Zhai (Eds.), *Territorial Evolution and Planning Solution: Experiences from China and France* (pp. 1–10). Paris: Atlantis Press.
- Tonucci, F. (2005). Citizen Child: Play as Welfare Parameter for Urban Life. *Topoi*, 24(2), 183–195. <http://doi.org/10.1007/s11245-005-5054-4>
- Tonucci, F., & Rissotto, A. (2001). Why do we need children's participation? The importance of children's participation in changing the city. *Journal of Community & Applied Social Psychology*, 11(6), 407–419. <http://doi.org/10.1002/casp.641>
- Tranter, P. (1994). Children's travel behaviours in Canberra: car-dependent lifestyles in a low-density city. *Journal of Transport Geography*, 2(4), 265–273. [http://doi.org/10.1016/0966-6923\(94\)90050-7](http://doi.org/10.1016/0966-6923(94)90050-7)
- Trevisan, G. P. (2012). Cidadania infantil e participação política das crianças: interrogações a partir dos Estudos da Infância. In L. V. Dornelles & N. Fernandes (Eds.), *Perspetivas sociológicas e educacionais em estudos da criança: as marcas das dialogicidades luso-brasileiras* (pp. 84–105). Braga: Centro de Investigação em Estudos da Criança-Universidade Minho.
- Tuan, Y.-F. (1983). *Espaço e lugar: a perspectiva da experiência*. São Paulo: DIFEL.
- UN General Assembly. (1989). UN Convention on the Rights of the Child. *Treaty Series*. United Nations. Retrieved from <http://www.refworld.org/docid/3ae6b38f0.html>
- UNICEF. (2014). General Comments of the Committee on the Rights of the Child: A Compendium for child rights advocates, scholars and policy makers.
- United Nations Children's Fund (UNICEF). (2012). *The State of the World's Children 2012. Children in an Urban World*.
- Van Vliet, W. (1983). Exploring the Fourth Environment An Examination of the Home Range of City and Suburban Teenagers. *Environment and Behavior*, 15(5), 567–588.
- Vanloon, J. (2011). *An examination of neighbourhood built and social environment influences on child physical activity patterns*. University of British Columbia.
- Wapner, S., & Demick, J. (2002). The Increasing Contexts of Context in the Study of Environment Behavior Relations. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 3–14). New York: John Wiley & Sons, Inc.
- Werner, C. M., Brown, B. B., & Altman, I. (2002). Transactionally Oriented Research: Examples and Strategies. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 203–221). New York: John Wiley & Sons, Inc.
- Weston, L. M. (2010). Building Cities for Young People: Why We Should Design Cities with Preteens and Young Teens in Mind. *Journal of Urban Design*, 15(3), 325–334. <http://doi.org/10.1080/13574809.2010.487809>
- Wicker, A. W. (2002). Ecological Psychology: Historical Contexts, Current Conception, Prospective Directions. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 114–126). New York: John Wiley & Sons, Inc.
- Zubrick, S., Wood, L., Villanueva, K., Wood, G., Giles-Corti, B., & Christian, H. (2010). *Nothing but fear itself: parental fear as a determinant of child physical activity and independent mobility*. Melbourne.

APPENDICES

Appendix 1 - Articles of Children's Independent Mobility



Original research

Children's (in)dependent mobility in Portugal



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ABSTRACT

Objectives: To characterize children's independent mobility in Portugal, by studying the influence of age, sex, school type (primary/secondary) and location (urban/rural). To explore associations between mobility licences and children's actual independent mobility.

Design: Cross-sectional study of 1099 children between 8 and 15 years of age and their parents. Children attended primary ($n = 660$, 49% boys, 69% urban) and secondary ($n = 439$, 43% boys, 72% urban) schools.

Methods: The Portuguese version of the child independent mobility survey (Policy Studies Institute, London) was completed. Parents reported the mobility licences granted to their children. Children reported their independent mobility on school journeys and on weekends. Differences were examined in mobility licences and independent mobility by sex, urban/rural setting and primary/secondary schools. Multiple logistic regression models examined the associations between different variables and actual independent mobility.

Results: Secondary school children are granted more licences and have greater levels of independent mobility than primary school children. Only 21% of primary school children and 45% of secondary school children come home from school actively and independently. Overall, sex does not influence the licences granted to children in Portugal but boys have greater levels of independent mobility during the weekends than girls. Children in rural settings report engaging in more activities during the weekend. The number of mobility licences granted to the child was identified as predictor for actual independent mobility on school days and during the weekend.

Conclusions: Portuguese children lack independent mobility. Complementary qualitative research will be important to inform about the better practices to tackle this problem.

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1. Introduction

Physical inactivity is considered “the fourth leading risk factor for global mortality”.¹ Although there are various correlates of physical activity, some of them show a consistent influence along different stages of lifespan. A review of 108 studies concluded that time spent outdoors is consistently and positively associated with children's physical activity, whereas sedentary behavior after school and on weekends is consistently and inversely associated with adolescent's physical activity.²

More recently, Schoeppe et al.³ confirmed the idea that children's independent mobility, which refers to the degree of freedom they have to move around in their local area without adult accompaniment, is an important correlate of physical activity.

Independent mobility has important implications for children's physical,⁴ cognitive⁵ and social⁶ development.

In 1990, a seminal study published by the Policy Studies Institute (PSI)⁷ showed that over the previous 20 years there had been a marked reduction in children's independent mobility in England. The report of the study titled ‘One False Move... a study in Children's Independent Mobility’ challenged the view that the reduction in child fatalities on the roads was mainly attributable to safer roads, showing that it was also due to a dramatic reduction in children's levels of independent mobility over the previous decades (i.e., instead of removing danger from the environment children had been removed from danger). Since then, there has been an international growing concern about the reduction of children's independent mobility. Recently the PSI surveys were repeated in England and international researchers were invited to conduct equivalent surveys in other countries. This study presents the main results of the Portuguese survey.

The study of children's independent mobility in Portugal has not been done nationwide before. Hence it is important to understand how freely Portuguese children interact with their environment

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and what factors might be related to their levels of independent mobility. Following the international guidelines produced by PSI, this study cross matched parents' and children's data and examined the mobility licences that parents grant to their children as well as actual indicators of independent mobility (e.g., way of traveling to and from school and number of independent activities during the weekend). The mobility licences are a set of rules defined by parents concerning permission for children to move around independently in their daily physical environment, for example, permission to cross roads or to ride a bicycle independently.⁷ The relationship between the mobility licences and children's actual independent mobility is also an important issue that has been addressed by some international partners⁸ and that should be explored in the Portuguese sample.

This study aims to describe the levels of independent mobility of Portuguese children; to investigate the influence of age, sex, and area of residence in the different mobility licences and in the number of independent weekend activities; and to analyze the associations between mobility licences and actual independent mobility.

2. Methods

The Portuguese versions of the international Child Independent Mobility questionnaires (for parents and children) were translated from the English version provided by the Policy Studies Institute and were completed by children from the 3rd to the 10th grade, aged between 8 and 15 years old. The questionnaires were completed in different public primary and secondary schools located in areas that were considered to be representative of five different areas requested by the international partners, namely: inner city (center of Lisbon, parish of São João de Brito, 223 child–parent dyads, population density 5143.4 people/km²), urban (Matosinhos, outer area of Oporto, 220 child–parent dyads, population density 4399.0 people/km²; and Linda-a-Velha, outer area of Lisbon, 72 child–parent dyads, population density 8620.3 people/km²), suburban (Brandoa, outer area of Lisbon, low economic conditions, 255 child–parent dyads, population density 8020.0 people/km²), small town (Silves, 192 child–parent dyads, population density 54.6 people/km²) and rural (Redondo, 137 child–parent dyads, population density 19.02 people/km²). In order to characterize the school areas, we used several sources of demographic and socio-economic information available in the official web sites of the local councils and/or parishes, together with the relevant information presented in the Statistics Portugal web site (INE). The areas of the schools were selected to include the north and south of Portugal and coastland and inland. Sixteen schools and 1099 child–parent dyads participated in the survey, which represents a response rate of 65.4%. For the urban/rural comparison, study areas were dichotomized as 'urban' (i.e., previously categorized as 'inner city', 'urban', 'suburban') and 'rural' (i.e., previously categorized as 'small town' and 'rural'). The data collection occurred during 2011 (Spring-time) in all areas except in the inner city area (Spring-time of 2012). Ethics approval was obtained from the Ethics Committee of Faculdade de Motricidade Humana and from the General Department of Education in Portugal.

Following initial contact and agreement with the principal of each school, a package was sent home to parents of the participating children, inviting them and their child to participate by completing the parent questionnaire and consent forms. Each parent questionnaire had a unique code that was linked to their child's questionnaire. Children with parental consent completed the survey at school (guided completion).

To measure mobility licences, parents were asked whether their child was allowed to: (1) cross main roads alone; (2) travel on their

own to places other than school (within walking distance of home); (3) travel home from school alone; (4) go out alone after dark; (5) travel on local (non-school) buses alone; (6) cycle on main roads alone. A mobility licences score was computed by summing the licences granted to the child (values range 0–6).

To measure the home–school distance, parents were asked to estimate the distance of their house to their child's school. Response options were: Less than 500 m; 500 m to 1 km; 1–2 km; more than 2 km. For data analysis a dichotomous variable was created relative to the home-school distance (i.e., up to 1 km, more than 1 km).

Children were asked about their travel mode to and from school on the day of the survey in two questionnaire items. Response options were: "Walked most or all of the way"; "Cycled"; "School bus"; "Local bus, train, tram or subway"; "Car"; "Other". Two child questionnaire items also asked about the level of accompaniment on those journeys. Response options were: "Traveled on my own"; "Parent"; "Another adult"; "Older child/teenager"; "Child of same age or younger". A dichotomous variable was created to identify children who traveled actively (i.e., walked or cycled) and independently (i.e., without adult accompaniment) on either journey.

Independent mobility on weekends was measured by the number of unaccompanied activities done by the child during the previous weekend. Children could choose the following activities: visited (1) friend's home, (2) relatives/grown-ups; went to (3) youth club, (4) shops, (5) library, (6) cinema; (7) spent time with friends after dark; (8) went to playground, park or sports field, (9) played sport or went swimming; (10) walked or cycled around; went to (11) concert or disco, (12) church. Children could report up to three "other" activities. Individual items were summed to give a score for independent activities on the previous weekend (possible range 0–15). A dichotomous variable was created to identify children who had done at least one activity without adult accompaniment on the weekend.

Descriptive data analysis was performed to examine the independent mobility of Portuguese children in general and according to age. Chi-square tests were used to investigate the differences in each independent mobility licence and in independent mobility on the school journey according to sex, urban/rural location, or school type (primary vs. secondary schools). The differences on the number of weekend independent activities done by these groups were investigated using independent *t*-tests.

Logistic regression analyses were performed to examine the associations between different variables and the odds of the child: (i) coming home from school independently (i.e., any travel mode without adult accompaniment); (ii) coming home from school actively and independently (i.e., walking or cycling without adult accompaniment); (iii) doing at least one independent activity on the weekend. Variables considered initially for the first two models were: age and sex of the child, distance from home to school, household access to car, number of mobility licences granted, and urban/rural location. The same variables, except for distance from home to school, were considered for the model related to weekend independent activities. We applied a stepwise selection procedure (backward and forward elimination (likelihood ratio), *p* in <0.05, *p* out >0.05). The final model included only factors with *p* <0.05. Results are presented as odds ratios (OR) with 95% confidence intervals (CI).

3. Results

The sample of 1099 parent–child dyads comprised: 660 primary school children (49% boys, 69% urban) (3rd to 6th grade) and 439 secondary school children (43% boys, 72% urban) (6th to 10th grade), with mean ages 9.8 (*SD*=1.5) and 13.8 (*SD*=1.6) years, respectively. Parents who filled in the questionnaire were

mostly mothers/female carers (82%), under 45 years (73%), who were employed (73% full time and 7% part time). According to parental reports about half of the children lived within 1 km of school (49%), and there were no significant differences in distance traveled to school between urban and rural children ($\chi^2(1) = .265$, $p = .639$). Most households had access to at least 1 car (74%), the percentage was slightly larger in rural than in urban households (78% vs 72%), but the differences were not significant ($\chi^2(1) = 3.74$, $p = .058$). Less than half of the Portuguese children went to school (34%) and returned home (42%) not accompanied by an adult, and less than 1/3 traveled actively (walked/cycled) and independently to (26%) and from (30%) school. About 2/3 of the children (67%) reported to have done at least one activity during the weekend which was not accompanied by an adult. The mean number of independent activities during the weekend reported by the children was 2.06 ($SD = 2.28$, median = 1, range 0–12).

The impact of age on the different independent mobility licences is presented in Table 1.

School type (primary vs. secondary), which is closely related to age, is an important variable for children's independent mobility since more secondary school children than primary school children were granted each licence, and more secondary than primary school children went to school (primary: 18%; secondary: 37%) and returned home (primary: 21%; secondary: 45%) actively and independently (all $ps < .001$). Primary school children engaged in fewer independent activities during the weekend ($M = 1.84$, $SD = 2.23$, median = 1, range 0–12) than secondary school children ($M = 2.39$, $SD = 2.32$, median = 2, range 0–11) ($t(1097) = 3.92$, $p < .001$).

The percentages of girls and boys granted the different licences were similar for all licences except for the licence to go on their own to other places other than school, which was granted to more boys (51%) than girls (44%) ($\chi^2(1) = 6.02$, $p = .016$). There were no significant differences in the percentage of girls and boys who traveled actively and independently to and from school. The major influence of sex was on the number of independent activities done during the weekend, which was greater for boys ($M = 2.43$, $SD = 2.51$, median = 2, range 0–12) than for girls ($M = 1.74$, $SD = 2.01$, median = 1, range 0–11) ($t(965) = 4.98$, $p < .001$).

School location (rural vs urban) also influences independent mobility in Portugal. A greater percentage of rural children than of urban school children are allowed to: go to places other than school on their own (53% vs. 45%) ($\chi^2(1) = 6.157$, $p = .014$), go out after dark (17% vs. 10%) ($\chi^2(1) = 9.672$, $p = .003$) and cycle on main roads alone (43% vs 27%) ($\chi^2(1) = 20.170$, $p < .001$). More urban than rural school children are allowed to travel on local buses alone (40% vs 29%) ($\chi^2(1) = 11.295$, $p = .001$). The percentage of children allowed to cross main roads (urban: 62%, rural: 67%) and to come home from school alone (urban: 48%, rural: 48%) was similar for urban and rural children. Rural children engage in more independent activities during the weekend ($M = 2.60$, $SD = 2.51$, median = 2, range 0–12) than urban children ($M = 1.83$, $SD = 2.14$, median = 1, range 0–11) ($t(541) = 4.82$, $p < .001$).

The results of the multiple logistic regression models are presented in Table 2. As expected, the distance from home to school is a strong predictor for coming home independently. In fact, considering the children that live more than 1 km away from the school, only about 30% of return home independently and only about 11% return home actively and independently. Being older and living in a household with no access to a car also increases the odds of children coming home from school actively and independently. However, after the distance to school, the number of mobility licences granted to the child is the most important variable for predicting independent and active mobility in the school-home journey. Children with more independent mobility licences and particularly boys are also more likely to engage in at least one independent activity on the weekend. Urban or rural location was not

a significant variable for predicting children's independent mobility in the school journey or on weekends. Despite the previously reported tendency for rural children to do more independent activities during the weekend than urban children, the urban or rural location failed to reach significance to be included in the multiple logistic regression model ($p = .059$).

4. Discussion

This study is the first large scale analysis of children's independent mobility in Portugal. Our main findings corroborated the results of previous studies in other countries that report low levels of children's independent mobility and an increase in car use in modern society.^{9–11} During school days only 30% of Portuguese children, from 8 to 15 years of age, travel home from school actively and independently. On weekends, 67% of the children engage in at least one independent activity outside their home, but no more than one independent activity for most children (median = 1). These results confirm a tendency for children to engage in sedentary activities within the home setting¹² and raise concerns about children's overall physical activity levels. The recommended 60 min of daily moderate-to-vigorous physical activity¹ are more difficult to attain if children have low levels of independent mobility and active travel.³

Of all the variables analyzed, age is the most directly correlated with children's levels of independent mobility in Portugal. As children grow older they are granted more licences of independent mobility and their levels of actual independent mobility also increase, both on the school journey and on weekends. International partners^{8,13} also report an increase in the number of independent mobility licences with age, but in Australia (unlike Portugal and England) fewer secondary than primary schoolchildren travel independently and actively on school journey.

Sex was not an influent factor on children's independent mobility on the school journey. There were no differences in most of the parental reports of the six independent mobility licences according to sex, which contradicts the results from previous studies.^{7,10,6} Sex only influenced the licence to go on their own to other places than school, which is granted to more boys than girls in Portugal. Maybe for that reason, boys were 1.4 times more likely than girls to engage in an independent activity outside their house during the weekend.

Area characteristics also influence the independent mobility licences granted to children in Portugal. More rural than urban children are allowed to go to places other than school, go out after and cycle on main roads on their own. Rural children also tend to engage in more activities during the weekend. However, having a greater number of mobility licences and being a boy are the best predictors for engaging in more independent activities during the weekend. The influence of area characteristics has been reported in previous studies⁷ and is correlated with economical, social and cultural differences between the families of those areas.⁵

The relationship between the mobility licences and children's actual independent mobility was also explored. Based on multiple logistic regression model estimates, we found strong associations between the mobility licences and different indicators of independent mobility, on school days and on weekends. More specifically, for each additional independent mobility licence granted to children in Portugal, their odds of coming home from school independently increase 2 times, their odds of coming home from school actively and independently increase 1.7 times, and their odds of doing at least one independent activity on the weekend increase 1.5 times. To our knowledge the relationship between mobility licences and actual mobility on school days and weekends has not been much explored in the literature. A previous

Table 1
Percentage of children who are granted the different mobility licences according to age.

Mobility licence	Children granted the licences by age group (%)							
	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs
Allowed to cross main roads	13.8	25.6	45.6	64.2	83.3	98.6	96.4	98.6
Allowed to go on their own to places other than school (usually goes alone/varies)	9.3	13.8	23.9	41.7	57.9	76.3	78.8	87.0
Allowed to come home from school alone	6.1	9.1	30.2	45.5	62.6	79.1	85.7	85.5
Allowed to go out after dark	0.8	1.0	2.6	2.8	8.7	15.6	27.4	41.8
Allowed to use buses	0.8	4.0	14.0	16.4	36.1	65.0	76.1	88.8
Allowed to cycle on main roads (if cycle owner)	4.0	12.2	10.6	25.0	34.1	52.2	65.8	76.8

Table 2
Multiple logistic regression model estimates for coming home from school actively and independently, for coming home from school independently, and for doing at least one independent activity on the weekend.

	Coming home from school independently ^a		Coming home from school actively and independently ^b		Doing at least one independent activity on the weekend ^c	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Age (years)	1.24	(1.09; 1.42)**	1.22	(1.05; 1.41)**	ns	
Distance home-school: up to 1 km (Ref. >1 km)	5.46	(3.49; 8.53)***	16.03	(9.70; 26.51)***	nc	
Household access to car: no (Ref. yes)	1.88	(1.16; 3.04)*	1.74	(1.08; 2.81)*	ns	
Mobility licences (n)	2.00	(1.70; 2.35)***	1.65	(1.39; 1.96)***	1.47	(1.34; 1.61)***
Sex: boy (Ref. girl)	ns		ns		1.44	(1.04; 1.99)*
School setting: rural (Ref. urban)	ns		ns		ns	

OR, odds ratio; 95% CI, 95% confidence interval; Ref., reference category; ns, non significant variables (not entered in the model after the selection procedure); nc, variable not considered for this model.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^a Hosmer–Lemeshow goodness-of-fit test statistic = 9.724, $p = 0.285$, correct predictions = 82.9%.

^b Hosmer–Lemeshow goodness-of-fit test statistic = 7.832, $p = 0.450$, correct predictions = 85.2%.

^c Hosmer–Lemeshow goodness-of-fit test statistic = 9.859, $p = 0.131$, correct predictions = 70.6%.

study⁸ found strong associations between mobility licences and walking/cycling independently to/from school, but the association between mobility licences and independent activities on the weekend were less clear than in our study. Living close to school (up to 1 km) and having no car in the household significantly increase the odds of children coming home from school actively and independently. These results are in line with previous research that considered trip distance as the determining factor in travel mode choice^{14,15} and in the odds of taking up and maintaining active commuting.¹⁶ Besides trip distance, car ownership has also been previously identified as negative correlate of active transport.¹⁷

Although this study provides an important picture of children's independent mobility in Portugal, it also has some limitations. The cross sectional design and the type of questions of the survey, which focused specifically on that day or on the previous weekend, might present some bias due to atypical behavior or seasonal influences in the levels of independent mobility. On the other hand, to better understand the correlates of independent mobility, complementary qualitative research might be necessary.

5. Conclusions

This study highlights the low levels of independent mobility among Portuguese children on the school journey and on weekends. Only 21% of primary school children and 45% of secondary school children come home from school actively and independently and the median number of weekend independent activities is 1 for primary school children and 2 for secondary school children. The fact that children are frequently driven to school and other destinations has a negative impact on their overall levels of physical activity.¹⁸ This is an important public health concern since it has been shown that both independent mobility and active travel

confer important health benefits for children.³ After this first large scale analysis, complementary qualitative, child-centered and local sensitive research will be important to inform about the better practices to promote children's active and independent mobility during school days and weekends.

Practical implications

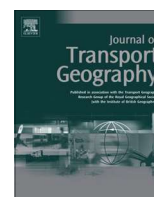
- Less than 1/3 of Portuguese children travel actively and independently on the school journey.
- Primary school children have lower levels of independent mobility than secondary school children. Parental concerns about independent mobility at younger ages should be addressed and parents should be informed about the physical, cognitive and social benefits of active and independent mobility.
- There are strong associations between the number of mobility licences granted to children and actual independent mobility on school days and during weekends.
- Programs to promote children's active and independent travel in Portugal should be local sensitive and age sensitive but should mainly target primary school children, urban areas and weekend activities for girls.

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References

1. WHO. *Global recommendations on physical activity for health*, Geneva, World Health Organization, 2010. Available from: http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf. Accessed 27 November 2013.
2. Sallis JF, Prochaska JJ, Taylor WC. A review of correlates of physical activity of children and adolescents. *Med Sci Sports Exerc* 2000; 32(5):963–975.
3. Schoeppe S, Duncan MJ, Badland H et al. Associations of children's independent mobility and active travel with physical activity, sedentary behaviour and weight status: a systematic review. *J Sci Med Sport* 2013; 16(4):312–319.
4. Page AS, Cooper AR, Griew P et al. Independent mobility in relation to weekday and weekend physical activity in children aged 10–11 years: the PEACH Project. *Int J Behav Nutr Phys Act* 2009; 6:2.
5. Rissotto A, Tonucci F. Freedom of movement and environmental knowledge in elementary school children. *J Environ Psychol* 2002; 22(1–2):65–77.
6. Brown B, Mackett R, Gong Y et al. Gender differences in children's pathways to independent mobility. *Child Geogr* 2008; 6(4):385–401.
7. Hillman M, Adams J, Whitelegg J. *One false move . . . A study of children's independent mobility*, London, Policy Studies Institute, 1990.
8. Carver A, Timperio AF, Crawford DA. Young and free? A study of independent mobility among urban and rural dwelling Australian children. *J Sci Med Sport* 2012; 15(6):505–510.
9. Kytta M. The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *J Environ Psychol* 2004; 24(2):179–198.
10. Hillman M. *Children, transport and quality of life*, London, Policy Studies Institute, 1993.
11. Fyhri A, Hjorthol R, Mackett RL et al. Children's active travel and independent mobility in four countries: development, social contributing trends and measures. *Transp Policy* 2011; 18(5):703–710.
12. Dollman J, Norton K, Norton L. Evidence for secular trends in children's physical activity behaviour. *Br J Sports Med* 2005; 39(12):892–897, discussion 897.
13. Carver A, Watson B, Shaw B et al. A comparison study of children's independent mobility in England and Australia. *Child Geogr* 2013; 11(4):461–475.
14. Lee C, Moudon AV. Physical activity and environment research in the health field: Implications for urban and transportation planning practice and research. *J Plann Lit* 2004; 19(2):147–181.
15. Davison KK, Werder JL, Lawson CT. Children's active commuting to school: current knowledge and future directions. *Prev Chronic Dis* 2008; 5(3):A100.
16. Panter J, Corder K, Griffin SJ et al. Individual, socio-cultural and environmental predictors of uptake and maintenance of active commuting in children: longitudinal results from the SPEEDY study. *Int J Behav Nutr Phys Act* 2013; 10(1):83.
17. Saelens BE, Sallis JF, Frank LD. Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning literatures. *Ann Behav Med* 2003; 25(2):80–91.
18. Mackett RL, Brown B, Gong Y et al. Children's independent movement in the local environment. *Built Environ* 2007; 33(4):454–468.



Children's independent mobility in Portugal: effects of urbanization degree and motorized modes of travel



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ABSTRACT

This study is aimed to evaluate the impact of urbanization in children's independent mobility in Portugal. Mobility licenses, actual mobility, fear of traffic, stranger danger and sense of community were compared in highly, moderately and non urbanized environments and according to gender. Results showed that increase of urbanization leads to a decrease of children's licenses to independently cross and cycle main roads; go out after dark and go to places other than school. The rising of urbanization leads to an increase of children's mean age for independent active travel; and at the same time a decrease of independent active school-home travel and leisure time activities. Parental fear regarding traffic is the most frequent cause for concern regarding children's safety when they are outdoors. Stranger danger and low sense of community are more prevalent in parents from the highly-urbanized environment. Overall, girls enjoy less actual mobility than boys. The discussion shows that children's freedom of movement in the highly-urbanized setting is very restricted due to a pervasive automobile dependence, proposing a shift from a motorized to a walkable city.

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1. Introduction

1.1. Children's independent mobility

Children's independent mobility (CIM) has been a crucial topic of research and one of major importance in children's lives (Hillman et al., 1990; Johansson et al., 2010; Prezza, 2007). CIM refers to the opportunities for children being able to move freely, explore and play in their local physical surroundings at their own pace and time, towards a progressively wider freedom of movement and acquisition of knowledge about the environment (Björklid, 2004). According to Rudner (2011), CIM focuses on the usage of public space by people under 18 years of age on their own, that is without being accompanied by adults.

Several studies acknowledge that children's independent mobility contributes to the overall health and well-being (Fagerholm and Broberg, 2011; Mackett et al., 2005a; Mackett and Paskins, 2008). On this topic, Brown et al. (2008) identified the benefits of children's independent mobility summarized from other European research, such as: development of motor skills; increase in additional physical activity; influence on cognitive

development by helping children to increase their way-finding abilities, and also the development of emotional bonds between children and the natural environment. A study conducted by Rissotto and Tonucci (2002) in Italy concluded positively about the role of freedom of movement in acquiring, processing and structuring environmental knowledge. A systematic review of studies done by Schoeppe et al. (2012) showed that children who are autonomous playing outdoors and traveling actively undertake more physical activity than those who are not.

Conversely, many studies refer to the negative effects of constraining children's autonomy and freedom of movement in the context of children's development and overall well-being such as, hindering the acquisition of environmental knowledge (Hillman, 1993); avoiding risk contact interactions in the physical environment and jeopardizing the development of resilience (Gill, 2007). Also, restricting the development of social and motor skills (Hüttenmoser, 1995) as well as spatial and analytical competence (Rissotto et al., 2006) adds to the problem. Equally, reducing the opportunities for outdoor and indoor independent play with peers (Prezza et al., 2001); decreasing opportunities for physical activity (Armstrong, 1993), accompanied with less spending of activity calories (Mackett et al., 2005a, 2005b) and increasing of weight, obesity and sedentary activities among children (Whitzman et al., 2010) lead to further constraints of children's autonomy. Furthermore, a recent study conducted by Pacilli et al. (2013),

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using an integrative model, revealed that loneliness, as a result of weak communities ties, low sense of security and less frequent social activities with peers, is a consequence of children's low independent mobility.

Nevertheless and despite its crucial importance on children's well-being and development, several studies indicate that children's independent mobility has drastically reduced throughout the last decades in many countries, such as Portugal (Arenz and Neto, 1999), England and Australia (Carver et al., 2013) and New Zealand (Oliver et al., 2011).

The decrease of CIM seems to be related with a set of environmental and sociocultural transformations that have taken place in industrialized countries over the past few decades. According to Tranter and Sharpe (2012), these changes have a common denominator sustained on the availability of cheap oil, which enabled modern urban societies to favor the widespread use of car on public space. This pedestrian unfriendly urban planning supports the pervasiveness of a motorized car culture, increasing parental concern on children's safety due to the risk of them being involved in car caused accidents, as a consequence of fast and reckless driving and lack of walking facilities and crossings (Malone and Rudner, 2011). Fyhri et al. (2011) carried out a study in Denmark, Finland, Great Britain and Norway, and concluded that longer distances to school, traffic, parents own convenience, children attending organized leisure time activities, more time pressure to families, increased access to car and use of mobile phones for transport arrangements have caused a decrease on children's active and independent mobility. Social fears reported by parents as fear of crime, stranger danger, abduction and being bullied or molested by older children are also documented as obstacles to children's freedom in public space (Alparone and Pacilli, 2012; Gill, 2007; Zubrick et al., 2010).

1.2. Mobility licenses and modes of travel

CIM was first operationalized by the work of Hillman et al. (1990), as a set of licenses granted by parents allowing children to move around autonomously in the environment. This set of licenses is defined as whether children are allowed without adult supervision to: cross main roads, travel the home-school journey, go to other places than school (walking distance scope), ride their bicycle, use public transportation and go out after dark (Carver et al., 2013; Hillman et al., 1990; Kyttä, 1997, 2004; O'Brien et al., 2000). Likewise, children's traveling to places without the accompaniment of adults is associated with active transportation such as walking, cycling and public transport use (Fyhri et al., 2011; Hillman et al., 1990; Sharpe and Tranter, 2010). School and leisure time activities are meaningful places for children (Broberg et al., 2013; Kyttä et al., 2012) and therefore should be accessed and traveled to autonomously and actively (Rissotto and Tonucci, 1999).

However, recent and past data has concluded that most children are being driven to school and to leisure time activities, preventing them of active travel forms (Mackett, 2002; Mammen et al., 2012; McLaren and Parusel, 2012). On this topic, Hjorthol and Fyhri (2009) show in their study a decrease in children's autonomy when going to leisure activities, these generally being organized and taking place outside the immediate neighborhood. The authors also mention that a large proportion of Norwegian children, between 6 and 12 years old, are driven to organized leisure activities. Simultaneously, they found out that increasing parental anxiety about traffic caused a decrease in children's independence. According to Deka (2013) adults' choice of driving to work significantly increases the probability of children being driven to school and decreases their likelihood of walking and cycling.

1.3. Degree of urbanization and children's independent mobility

According to Johansson (2006) study about CIM to leisure places adopting Küllers Human Environment Interaction (HEI) model, parental decision to allow for child's independent or driven mobility is an emotional process influenced by the characteristics of the leisure activity, physical and social environment, individual parental factors and characteristics of the child. Also, in the study conducted by Alparone and Pacilli (2012), the authors conclude that CIM is influenced by the interplay of personal, environmental and psychosocial variables hinged on the bioecological model of human development proposed by Bronfenbrenner (1979). Based on the previous theoretical models, physical environment characteristics either promote or hinder CIM. Hence, the degree of urbanization is a rather relevant environmental feature that influences parents decision to enable or unable children's independent travel, as well as it may potentiate or hinder children's possibilities to actualize their interactions with the environment. On this subject, Kyttä (2004) notes that characteristics of the environment, as well as the degree of freedom children have to explore it have great impact on how they perceive, act and move in their surroundings. If in the past it was clearer that rural environments afforded better possibilities for children's freedom of movement than more urbanized environments, nowadays, consistent results in many studies confront those earlier findings (Broberg et al., 2013; Carver et al., 2012; Kyttä et al., 2012).

1.4. Aim of study

A considerable amount of research has been produced internationally about CIM and its variation in terms of the urban/rural environment dichotomy. In Portugal, so far, most available data on CIM is of descriptive nature. Preliminary results of an international research show that CIM of Portuguese children occupies the 10th place among a total of 16 countries, led by Finland and followed by Japan and reared by Italy and Sri Lanka, respectively (Bicket, 2013). However, less attention has been paid to the influence of urbanization in children's freedom of movement. Moreover, national research has been scarce in studying how prone the city environment is for children's autonomy and independent active travel. Therefore, the current research closes this gap by addressing children's mobility in the above terms in order to gain a more wholesome perspective of this phenomenon. The purpose of this paper is firstly to characterize psychosocial factors that affect CIM, namely, parental fears regarding children's safety; and perception on sense of community, in the highly, moderately and non-urbanized environments. Secondly, is to assess how children's mobility licenses and actual mobility vary in a highly, moderately and non urbanized types of environment. Lastly, is to draw attention to the specific case of CIM in the highly-urbanized setting (city environment) proposing a shift in the city from a motorized and dependent children's mobility to an active and autonomous one.

2. Methodology

2.1. Participants

Participants were selected from the Portuguese sample ($n = 1099$, 16 schools involved) which was part of an international comparison research on CIM, led by researchers at *Policy Studies Institute* (PSI), London. According to the international CIM research guided by PSI, five types of settlements were indicated, "Inner City", "Urban", "Suburban", "Small Town" and "Rural".

To study effect of urbanization degree in CIM, three types of environments were extracted from the original sample, namely,

“Inner City” ($n_1 = 223$; 54% boys, 46% girls) as “highly-urbanized”; “Small town” ($n_2 = 192$, 44% boys, 56% girls) as “moderately-urbanized”; and “Rural” ($n_3 = 137$, 48% boys, 52% girls) as “non-urbanized”. The urbanizing categories of our sample were devised upon population density and other relevant territorial information available in the official web sites of the local councils, and in the Statistics Portugal web site (INE). The “highly urbanized” setting is constituted by the areas that correspond to the center of Lisbon (parish of São João de Brito). This is considered a typical consolidated inner urban area with moderate dense housing, easy access to public transport, different services and cultural areas, and with a population density of 5143.4 people/km². The “moderately-urbanized” setting corresponds to the small town of Silves in the south of the country. Silves has a population density of 54.6 people/km²; limited use of public transportation (due to lack of connections); moderate dense housing, different services and cultural areas; characterized by a loss of active population in the last 30 years due to migratory fluxes. The “non-urbanized” setting corresponds to Redondo in the southeast-central of the country. Redondo is a typical rural area characterized by a concentrated settlement of houses and population and by the desertification tendency of rural spaces. It has a population density of 19.02 people/km², restricted access to public transportation (almost nonexistent), few services and lack of cultural areas. For some analysis children were grouped in primary (3rd to 6th grade; $M_{age} = 9.81$ yrs; $SD = 1.45$) and secondary (7th to 10th grade; $M_{age} = 13.89$ yrs; $SD = 0.99$) school types. In order to conduct this study, Ethics approval was obtained from the Ethics Committee of Faculdade de Motricidade Humana, Universidade de Lisboa, as well as authorization from the General Department of Education from the Portuguese Education and Science Ministry.

2.2. Methods and data collection

The international child independent mobility questionnaires for parents and children used by PSI researchers were translated to Portuguese. Following initial contact and agreement with each school, parental consent for each child and parent participation in the study was requested. Parents were sent a package with a consent form and a parental questionnaire to be completed at home. Children that were allowed to participate have also completed a questionnaire in school. In order to link the correct questionnaires between parents and children, each dyad was linked by a unique and shared code on both questionnaires. Data collection occurred during 2011 (Spring-time) in the moderately and non-urban settlements and in 2012 (Spring-time) in the highly-urbanized one.

2.3. Measures and data analysis

The influence of gender was analyzed in this present study, in the overall sample and in some cases within the different territorial typologies. In order to characterize psychosocial factors that affect CIM, parental perception regarding children’s safety was measured as “reasons to collect children at school”, “concern about the risk of the child being injured in a traffic accident when crossing a road”; “sense of neighborhood safety” and “sense of community”. In order to study CIM according to the degree of urbanization, children’s age for independent active travel, mobility licenses, actual mobility in the home-school trajectory and in weekend leisure time activities were also measured. These variables and questions that were used to compose them and parents’/children’s possible answers are depicted in Table 1.

Frequency analysis and Chi Square tests were performed to analyze differences in reasons to collect children at school, mobility licenses and actual mobility on the home-school trajec-

tory among the three research environments and by gender. Univariate analysis of variance (ANOVA) and post hoc Scheffe tests were conducted to compare levels of concern about the risk of the child being injured in a traffic accident when crossing a road, sense of neighborhood safety, perception on sense of community, children’s age for independent active travel and actual mobility during weekend leisure time activities. Independent sample *t* tests were conducted to investigate gender differences in these variables. Also, descriptive statistics were used to calculate the frequency of each independent and non-independent activity and reasons to collect children at school.

2.4. Results

2.4.1. Psychosocial factors that affect CIM

2.4.1.1. Parental fears regarding children’s safety: traffic and social danger. In Table 2, findings about main reasons for parents to collect children at school are summarized. According to our results, traffic danger is the most representative concern in all three environments (51.6% in the highly-urbanized, 62.2% in the moderately-urbanized and 66.4% in the non-urbanized). These values are consistent with other findings, in the present study, showing a significant effect of the risk of a child being injured in a traffic accident when crossing a road on the parental level of concern according to the urbanization condition [$F(2, 523) = 4.876$, $p = .008$]. Post hoc tests indicated that parents from the highly-urbanized environment are less concerned about traffic than parents from the moderately-urbanized one. The second most cited cause of concern by parents in the highly and moderately settings is danger from adults, with values of 49.3% and 46.8%, accordingly, whereas only 34.3% of parents in non-urban area refer to it. Concerning parental level of agreement about the presence of some young people and adults in the neighbourhood that make them afraid to let their children play outdoors, significant differences were found according to the type of environment [$F(2, 505) = 6.012$, $p = .003$]. Post hoc tests indicated that parents in the three environments do not perceive young people and adults in their neighborhood as a threat for their children’s safety while they are playing outdoors. Specifically, parents from the non-urbanized environment are more confident that young people and adults in their neighborhood do not pose a threat to their children’s outdoor safety than parents from the highly-urbanized setting. The influences of gender in parental fears regarding traffic and social danger were only relevant in the highly urbanized environment, where danger from adults was the most representative reason for parents to pick their daughters up from school. In all other cases, traffic was always the main parental concern. Danger from adults was pointed out as relevant by more parents of girls (56.7%) than of boys (42.1%) ($\chi^2(1) = 4.468$, $p = .035$) in the highly urbanized setting.

2.4.1.2. Perception on sense of community. A significant effect regarding parental level of agreement about most adults in the neighborhood looking out for other people’s children was found for the three conditions [$F(2, 518) = 5.346$, $p = .005$]. Post hoc tests indicated that parents from the highly and moderately urbanized environments tend not to trust that other adults in the neighborhood supervise other people’s children, when compared to parents from the non-urbanized environment that are more convinced about other adults capabilities to supervise their children. No gender differences were found for this variable.

2.4.2. CIM and degree of urbanization

2.4.2.1. Children’s age for independent active travel. There was a significant effect of the age for children to travel on their own according to the type of environment [$F(2, 527) = 5.56$, $p = .004$]. Post hoc tests indicated that the mean ages were significantly different for

Table 1
List of dependent variables and questions.

Source of variable	Name of variable	Question	Answer	Answer recoding for further analysis
Parents questionnaire	<i>Reasons to collect children at school</i>	What are your <i>main</i> reasons for picking your child up from school?	List of ten answers (e.g. “concern about traffic danger”) ^a	
Parents questionnaire	<i>Concern about the risk of the child being injured in a traffic accident when crossing a road</i>	How worried are you about the risk of your child being injured in a traffic accident when crossing a road?	“very”; “quite”; “not very”; “not at all”; “don’t know/not sure”	
Parents questionnaire	<i>Sense of neighborhood safety</i>	Some young people and adults in the area make you afraid to let your children play outdoors	“agree strongly”; “agree”; “neither agree nor disagree”; “disagree”; and “disagree strongly”	“agree”; “neither agree nor disagree”; “disagree”
Parents questionnaire	<i>Sense of community</i>	Most adults who live in the neighbourhood look out for other people’s children in the area	“agree strongly”; “agree”; “neither agree nor disagree”; “disagree”; and “disagree strongly”	“agree” “neither agree nor disagree”; “disagree”
Parents questionnaire	<i>Age for independent active travel</i>	At what age did you/will you allow your child to independently: cross main roads, travel home from school, travel on local buses, and cycle on main roads?	Age to independently: cross main roads, travel home from school, travel on local buses, and cycle on main roads	Computed mean age of the four licenses into mean value
Parents questionnaire • Primary school children • Secondary school children	<i>Mobility licenses</i>	Is your child allowed to independently cross main roads, travel to places other than school (within walking distance of home), travel home from school, go out after dark, travel on local (non-school) buses and cycle on main roads?	Yes/no	
Children’s questionnaire • Primary school children • Secondary school children	<i>Actual mobility in the home-school trajectory</i>	<ul style="list-style-type: none"> • Who did you travel to school with this morning?/“Who will you travel home with today?” • “How did you get to school this morning?/“How will you go home today?” 	“travelled on my own”, “parent”, “another adult”, “older child” or “child of same age or younger” <ul style="list-style-type: none"> • “walked most of the way”, “cycled”, “school bus”, “local bus, train, underground or tram”, “car” or “other 	Independent Active travel to and from school ^b
Children’s questionnaire • Primary school children. • Secondary school children	<i>Actual mobility in weekend leisure time activities</i>	Which of these activities did you do this weekend? <ul style="list-style-type: none"> • on your own or with another young person • with a parent or other adult 	List of twelve options (e.g. went to a friend’s home, went for a walk or cycle) ^a	

^a Multiple choice was allowed.

^b This variable was computed by merging the variables that inform about the type of accompaniment to and from school (“goes independently (1)/goes with parent (0)”) with the variables that inform about the transportation mode to and from school (“goes actively (1)/doesn’t go actively (0)”). We considered that children went independently if no adult was accompanying them (i.e., when they went alone, with an older child, or with a child of same age or younger). We considered that they traveled actively when they walked or cycled to and from school.

the three groups of participants. Children from the non-urbanized environment are allowed to travel on their own from the mean age of 11 ($M = 11.05$; $SD = 1.86$), whereas children from the “moderately-urbanized” and “highly-urbanized” environments are only allowed active travel at the mean age of 12 ($M = 11.65$; $SD = 1.58$) and 13 ($M = 12.56$; $SD = 1.43$) years old. Overall, gender does not influence the mean age for children’s independent active travel [$t(520) = .642$, $p = .521$].

2.4.2.2. Mobility licenses. Gender did not influence the parental granting of mobility licenses, since there were no significant differences between the frequency of boys and girls granted any of the licenses for the whole sample, between primary and secondary groups, and within the 3 territorial typologies (all $ps > .05$). The results on CIM licenses and degree of urbanization for primary and secondary school children are shown in Fig. 1. In both cases, the percentage of children corresponds to those children who were granted each license by their parents among the total number of children in each of the research groups.

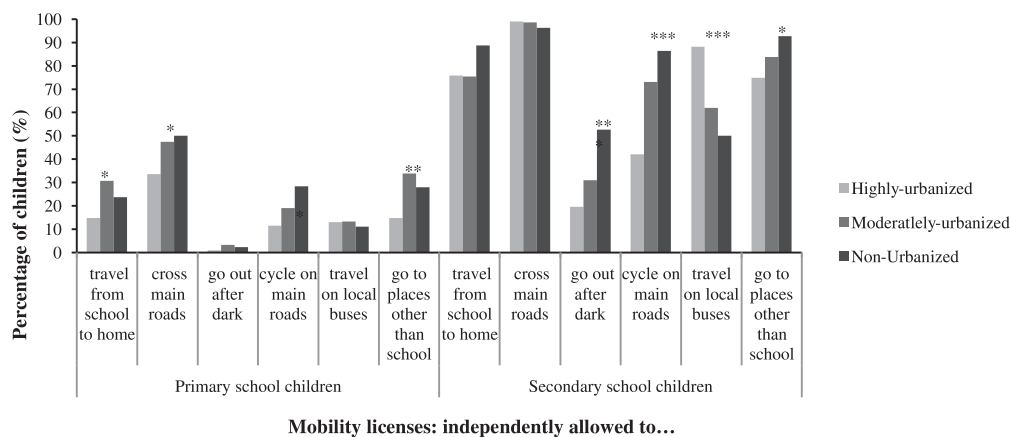
In terms of primary school category ($n_{\text{highly-urbanized}} = 115$; $n_{\text{moderately-urbanized}} = 124$; $n_{\text{non-urbanized}} = 82$), we found significant results in all independent mobility licenses, except on going out after dark and traveling on local buses. More children from the moderately urbanized setting were allowed to independently travel home from school (30.6%), followed by 23.8% of children from the non-urban and 14.8% of children from the highly-urban-

ized settings ($\chi^2(2) = 8.445$, $p = .015$). Regarding being allowed to independently cross main roads ($\chi^2(2) = 6.633$, $p = .036$), our findings show that in the non-urbanized and moderately-urbanized groups, a significant percentage of children, 50% and 47.5%, respectively, enjoyed this license, whereas only 33.6% of children from the highly-urbanized environment are allowed to do this. With regard to cycling independently on main roads, the trend is similar to the former license, showing higher percentage of allowed children in the non and moderately urbanized groups (28.4% and 19%) and 11.4% of children in the highly-urbanized setting ($\chi^2(2) = 7.531$, $p = .023$). Concerning going independently to places other than school ($\chi^2(2) = 11.176$, $p = .004$), the highest value of children that are allowed this license is registered on the moderately-urbanized environment (33.9%), followed by the non and highly urbanized areas, with 28% and 14.8%, respectively. With regard to the secondary school children ($n_{\text{highly-urbanized}} = 108$; $n_{\text{moderately-urbanized}} = 68$; $n_{\text{non-urbanized}} = 55$), we found differences, between the three environments on the licenses to independently go out after dark (52.7% in the non-urban, 30.9% in the moderately-urban, 19.6% in the highly-urban); cycle on main roads (86.4% in the non-urban, 73.1% in the moderately-urban, 42% in the highly-urban) and go to places other than school (92.7% in the non-urban, 83.8% in the moderately-urban, 74.8% in the highly-urban). These results are all statistically significant ($\chi^2(2) = 18.652$, $p < .001$; $\chi^2(2) = 25.746$, $p < .001$ and $\chi^2(2) = 11.176$, $p = .004$, respectively, for each of the former licenses). Regarding traveling independently

Table 2

Parental reasons to collect children at school. Percentage of parents that mention each reason according to the type of environment.

Parental reasons to collect children at school (multiple choice was allowed)	Highly-urbanized environment	Moderately-urbanized environment	Non-urbanized environment	Statistical relevance
Opportunity to spend time with my child	35.3	27.1	29.1	n.s.
Opportunity for exercise or to get out of house	1.4	5.9	5.2	$\chi^2(2) = 6.119, p = .047$
Concern about traffic danger	51.6	62.2	66.4	$\chi^2(2) = 8.693, p = .013$
Child unreliable or too young	30.2	22.3	18.7	$\chi^2(2) = 6.750, p = .034$
Danger from adults	49.3	46.8	34.3	$\chi^2(2) = 8.012, p = .018$
Fear of bullying by other children	16.7	16	15.7	n.s.
Opportunity to meet people	9.8	11.2	12.7	n.s.
On the way to an activity for you or the child	20.5	22.3	11.2	$\chi^2(2) = 7.010, p = .030$
School too far away	23.7	35.1	37.3	$\chi^2(2) = 9.286, p = .010$
Collecting younger sibling first	10.7	9.6	10.4	

Note: n.s. non significant, $p > .05$.**Fig. 1.** CIM licenses for primary and secondary school children according to urbanization degree.

on local buses, our results are significant ($\chi^2(2) = 28.580, p < .001$) among the three settings but with a different trend than the other licenses, since this one is more prevalent in the highly-urban setting (88.2% in the highly-urban, 62.1% in the moderately urban and 50% in the non-urban).

2.4.2.3. Actual mobility in the home-school trajectory. As regards to children's actual mobility when going to school and coming back home, see Fig. 2. We found significant differences in children's independent and active travel from home to school between the three environments, both in primary ($\chi^2(2) = 18.703, p < .001$) and in secondary ($\chi^2(2) = 6.551, p = .038$) school children. Concerning the primary children, the highest percentage of independent and active travelers occurs in the moderately-urbanized setting (22.6%). In the secondary children, the non-urban typology counts with the greatest percentage of independent and active mode of travel (43.6%). In terms of gender, and only for secondary school children in the highly urbanized area, significant differences were found between the percentage of boys (41.5%) and girls (22.2%) that go to school independently and actively ($\chi^2(1) = 4.590, p = .032$). Significant differences were also revealed in the analysis of the school-home trajectory in terms of independent active travel. For the primary group ($\chi^2(2) = 17.031, p < .001$), more children from the moderately-urban environment were independent and active on their way back home (27.4%). In terms of gender, and only for primary school children in the moderately urbanized area, significant differences were found between the percentage of boys (38.9%) and girls (19.4%) that go to school independently and actively ($\chi^2(1) = 5.619, p = .018$). As regards to the secondary group, more children from the non-urban environment travel

home from school independently and actively (60%), followed by those from the moderately and non urbanized environments, 38.2% and 34.3%, respectively. These differences were significant ($\chi^2(2) = 10.380, p = .006$).

2.4.2.4. Actual mobility in weekend leisure time activities. Considering the mean number of independent activities, children from the highly-urbanized environment were involved in 2 independent activities ($M = 1.83, SD = 2.13, \text{Median} = 1, \text{range} = 0-12$), whereas children from the moderately and non-urban environments took part in 3 independent activities ($M = 2.57, SD = 2.37, \text{Median} = 2, \text{range} = 0-12$ and $M = 2.63, SD = 2.71, \text{Median} = 2, \text{range} = 0-12$, respectively). The differences between settings were significant [$F(2,549) = 7.579, p = .001$]. Differences between gender were observed in the number of independent activities done by girls and boys of the moderately urbanized environment ($t(160) = 3.385, p = .001$) and of the non-urbanized environment ($t(120) = 2.314, p = .022$). In both environments, girls participated in about 2 non-accompanied activities during the weekend (moderately urbanized: $M = 2.02, SD = 2.09$; non-urbanized: $M = 2.13, SD = 2.32$), whereas boys participate in about 3 (moderately urbanized: $M = 3.18, SD = 2.52$; non-urbanized: $M = 3.20, SD = 3.01$).

With regards to mean number of non-independent activities, thus, accompanied journeys (with a parent or another adult) to leisure activities, our results are also significant [$F(2,549) = 11.823, p < .001$]. The highest number of non-independent activities is 4 and belongs to children from the moderately-urban setting ($M = 4.10, SD = 3.41, \text{Median} = 3, \text{range} = 0-12$), followed by 3 non-independent activities for children from the highly-urban group ($M = 3.09, SD = 2.98, \text{Median} = 2, \text{range} = 0-12$) and from the

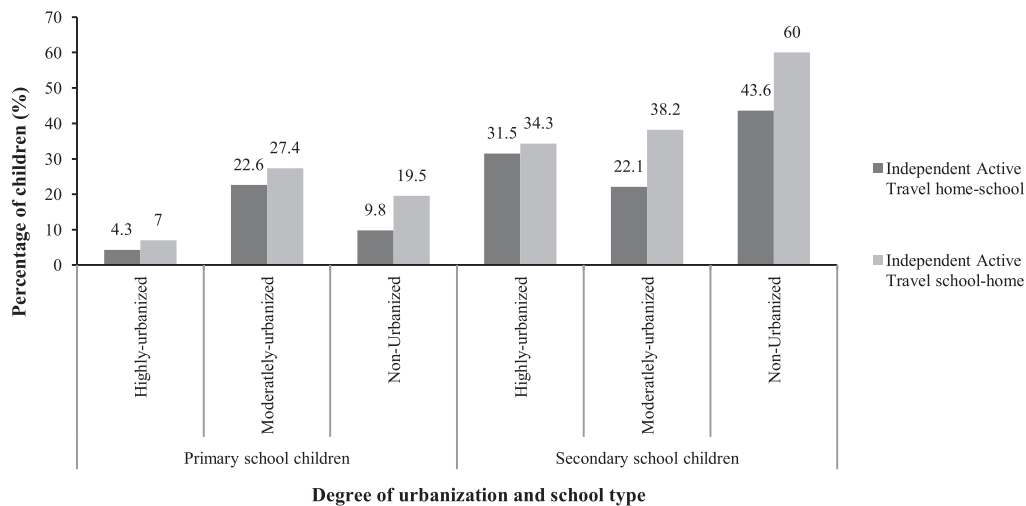


Fig. 2. Children's actual mobility in the home-school/school-home trajectory according degree of urbanization.

non-urban environment ($M = 2.73$, $SD = 2.48$, Median = 2, range 0–12). Non-urbanized area congregates the least number of non-independent activities. This result is not surprising if we consider previous findings on mean number of independent activities. No gender differences were found in the number of non-independent activities for any of the settings. The percentages of independent and non-independent activities done by children in each environment are presented in Tables 3 and 4, respectively. Each value corresponds to the percentage of children that took part in a certain activity, within each study group. Children were free to choose more than one option and could report to have done the same activity both independently or accompanied by adults.

2.5. Discussion

2.5.1. Environmental and psychosocial factors that affect CIM

In terms of parental concerns regarding children's safety, our results show that fear of traffic is the most prominent one in all three environments. In the non-urbanized setting more parents are concerned about this than in the other two settings. One possible reason to explain this is that children in the non-urbanized areas may be less exposed to traffic circulation than the other children. Consequently, their parents may look at them as less competent to deal with traffic issues, what might increase the percentage of parents of this group who feel this type of concern. In relation to the risk of children being injured in a traffic accident when crossing the road, our findings reinforce the former, showing that parents are strongly concerned about it. In terms of traffic concern and degree of urbanization, our findings show that this type of parental concern becomes more frequent as the urbanization degree of the environment decreases. This is consistent with Tillberg Mattsson (2002), who found that Swedish parents in the countryside environment are more worried about traffic as a threat for children's safety when they are outdoors than parents from the town environment. Conversely, Shaw et al. (2012), using the same methodology adopted in the present study, found that parents from a rural village in England are less concerned about children being at risk due to traffic danger than parents from the inner-city area. Moreover, Johansson (2006), based on a model of Human-Environment Interaction, concluded that attitudes towards driving children to places are based on parents' perceptions of environmental factors, namely, traffic danger. Stranger danger was found to be a significant cause of concern amongst the three types of environment. Our results show that frequency of perception of danger from

adults accompanies the decrease of urbanization degree. As to the gender differences related with danger from adults, our most interesting result is found in the highly urbanized environment. In this setting, stranger danger is more referred by girls' parents than by boys' as cause of concern when children are out by themselves. However, overall we found that parents are not afraid to let their children play outdoors because of the presence of other people in their neighborhood; and, specifically, parents from the non-urbanized environment are more at ease with the presence of other people in their neighborhood than parents from the highly-urbanized setting. These results about parental perception of social danger are consistent with those found by Prezza et al. (2005) in Italy revealing that perception of social danger was higher in mothers who live in larger urban contexts and who have more personal fear of crime and a lower sense of community. Also, our findings concur to those of many other studies referring that perception of stranger danger and traffic related concerns are alleged by parents as inhibitors for children's independent and/or active commuting to school (Björklid, 2004; Davison et al., 2008; Lam and Loo, 2013). With regard to parental perception on sense of community, Prezza et al. (2001) argue that stronger neighborhood relations, together with sense of belonging and of community enable more shared control and surveillance for children and help parents to perceive neighborhood as a safe place for their children to move about freely.

Our most relevant finding is that parents from more urban environments do not perceive a mutual surveillance network that gives security to children when they are out by themselves in their neighborhood. Furthermore, this may suggest that sense of community decreases with increase of urbanization degree. This concurs with other studies that have reported stronger sense of community in rural and small town areas than in typologies with a greater degree of urbanization (Obst et al., 2002; Roussi et al., 2006). However, other studies have shown the opposite, revealing that in places with a high degree of urbanization, the sense of community is greater than in less urbanized contexts (Prezza et al., 2009).

2.5.2. CIM and degree of urbanization

Children's mean age for independent active travel was found to diminish with the decrease of urbanization (13, 12 and 11 in the highly, moderately and non urbanized environments, respectively). The highly and moderately urbanized results are consistent with some findings of a recent research conducted in the state of

Table 3
Children's leisure activities accessed autonomously or with another child in each environment. Percentage of children that mention each activity according to the type of environment.

Independent activities (multiple choice was allowed)	Highly-urbanized environment	Moderately-urbanized environment	Non-urbanized environment
Went to a friend's home	24.2	39.6 ^a	35
Visited relatives or grown-ups	10.8	17.7 ^a	9.5
Went to a youth club	9.9	13	16.8 ^a
Went to the shops	12.6	13.5 ^a	10.9
Went to a library	10.3	21.9	25.5 ^a
Went to a cinema	10.3	8.9	15.3 ^a
Spent time with friends outside after dark	19.7	25	29.9 ^a
Went to a playground, park or playing fields	21.1	24	28.5 ^a
Played sport or went swimming	19.7	33.9 ^a	27
Went for a walk or cycled around	25.6	34.9 ^a	34.3
Went to a concert or nightclub	6.7	5.7	13.1 ^a
Visited a place of worship	4.9	8.9	11.7 ^a

^a Maximum percentage of children found in each activity.

Table 4
Children's leisure activities accessed with a parent or another adult in each environment. Percentage of children that mention each activity according to the type of environment.

Non-independent activities (multiple choice was allowed)	Highly-urbanized environment	Moderately-urbanized environment	Non-urbanized environment
Went to a friend's home	20.2	31.3 ^a	16.1
Visited relatives or grown-ups	52.5	55.7 ^a	54.7
Went to a youth club	15.7	21.4	24.8 ^a
Went to the shops	52.5	69.3 ^a	47.4
Went to a library	11.2	21.4 ^a	5.1
Went to a cinema	19.8	37.5 ^a	10.9
Spent time with friends outside after dark	12.6 ^a	9.8	8.8
Went to a playground, park or playing fields	21.5	32.8 ^a	24.1
Played sport or went swimming	26	31.8 ^a	10.9
Went for a walk or cycled around	25.6	34.4 ^a	19.7
Went to a concert or nightclub	13.9	23.4 ^a	16.8
Visited a place of worship	23.8	22.9	29.2 ^a

^a Maximum percentage of children found in each activity.

Victoria (Australia) where parents (with children aged under 18 living at home) said that, on average, children should be over 12 years old to walk or cycle alone and nearly 14 years old (13.8) to go independently on public transport; and parents of primary school children reported 11.6 years old for traveling to school independently (VicHealth, 2011). It is important to outline that in the former research variables no difference was found between the rural and urban areas of Victoria. Regarding the effect of urbanization on children's mean age for independent active travel, our results are similar to Kytta's (1997) results in a study comparing CIM in the urban, small town and rural Finnish environments. The researcher found that mean age for parents to allow their children to go out alone was 5.6 in the city, 4.5 in the small town and 4.3 in the rural village. Nevertheless, the mean age for Portuguese children to move independently nearly trebles in two of the settings and is over the double in the other one. With reference to primary school children's mobility licenses, we found that an increase of urban degree corresponds to a decrease in the percentage of children that are allowed to independently cross main roads and cycle on them. Moreover, the non-urbanized environment is the most capable for allowing children the former two licenses. The same result was found in Shaw et al. (2012), where primary school children from the rural setting had the highest levels of independence for these two licenses, as well as for going to places other than school. Conversely, our results show that a highly-urbanized area is the least friendly for young children to be allowed the independent mobility licenses, except for the case of traveling alone on local buses, probably due to the fact that the city environment has better link of public transport than the other surveyed settings. These findings are similar to those found in an urban core area of Hong Kong, where children aged 6–12 years old showed the lowest levels of independent mobility when compared to rural and government-planned new town environments (Lam and Loo, 2013).

Concerning gender differences in the age for independent active travel, we found no difference between boys and girls. This result contrasts with those from previous studies (e.g., Brown et al., 2008; Mackett et al., 2005b), which mention that boys became independent at an earlier age than girls. As regards to mobility licenses for the secondary school children, our findings show that a great majority of young people are granted all six independent mobility licenses, except going out after dark for the highly and moderately urbanized environments and cycling on main roads for the highly-urbanized group. Previous research carried out by O'Brien et al. (2000) in different urban settings also concluded that a great majority of secondary school children are allowed to freely navigate their environment. Specifically, we found that lower degree of urbanization allows more children to independently go out after dark, cycle on main roads and go to places other than school. The previous author also found that children who live in non-urbanized or low-density environments enjoy greater freedom to move around than children from highly-urbanized or high-density areas. On the contrary, as for traveling independently on local buses, our findings show that more children are allowed this license as urbanization degree increases. A possible reason for this finding is having higher availability of public transport in the city area. Overall, with regards to actual mobility in the home-school journey, percentages of primary school children that travel autonomously and independently to and from school are low. These results are consistent with parental findings on the license for children to go home from school independently (just over 30%), mentioned in Section 2.4.2. of the current paper. As to mobility licenses according the sex of the child, gender was not found to be an influential variable for the whole sample, between primary and secondary groups or within the three types of environment. Likewise, Kytta's (2004) research on children's independent mobility and affordances did not show gender differences in

mobility licenses. Also, a more recent study conducted by Carver and colleagues did not reveal any gender differences in the mobility licenses of primary school children in England and Australia (Carver et al., 2013).

Moreover, present scores of children's mobility licenses corroborate findings from a study conducted in Portugal, where areal characteristics were found to significantly influence parental granting of these licenses (Cordovil et al., in press). Not surprisingly, independent active travel was found to increase with age. Such finding reinforces Carver et al. (2013) results in urban and rural areas of England, and is consistent with evidence shown in the program "We go to school alone" (Prezza et al., 2010). However, Carver et al. (2012) found that older boys from rural environment show significantly lower levels of independent and active commuting to and from school than younger ones. In both primary and secondary children in all three environments, coming home from school is when children are more active and independent. A possible reason for this might be due to parents' lack of time to pick children up at the end of the school day as a result of work commitments. In one hand, such finding concurs with Shaw et al. (2012) regarding English secondary school children's mode of travel from school to home; in the other hand, Björklid and Gummesson (2013) did not find any significant differences in children's answers regarding accompaniment to and from school. For the secondary school children, independent and active travel from school to home drops as the degree of urbanization increases. This is different from the results of a review on children's active commuting to school stating that children from the urban milieu are more likely to walk or cycle to school than children from rural environments (Davison et al., 2008). Concerning actual mobility during weekend leisure activities, our findings show that the mean number of non-independent activities is higher than the mean number of independent activities in the three environments. Mean number of independent activities was quite low (between 2 and 3). Moreover, a decrease of urbanization degree corresponds to an increase in the mean number of this type of activities. This result contrasts with Tillberg Mattsson (2002), who found children's independent travel to leisure activities to be higher in more urbanized type of milieu. Also, Kytä (1997) did not find any significant differences among rural, small town and city environments, in the proportions of children's independent journeys to outdoor activities. In the present study, moderately-urbanized environment afforded highest participation of children in independent leisure time activities. This finding is coherent with Kytä et al. (2012), who concluded that moderate urban density offers very high possibilities for children's independent use of it, promoting active behavioral patterns and access to meaningful places. According to our results, the most common independent activities accessed by children were going to a friend's house; going for a walk or cycling around; and playing sports or swimming. All of these values were registered in the moderately urbanized setting. These activities are somewhat consistent with those found by Björklid and Gummesson (2013), namely "going to a friend's home" which was, in both cases, the most common activity. As to non-independent activities, the majority of the maximum values were also concentrated in the moderately-urbanized setting, namely, going to shops; visiting relatives or grown-ups and going to the cinema. Based on our findings, when on their own or with the company of peers, children report accessing leisure activities where they can be more physically active (i.e., sports, walking, cycling), whereas in the company of adults they engage in more sedentary activities (like shopping), probably dictated by the adults' own convenience and needs. Regarding the effect of gender on the actual mobility in the home-school trajectory, in the highly and moderately urbanized settings more boys than girls travel to school independently and actively. However, these differences are only found in the secondary group of children for the highly urbanized setting and in the primary group for the moderately

urbanized setting. During weekend leisure time activities, boys from the moderately and non urbanized environments, engage in a higher number of independent activities than girls. Overall, these gender differences in terms of actual mobility are similar to the findings of Fyhri and Hjorthol (2009) who showed that boys have a higher mobility index than girls when going to school and to leisure activities.

Although this study is noteworthy of the impact of urbanization in children's independent mobility, it also has some limitations. The type of questions of the survey, which focused specifically on actual mobility in the home-school journey and during weekend leisure time activities, are specific to the day the questionnaire was filled and to the previous weekend, respectively. This fact could present some bias in terms of the representativeness of the usual daily and weekend mobility. Moreover, complementary qualitative research should be conducted, in order to gain a more in-depth grasp about the links between children's independent mobility and degree of urbanization.

2.5.3. A need for a change of CIM in the highly urbanized environment: from a motorized city to a walkable one

In the highly-urbanized environment, our findings show that children's mean age for independent active travel is 13 years old, the highest from the three settings. Regarding mobility licenses, we found that the lowest percentage of secondary school children allowed to independently go out after dark, cycle on main roads and go to places other than school occurs in the city setting; as to primary school children, the minimum percentage allowed to independently cross main roads and cycle on them, and to go to places other than school takes place in the former setting. In terms of actual mobility, the smallest value of secondary school children that return home from school actively and independently occurs in the highly-urbanized group, as well as the least mean number of independent leisure time activities. Moreover, the city environment registered highest level of parental concern regarding strange danger; strong concern regarding traffic; and lowest parental sense of community. These results show that CIM in the city of Lisbon is quite restricted, meaning that this conspicuous highly-urbanized environment does not seem to gather enough requirements and opportunities for children's and young people's independent movement and autonomous environmental experiences. Simultaneously, it is very relevant the fact that in the Great Lisbon, 20.5% of its population is composed of children and young people, aged between 0 and 14 years old (Pordata and Statistics Portugal, 2011). Therefore, such city's unfriendliness towards children's independent and active movement should be a topic of major concern. Churchman (2003) recommends that cities and neighborhoods should physically and socially provide opportunities for children's independent travel, play and use of public space. Additionally, Burdette and Whitaker (2005) and Mainella et al. (2011) call the attention for the need to reinstall free outdoor play back into children's lives due to its therapeutic value in terms of child development, well-being and happiness. Moreover, Weston (2010) claims that the primary reason cities should be designed for young people (11–15 years old) to independently travel within them is because the area of the brain related to spatial perception and analysis is developing in this period of time and freedom of movement is determinant for such development to occur. Therefore, it is our opinion that changing the city's paradigm of child mobility from driving to walking should become a public health goal.

3. Concluding remarks

In this study we have shown that an increase of urbanization degree leads to a general decrease of children's independent

mobility. Gender did not influence the independent mobility licenses. Nevertheless, boys have higher levels of actual mobility than girls. Parental perception of stranger danger is more frequent in parents from the city environment as well as a lower sense of community. We have also shown that parental fears regarding traffic and stranger danger are the most frequent among the three environments with different degree of urbanization. According to our results, children from the city environment are those whose quest for independence and autonomy is more at risk. We believe that children's daily chauffeuring and escorting in public space, as a result of a pervasive motorized culture and of cultural specific factors, strongly contribute for this decrease of CIM. In this way, instead of exploring the city environment at their own pace and freedom, actively moving from place to place, children are sight-seeing the territory in the back seat of automobiles. Their vision of the environment is a motorized one where meaningful places are isolated islands, excluded from each other. Furthermore, children's bodies are being excluded from freedom of movement and their interactions with the physical environment are severely restricted. Consequently, children's autonomy, health and development are at risk. Hence, in order to reverse this body-space alienation and concomitantly rescue both children's and the city's well-being, a shift from a motorized city to a walkable one is not only advisable, as it is desperately needed.

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References

- Alparone, F.R., Pacilli, M.G., 2012. On children's independent mobility: the interplay of demographic, environmental, and psychosocial factors. *Childrens Geograp.* 10 (1), 109–122.
- Arez, C., Neto, C., 1999. The study of independent mobility and perception of the physical environment in rural and urban children. Paper presented at IPA Congress, Lisbon, Portugal.
- Armstrong, N., 1993. Independent mobility and children's physical development. In: Hillman, M. (Ed.), *Children, Transport and the Quality of Life*. Policy Studies Institute, pp. 35–43.
- Bicket, M., 2013. Children's Independent Mobility. 16-Country International Comparison. London.
- Björklid, P., 2004. Children's independent mobility and relationship with open space – studies of 12-year-olds' outdoor environment in different residential areas. *J. Appl. Psychol.* 6 (3–4), 52–61 (Special Issue 18th IAPS Conference).
- Björklid, P., Gummesson, M., 2013. Children's Independent Mobility in Sweden. Stockholm.
- Broberg, A., Salminen, S., Kyttä, M., 2013. Physical environmental characteristics promoting independent and active transport to children's meaningful places. *Appl. Geogr.* 38, 43–52. <http://dx.doi.org/10.1016/j.apgeog.2012.11.014>.
- Bronfenbrenner, U., 1979. *The Ecology of Human Development: Experiments by Nature and Design*. Harvard Un., Cambridge, MA.
- Brown, B., Mackett, R., Gong, Y., Kitazawa, K., Paskins, J., 2008. Gender differences in children's pathways to independent mobility. *Childrens Geograph.* 6 (4), 385–401.
- Burdette, H.L., Whitaker, R.C., 2005. Resurrecting free play in young children: looking beyond fitness and fatness to attention, affiliation, and affect. *Arch. Pediatr. Adolesc. Med.* 159 (1), 46–50. <http://dx.doi.org/10.1001/archpedi.159.1.46>.
- Carver, A., Timperio, A.F., Crawford, D.A., 2012. Young and free? A study of independent mobility among urban and rural dwelling Australian children. *J. Sci. Med. Sport/Sports Med. Aust.* 15 (6), 505–510. <http://dx.doi.org/10.1016/j.jsams.2012.03.005>.
- Carver, A., Watson, B., Shaw, B., Hillman, M., 2013. A comparison study of children's independent mobility in England and Australia. *Childrens Geograph.* 11 (4), 461–475. <http://dx.doi.org/10.1080/14733285.2013.812303>.
- Churchman, A., 2003. Is there a place for children in the city? *J. Urban Des.* 8 (3), 293–302. <http://dx.doi.org/10.1080/1357480032000108116>.
- Cordovil, R., Lopes, F., Neto, C., in press. Children's (in)dependent mobility in Portugal. *J. Sci. Med. Sport*. <http://dx.doi.org/10.1016/j.jsams.2014.04.013>
- Davison, K.K., Werder, J.L., Lawson, C.T., 2008. Children's active commuting to school: current knowledge and future directions. *Prevent. Chron. Dis.* 5 (3), A100. <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2483568&tool=pmcentrez&rendertype=abstract>.
- Deka, D., 2013. An explanation of the relationship between adults' work trip mode and children's school trip mode through the Heckman approach. *J. Transport Geogr.* 31, 54–63. <http://www.sciencedirect.com/science/article/pii/S0966692313000823>.
- Fagerholm, N., Broberg, A., 2011. Mapping and characterising children's daily mobility in urban residential areas in Turku, Finland. *Fennia-Int. J. Geograp.* 189 (2), 31–46.
- Fyhri, A., Hjorthol, R., 2009. Children's independent mobility to school, friends and leisure activities. *J. Transp. Geogr.* 17 (5), 377–384. <http://www.sciencedirect.com/science/article/pii/S0966692308001154>.
- Fyhri, A., Hjorthol, R., Mackett, R.L., Fotel, T.N., Kyttä, M., 2011. Children's active travel and independent mobility in four countries: development, social contributing trends and measures. *Transp. Policy* 18 (5), 703–710. <http://dx.doi.org/10.1016/j.tranpol.2011.01.005>.
- Gill, T., 2007. *No Fear-growing up in a Risk Averse Society*. Calouste Gulbenkian Foundation, London.
- Hillman, M. (Ed.), 1993. *Children, Transport and Quality of Life*. Policy Studies Institute, London.
- Hillman, M., Adam, J., Whitelegg, J., 1990. *One False Move: A Study of Children's Independent Mobility*. Policy Studies Institute, London.
- Hjorthol, R., Fyhri, A., 2009. Do organized leisure activities for children encourage car-use? *Transport. Res. Part A: Policy Pract.* 43 (2), 209–218. <http://www.sciencedirect.com/science/article/pii/S0966856408002012>.
- Hüttenmoser, M., 1995. Children and their living surroundings: empirical investigations into the significance of living surroundings for the everyday life and development of children. *Childrens Environ.* 12 (4), 1–17.
- Johansson, K., Hasselberg, M., Laflamme, L., 2010. Young adolescents' independent mobility, related factors and association with transport to school. A cross-sectional study. *BMC Public Heal.* 10 (1), 635. <http://dx.doi.org/10.1186/1471-2458-10-635>.
- Johansson, M., 2006. Environment and parental factors as determinants of mode for children's leisure travel. *J. Environ. Psychol.* 26 (2), 156–169. <http://dx.doi.org/10.1016/j.jenvp.2006.05.005>.
- Kyttä, M., 1997. Children's Independent Mobility in Urban, Small Town and Rural Environments. In: Camstra, R. (Ed.), *Growing up in a Changing Urban Landscape*, vol. 4. Royal Van., pp. 41–52 (Assen.).
- Kyttä, M., 2004. The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *J. Environ. Psychol.* 24 (2), 179–198. [http://dx.doi.org/10.1016/s0272-4944\(03\)00073-2](http://dx.doi.org/10.1016/s0272-4944(03)00073-2).
- Kyttä, M., Broberg, A.K., Kahila, M., 2012. Urban environment and children's active lifestyle: SoftGIS revealing children's behavioral patterns and meaningful places. *Am. J. Health Promot.*
- Lam, W.W.Y., Loo, B.P.Y., 2013. Determinants of children's independent mobility in Hong Kong. In: Fujiwara, A., (Ed.), *Eastern Asia Society for Transportation Studies*, Taipei, vol. 9, p. 3. <http://easts.info/on-line/proceedings/vol9/PDF/P3.pdf>.
- Mackett, R., 2002. Increasing car dependency of children: should we be worried. In: *Proceedings of the Institution of Civil Engineers-Municipal Engineer*, vol. 151, no. 1, pp. 29–38. <Go to ISI>://000175675800005.
- Mackett, R., Brown, B., Paskins, J., 2005a. Overcoming the barriers to walking for children. In *Walk21-VI "Everyday Walking Culture"*. In: *The 6th International Conference on Walking in the 21st Century*. Zurich. <http://www.walk21.com>.
- Mackett, R.L., Lucas, L., Paskins, J., Turbin, J., 2005b. The therapeutic value of children's everyday travel. *Transport. Res. Part A Pol. Pract.* 39 (2–3), 205–219. <http://dx.doi.org/10.1016/j.tra.2004.09.003>.
- Mackett, R.L., Paskins, J., 2008. Children's physical activity: the contribution of playing and walking. *Child. Soc.* 22 (5), 345–357. <http://dx.doi.org/10.1111/j.1099-0860.2007.00113.x>.
- Mainella, F.P., Agate, J.R., Clark, B.S., 2011. Outdoor-based play and reconnection to nature: a neglected pathway to positive youth development. *New Direct. Youth Develop.* 2011 (130), 89–104. <http://dx.doi.org/10.1002/yd.399>.
- Malone, K., Rudner, J., 2011. Global Perspectives on Children's Independent Mobility: a socio-cultural comparison and theoretical discussion of children's lives in four countries in Asia and Africa. *Glob. Stud. Childhood* 1 (3), 243–259. https://www.academia.edu/1141908/Global_Perspectives_on_Childrens_Independent_Mobility_a_socio-cultural_comparison_and_theoretical_discussion_of_childrens_lives_in_four_countries_in_Asia_and_Africa.
- Mammen, G., Faulkner, G., Buliung, R., Lay, J., 2012. Understanding the drive to escort: a cross-sectional analysis examining parental attitudes towards children's school travel and independent mobility. *BMC Public Heal.* 12 (1), 862. <http://dx.doi.org/10.1186/1471-2458-12-862>.
- McLaren, A.T., Parusel, S., 2012. Under the radar: parental traffic safeguarding and automobility. *Mobilities* 7 (2), 211–232. <http://dx.doi.org/10.1080/17450101.2012.659465>.
- O'Brien, M., Jones, D., Sloan, D., Rustin, M., 2000. Children's independent spatial mobility in the urban public realm. *Childhood* 7 (3), 257–277. <http://dx.doi.org/10.1177/0907568200007003002>.
- Obst, P., Smith, S.G., Zinkiewicz, L., 2002. An exploration of sense of community, Part 3: Dimensions and predictors of psychological sense of community in geographical communities. *J. Commun. Psychol.* 30 (1), 119–133. <http://dx.doi.org/10.1002/jcop.1054>.

- Oliver, M., Witten, K., Kearns, R.A., Mavoa, S., Badland, H.M., Carroll, P., Ergler, C., 2011. Kids in the city study: research design and methodology. *BMC Public Health* 11 (1), 587. <http://dx.doi.org/10.1186/1471-2458-11-587>.
- Pacilli, M.G., Giovannelli, I., Prezza, M., Augimeri, M.L., 2013. Children and the public realm: antecedents and consequences of independent mobility in a group of 11–13-year-old Italian children. *Childs Geograph*. 11 (4), 1–17. <http://dx.doi.org/10.1080/14733285.2013.812277>.
- Pordata, Statistics Portugal, 2011. Census 2011. <<http://www.pordata.pt/Municipios/Populacao+residente+segundo+os+Censos+total+e+por+grandes+grupos+etarios-22>> (retrieved 13.04.14).
- Prezza, M., 2007. Children's independent mobility: a review of recent Italian literature. *Child. Youth Environ.* 17 (4), 294–318.
- Prezza, M., Alparone, F.R., Cristallo, C., Luigi, S., 2005. Parental perception of social risk and of positive potentiality of outdoor autonomy for children: the development of two instruments. *J. Environ. Psychol.* 25 (4), 437–453, <<http://www.sciencedirect.com/science/article/pii/S0272494405000721>>.
- Prezza, M., Alparone, F.R., Renzi, D., Pietrobono, A., 2010. Social participation and independent mobility in children: the effects of two implementations of “we go to school alone”. *J. Prevent. Intervent. Commun.* 38 (1), 8–25, <<http://www.ncbi.nlm.nih.gov/pubmed/20391051>>.
- Prezza, M., Pacilli, M.G., Barbaranelli, C., Zampatti, E., 2009. The MTSOCS: a multidimensional sense of community scale for local communities. *J. Commun. Psychol.* 37 (3), 305–326. <http://dx.doi.org/10.1002/jcop.20297>.
- Prezza, M., Stefania, P., Morabito, C., Cinzia, S., Alparone, F.R., Guilian, M.V., 2001. The influence of psychosocial and urban factors on children's independent mobility and relationship to peer frequentation. *J. Commun. Appl. Soc. Psychol.* 11, 435–450.
- Rissotto, A., Giuliani, M.V., Giuliani, M.V., 2006. Learning neighbourhood environments: the loss of experience in a modern world. In: Spencer, C., Blades, M. (Eds.), *Children and their Environments*. Cambridge University Press, Cambridge, UK, pp. 75–90.
- Rissotto, A., Tonucci, F., 1999. Urban mobility as a measure of democracy in the city – the child as a unit of measure. *Medio ambiente y responsabilidad humana*. Romeo
- Rissotto, A., Tonucci, F., 2002. Freedom of movement and environmental knowledge in elementary school children. *J. Environ. Psychol.* 22 (1–2), 65–77, <<http://www.sciencedirect.com/science/article/B6WJ8-462T8K3-7/2/0b32ccb6fccc0c4ef2cec637010e3e5>>.
- Roussi, P., Rapti, F., Kiosseoglou, G., 2006. Coping and psychological sense of community: an exploratory study of urban and rural areas in Greece. *Anxiety Stress Coping* 19 (2), 161–173. <http://dx.doi.org/10.1080/10615800600593304>.
- Rudner, J., 2011. *Conceptions of Risk and Children's Independent Mobility*. The University of Melbourne.
- Schoeppe, S., Duncan, M.J., Badland, H., Oliver, M., Curtis, C., 2012. Associations of children's independent mobility and active travel with physical activity, sedentary behaviour and weight status: A systematic review. *J. Sci. Med. Sport/Sports Med. Aust.* <http://dx.doi.org/10.1016/j.jsams.2012.11.001>.
- Sharpe, S., Tranter, P., 2010. The hope for oil crisis: children, oil vulnerability and (in)dependent mobility. *Aust. Planner* 47 (4), 284–292. <http://dx.doi.org/10.1080/07293682.2010.526622>.
- Shaw, B., Watson, B., Frauendienst, B., Redecker, A., Jones, T., Hillman, M., 2012. *Children's Independent Mobility: A Comparative Study in England and Germany (1971–2010)*. London.
- Tillberg Mattsson, K., 2002. Children's (in)dependent mobility and parents' chauffeuring in the town and the countryside. *Tijdschr. Econ. Soc. Ge.* 93 (4), 443–453. <http://dx.doi.org/10.1111/1467-9663.00215>.
- Tranter, P., Sharpe, S., 2012. Disney-Pixar to the rescue: harnessing positive affect for enhancing children's active mobility. *J. Transp. Geogr.* 20 (1), 34–40, <<http://www.sciencedirect.com/science/article/pii/S0966692311000470>>.
- VicHealth, 2011. *Towards Active and Independently Mobile Children*. Survey Review. Melbourne.
- Weston, L.M., 2010. Building cities for young people: why we should design cities with preteens and young teens in mind. *J. Urban Des.* 15 (3), 325–334. <http://dx.doi.org/10.1080/13574809.2010.487809>.
- Whitzman, C., Romero, V., Duncan, M., Curtis, C., Tranter, P., Burke, M., 2010. Links between children's independent mobility, active transport, physical activity and obesity. In: *Preventing Childhood Obesity*. Wiley-Blackwell, pp. 105–112, doi: <http://dx.doi.org/10.1002/9781444318517.ch13>.
- Zubrick, S., Wood, L., Villanueva, K., Wood, G., Giles-Corti, B., Christian, H., 2010. Nothing but Fear Itself: Parental Fear as a Determinant of Child Physical Activity and Independent Mobility. Melbourne.

Appendix 2 - Devising and testing of SoftGIS*children* application and survey

Devising a softgischildren survey

In the end of April 2012, contact was established with Marketta Kyttä, coordinator of YTK Land Use Planning and Urban Studies Group, of Aalto University and head of research of a Finnish company called Mapita Ltd, in Finland and with Kristoffer Snabb, a coder, at this time, for this company. In the following months, a beta version of a “do-it-yourself” softGIS application was being devised by Mapita Ltd and it was important and very relevant to have a “test-user” for feedback developing purposes.

The collaboration between the Portuguese researcher and the Finnish coder occurred until the end of 2012 and was based on the online training given by the latter to the former on how to use the application “do-it-yourself” tools that allowed the user to devise questionnaires; insert maps and map layers; create different types of content structures and download data. The content structures of the questionnaires were questionnaires pages; paragraphs; draw buttons; pop-ups; one choice questions; multiple choice questions; range questions; text entries; number entries; route drawing and place marking.

As training took place, the survey content was gradually introduced in the application and feedback was continuously given to the coder regarding the different tools’ usability when creating and testing the content structures. As feedback was sent by the user, changes on the usability features of the software were installed by the coder, making the general use of the application more user-friendly. The web map source used in the SoftGIS software varied as the development process of the application took place. For the subsequent first testing with children of the beta softGISchildren software, the researcher opted for “Google Hybrid” map source.

First trial testing of Beta SoftGISchildren application

In the period between end of January and beginning of February 2013, a total of 21 individual survey trialing sessions took place with 21 children (11 boys; 10 girls) aged between 12 and 16 years old (3 from *year 5*; 6 from *year 6*; 3 from *year 7*; 6 from *year 8*; 3 from *year 9*) participated in the first SoftGISchildren survey testing. These participants were all attending a specific school in Lisbon, autonomous from the General Department of Education, that focus on working with children from deprived social backgrounds and low income families. School board, parental and children’s informed consent to participate in research was obtained.

The room provided by the school for testing and the environment surrounding it was quiet. The child and the researcher sat perpendicular to each other, the former facing the

computer and the latter facing a field notes diary. This setting is displayed next on figure 1.



Fig. 1- Data collection setting for the first testing of SoftGISchildren survey-beta

Overall, the first testing of the Beta SoftGISchildren application revealed the following results:

- Children were able to answer the surveys questions, mark places according to the pre-established categories and draw the home-school route using hybrid maps (photographic and road maps).
- The individual sessions of testing took between 20 to 63 minutes. The average time a child took to fill in the survey was of 39 minutes. Generally, older children (9th and 8th year) took less time to fill in the questionnaire than younger ones (7th and 6th year). All children from the 5th year and one child of the 6th year took the longest time to fill in questionnaire (63, 60, 56 and 57 minutes respectively).
- The photographic map was fundamental for children to perceive their local environment and identify significant places.
- A total 445 places were marked ($M=21$); the minimum number of places marked by a child was of 7 and the maximum number was of 57. 47.6% of the children marked between 20 and 29 locations.
- Only one child (from year 5) was not able to mark the home location and draw the home-school itinerary.
- Children from year 5 found it more difficult to navigate through the map and consequently mark affordances on it. The researcher was more active in helping them find the places where the affordances occurred than with the older children. The older children are more able to autonomously navigate through the map and use the softGIS survey tools.
- Children from year 6 marked more functional (play) affordances than children from year 7, 8 and 9.
- As children passed through each category of affordances (social, emotional, functional, leisure time and emotional), they became quicker answering questions that showed up after marking a place. This probably happened due to the fact that these questions are always the same on each category.
- Marking the home place and drawing the home-school trajectory enables children to progressively identify meaningful public places and significant physical features of daily physical environment. Overall, drawing the home-school itinerary was the most time consuming task on the questionnaire. These two former aspects seemed crucial for participants to complete the survey successfully.

- Participants suggested some content and button changes in order to simplify marking of places and the answering of some questions.
- List of affordances by categories is well understood by participants and seems cultural sensitive and adequate to represent child-place interactions.
- Applicants were engaged and showed enthusiasm in the process of completing the survey, namely, finding and marking significant places.
- Participants found software as user-friendly.

SECOND TRIAL TESTING OF BETA SOFTGISCHILDREN APPLICATION

Data collection

Data collection procedure implemented in the second trial testing of the SoftGIS*children* software was methodologically different than the one used in the first trial. Herein, the same participant was asked to fill the same survey twice, one or two weeks apart. The idea underpinned in this specific methodological procedure was to test SoftGIS survey feasibility, namely consonance between answers and mapping of children's interactions in the urban environment.

The softGIS*children* software used in the second trial was reconceived upon inputs from the first trial testing; and by introducing content aiming to reveal participants' opinions about how they envision their ideal city in terms of mobility and freedom to play and leisure. The main alterations were as follows:

- Web-questionnaire was renamed as "*Cidade ideal: Um jogo de imaginação gráfica!*" (Ideal City: a game of graphic imagination!).
- Different layout for the questionnaire pages was designed with less text information.
- Visual display of the questionnaire content, features and mapping tools was improved due to a change in the service domain and updates performed by Mapita Inc, enhancing the application user-friendliness.
- Possibility of drawing other relevant daily trajectories besides the home-school one was introduced.
- Questionnaire pages with list of affordances were renamed as "Social" (social); "Brincadeiras" (play); "Tempo Livre" (free time/leisure); and "Sensações" (sensations).
- Content to explore participants' perceptions about desired (ideal) mobility to significant places was introduced.
- Content to explore participants' perceptions about desired (ideal) structural degree of play and of leisure affordances was added (free or structured).
- Web-map source was changed to "Bing aerial" maps.

During October 2013, four children (two boys from year 6, aged 10 and 11 years old and two girls aged 13 and 14 years old, from year 8 and year 9, respectively) participated in the second individual survey trialing sessions. These participants attended a public school (EBI Dr. Joaquim de Barros) located in the coastal area of Lisbon, in the municipality of Oeiras, and were recruited from a Leisure Time Centre "CATL Vitamina" situated inside this school grounds.

Data collection took place under the ethical approval of the Portuguese Data Protection Authority; and informed consent was obtained from General Department of Education, Leisure Time Centre Direction, parents and children.

The space provided for testing was the computer designated area of the leisure centre room. The environment surrounding it was quiet because other children were kept away from the computer area. The child faced the computer and the researcher sat next to him/her, with the field note diary on top of the table. This setting is displayed next on figure 2.



Fig. 2- Data collection setting for the second testing of SoftGISChildren survey-beta.

Data analysis

Comparisons between the two surveys were established in terms of three axis, “non-mapping” questions, “mapping” questions and territorial distance. The first includes the analysis of the following items: “car and bicycle ownership”; “school-home and home-school accompaniment (real and ideal)”; “home-school and school-home travel mode (real and ideal)”; and “environmental fears”. The second includes number of meaningful places (total, by categories of interaction and common shared meaningful affordances), and content of common shared meaningful affordances. On the third level, territorial distance was defined as the spatial area formed by the child’s meaningful places and daily trajectories; and it was operationalized through “Minimum Convex Polygon” method (MCP), by using the appropriate QUANTUM GIS tool. The MCP enabled the connection of meaningful places in the shortest convex polygon in each of the surveys, displaying the area corresponding to the child’s spatial narrative.

Table 1. Number of meaningful places on the first and second surveys

Participant	Total number of places*		Social places		Play places		Leisure places		Sensations places		N° of common affordances shared on the two surveys
	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	
1 Girl 13 years old year 8	18	16	3	4	7	4	5	4	3	4	7
2 Boy, 11 years old year 6	16	10	5	1	3	3	7	5	1	1	9
3 Boy 10 years old year 6	29	30	7	7	9	10	10	10	3	3	23
4 Girl 14 years old year 9	17	17	3	5	5	4	7	7	2	1	11

*Except the "home-place"

Participant 1

The two surveys were applied with two weeks of interval.

“Non-mapping” questions

No differences were found content wise in terms of answers given by the child on the two surveys.

Mapping questions

The place qualified as “home” was located by the participant on the same spot in both trials. Between the two surveys it was found a decrease of two meaningful places (on the total). Within categories of interaction, results show a decrease on “play” and “leisure” and an increase on “social” and “sensations” meaningful localized places. However, in both surveys, there were meaningful places of all categories. Seven affordances were matched on both surveys (see Table 1). In terms of the real city (participants’ daily life) and ideal city (how participant would like her daily life to be), differences were found between travel accompaniment and travel mode to places where the affordances were located (see Table 2.). In spite of these dissimilarities, participant’s answers on the second survey always include first survey’s content and new one.

Table 2. Qualitative differences between first and second surveys on identified common affordances for participant 1

Participant 1	Affordances	Likeability degree		Travel accompaniment		Travel mode		Structural action/activity	
		1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey
Girl, 13 years old, year 8	playing with sand or earth					on foot and by bicycle	on foot		
	cinema			with other children and with adults	with adults	by car	on foot and by car		
	Real City shopping					by car	on foot and by car		
	being in peace and quiet			alone and with other children and with adults	with other children and with adults	on foot and by car	on foot		
	playing with sand or earth					on foot and by bicycle	on foot		
	cinema			with other children	with other children and with adults	on foot	on foot and by car		
	Ideal City shopping					by car	on foot and by car		
	being in peace and quiet			alone and with other children and with adults	with other children and with adults	on foot and by bicycle and by car	on foot		
	playing ball games					by car	by bicycle and by car		

Territorial distance

Although there is no exact correspondence between first and second surveys' MCP, most significant places are located within the same physical areas of the environment in the two surveys (see Figs.3-5). The areas and shapes of each MCP would be similar, if not for two affordances located on the far right of figure 5 which were marked on the first survey.

All affordances (meaningful places) inside the yellow circle and daily trajectories (represented by red and blue line strings) are located on common areas that are intersected by the two MCPs. Regarding the orange circle, and despite each survey's meaningful places being located inside each corresponding MCP, red and blue point locations are borderer to each other. In fact, these places are all marked within an area designated as a park (Parque Urbano do Jamor) in terms of public space typology.



Fig. 3-First survey MCP for participant 1



Fig. 4-Second survey MCP for participant 1



Fig.5- First (blue points) and second (red points) MCP for participant 1.

Participant 2

The two surveys were applied with one week of interval.

“Non-mapping” questions

Differences were found between the two surveys in terms of home –school travel mode, both in the real (bus and car, respectively) and ideal city (bicycle and car, respectively). In terms of the former, it may have happened that the child uses both modes of travel to school, hence referring to the specific travel mode used on the day when the surveys took place. Otherwise, it could have been a questionnaire filling mistake. This second hypothesis is quite likely due to the fact that in both surveys, the child went to school with the company of adults; and so it is likely that car mode might have been the transport used. Also, the child might have misread answering options, in the sense that words “car” and “bus” share a common spelling in Portuguese language (“carro” and “autocarro”, respectively). On the latter, it is possible that the child might have chosen “car” by mistake, because on the two surveys, in all other questions regarding choice of ideal travel mode (home-school and vice-versa travel mode), the child opted for the “bicycle”.

Mapping questions

The place qualified as “home” was located by the participant on the same spot in both trials. Between the two surveys it was found a decrease of 6 meaningful places (on the total). Within categories of interaction, results show a decrease on “social” and “leisure” meaningful localized places, of 4 and 2, respectively. However, in both surveys, there were meaningful places of all categories. Nine affordances were matched on both surveys (see Table 1). In terms of the real city (participants’ daily life) and ideal city (how participant would like her daily life to be), differences were found between travel accompaniment and travel mode to places where the affordances were located (see Table 3.). All of these differences show that participant’s answers on the second survey always include first survey’s content and, in most cases, new content. There were, however, three exceptions. On two of them the child did not answer a certain question on the second survey; and in one case, within the “ideal city” section, the child reported distinct travel modes (bus and bicycle, on the first and second surveys, accordingly). Moreover, within the “ideal city”, in terms of “structural action/activity” field, the child did not answer that question on the second survey.

Table 3. Qualitative differences between first and second surveys on identified common affordances for participant 2.

Participant 2	Affordances	Likeability degree		Travel accompaniment		Travel mode		Structural action/activity	
		1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey
Boy, 11 years old, year 6	playing computer/ PlayStation/ electronic games			with adults					
	being with friends			with other children and with adults	with adults				
	Real City going on the swings			with adults	with other children and with adults	on foot and by bicycle	on foot and by car		
	riding a bike					on foot and by bicycle	by bicycle and by car		
	going out for a meal			with adults	with other children and with adults	by car	on foot and by car		
	leisure time centre			with adults		by car			
	being with friends					by bus	by bicycle		
	Ideal City riding a bike					on foot and by bicycle	by bicycle		
	leisure time centre			with adults		by car		free (do as I want)	

Territorial distance

Although there is no exact correspondence between first and second surveys' MCP, Most significant places (affordances) are located within the same physical areas of the environment.in the two surveys (see Figs. 6-8). The areas and shapes of each MCP would be similar, if not for one affordance located on the far right of figure 8, which was marked on the first survey. Most places inside the orange circle and daily trajectories (represented by red and blue line strings) are located on common areas that are intersected by the two MCPs. Those that are not, however, border or are close to the intersected areas of the MCPs.

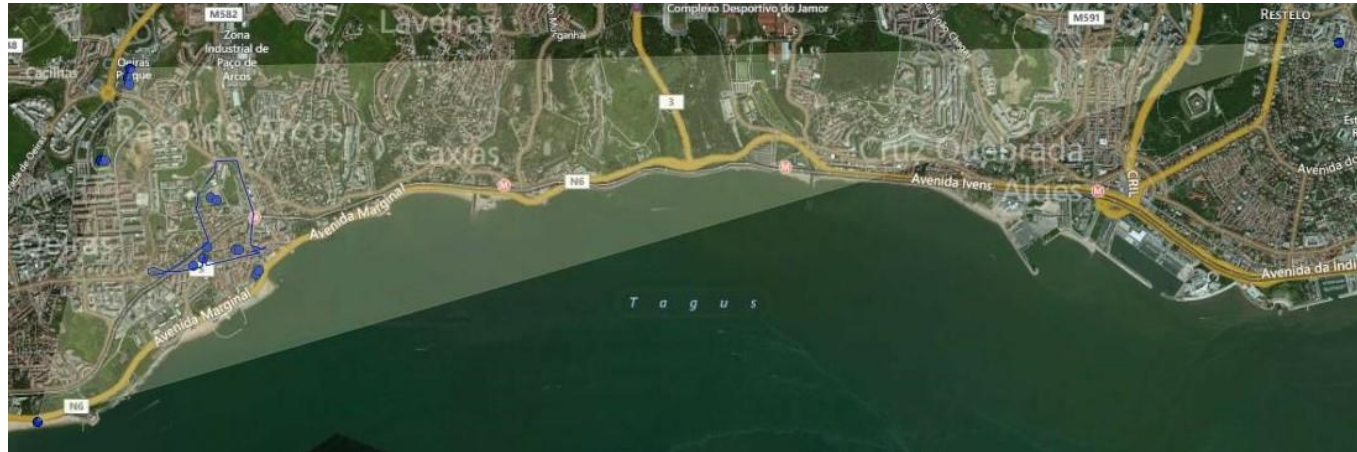


Fig 6- First survey MCP

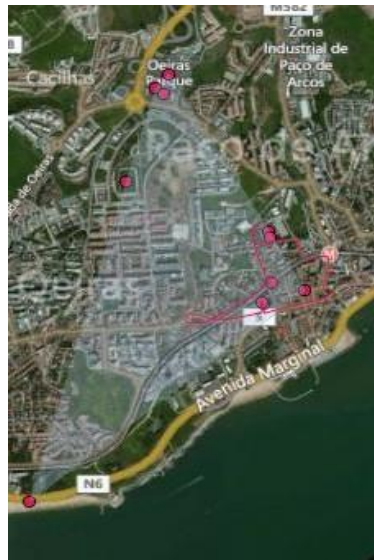


Fig 7- Second survey MCP



Fig.8- First (blue points) and second (red points) MCP for participant 2.

Participant 3

The two surveys were applied with one week of interval.

“Non-mapping” questions

Differences were found between the two surveys in terms of home-school and vice-versa “ideal” accompaniment. While in the first survey the child mentioned being ideally accompanied by other children in the second survey, the child referred to adults and other children. Hereby, participant’s answers on the second survey always included first survey’s content and new one.

Mapping questions

The place qualified as “home” was located by the participant on the same spot in both trials. Between the two surveys it was found an increase of one meaningful place, within “play” category of interaction. However, in both surveys, there were meaningful places of all categories. A total of twenty-three affordances were matched on both surveys (see Table 1). In terms of the real city (participants’ daily life) and ideal city (how participant would like her daily life to be), most differences were found in terms of travel mode to places where the affordances were located, followed by travel accompaniment, place likeability degree and structural action/activity (see Table 4.) In most of these dissimilarities, participant’s answers on the second survey always include first survey’s options and new ones. In some other cases, participant’s second answers include fewer options than on the first survey but maintain original content. The deepest discrepancy of results is found in the affordance “riding a bike”, within the “real city”, where the child in the second survey indicates that this activity is not spontaneous as it was considered on the first survey.

Table 4. Qualitative differences between first and second surveys on identified common affordances for participant 3

Participant 3	Affordances	Likeability degree		Travel accompaniment		Travel mode		Structural action/activity		
		1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	
Boy, 10 years old year 6	Real City									
		riding a bike					on foot and by bicycle	on foot and by bicycle and by car	free (do as I want)	organized by adults/ organizations
		skating					on foot and by bicycle	on foot and by bicycle and by other (i.e.: skate, scooter)		
		shopping	unpleasant	pleasant unpleasant						
		being myself					on foot and by bicycle	on foot and by bicycle and by car		
		being with friends					on foot and by bicycle and by car	by car		
		playing ball games					on foot and by bicycle and by car	by car		
swimming					on foot and by	on foot				

				car	
	climbing			on foot and by car	on foot and by bicycle and by car
	visiting relatives	with adults	with other children and with adults		
	boring			by bicycle and by car	by car
	going on the swings			by bicycle and by car	by bicycle and by car and by other(i.e. : skate, scooter)
Ideal City	riding a bike			on foot and by bicycle	on foot and by bicycle and by car
	leisure time centre			by bicycle	by bicycle and by car
	shopping	with other children and with adults	with adults		
	being myself			on foot and by	on foot and by

	bicycle	bicycle and by car and by other(i.e. : skate, scooter)
being with adults	on foot and by bicycle and by car	on foot and by bicycle and by car and by other(i.e. : skate, scooter)
being with friends	on foot and by bicycle and by car	by bicycle and by car
being with animals	on foot and by bicycle and by car	on foot and by bicycle and by car and by other(i.e. : skate, scooter)
playing hide and catch	by bicycle and by car	by bicycle and by car and by other(i.e. : skate, scooter)
playing computer/plays various/electronic games	on foot and by bicycle and by	on foot and by bicycle and by

			car	car and by other(i.e.: skate, scooter)
swimming			by bicycle and by car	on foot and by bicycle and by other (i.e.: skate, scooter)
parks			by car	by bicycle and by car
new people	with other children	with other children and with adults	by car	by bicycle and by car
quiet			on foot and by bicycle and by car	on foot and by bicycle and by car and by other(i.e.: skate, scooter)

Territorial distance

The spatial correspondence (area and shape) between first and second surveys' MCP and daily trajectories (represented by red and blue line strings) are, in fact, very similar (see Figs. 9-11). Most significant places (affordances) are located in common physical areas of the environment that are intersected by the two MCPs. In the second survey, the child told the researcher that location for "climbing" was different than the one in the first survey. The reason appointed was that the current place is frequently more used by the child for the actualization of this specific affordance than the former.

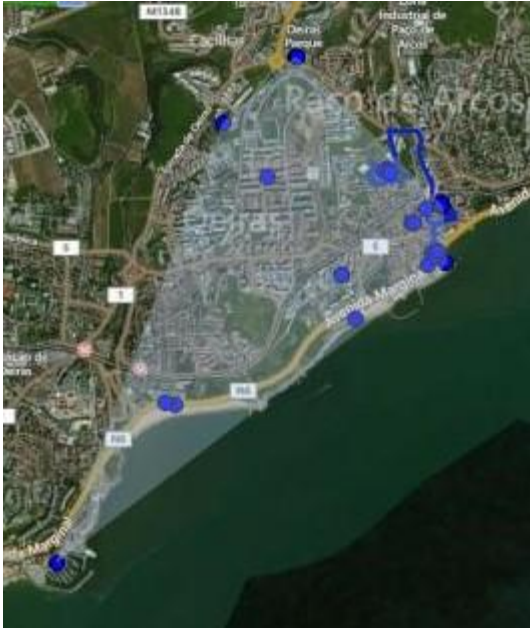


Fig 9- First survey MCP for participant 3

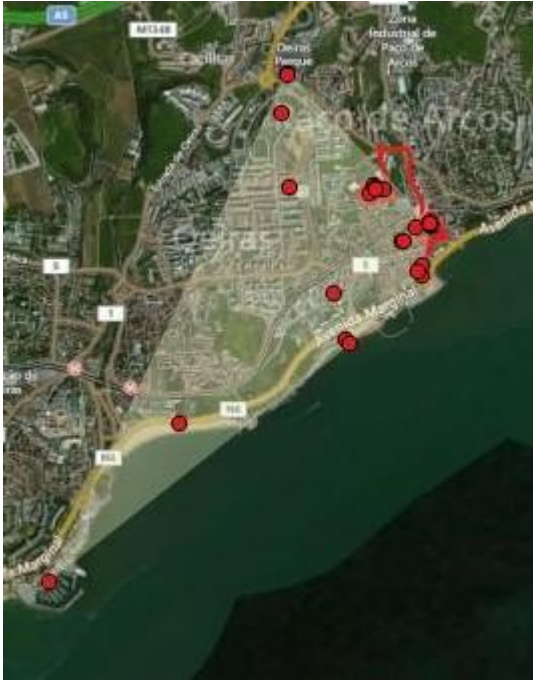


Fig 10- Second survey MCP for participant 3

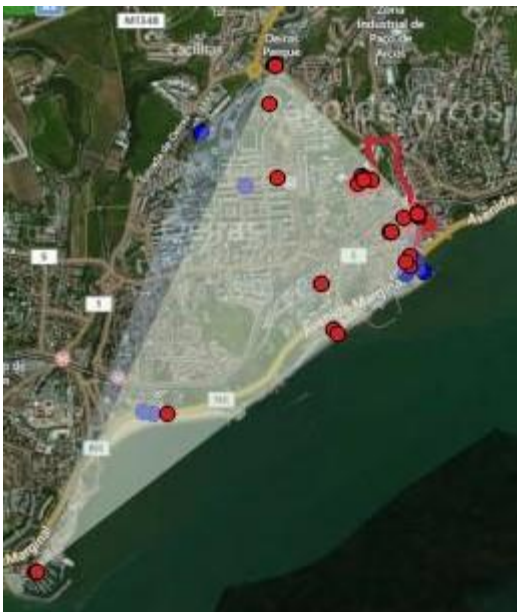


Fig.11- First (blue points) and second (red points) MCP for participant 3

Participant 4

The two surveys were applied with one week of interval.

“Non-mapping” questions

No differences were found content wise in terms of answers given by the child on the two surveys.

Mapping questions

The place qualified as “home” was located by the participant on the same spot in both trials. Total number of meaningful places did not change between the two surveys. Within categories of interaction, results show an increase on “social” places and a decrease on “play”

and “sensations” meaningful localized places. However, in both surveys, there were meaningful places of all categories. A total of 11 affordances were matched on both surveys (see Table 1). In terms of the real city (participants’ daily life) and ideal city (how participant would like daily life to be), differences were found between travel accompaniment and travel mode to places where the affordances were located (see Table 5.). More specifically in terms of travel accompaniment dissimilarities, participant’s answers on the second survey always include first survey’s options and new ones. As for travel modes discrepancies, on the second survey the child chose “on foot” instead of “by bicycle”. In spite of this difference, the option on both surveys is on active travel mode. Also, regarding the affordance “leisure time centre”, for each survey there was a different answer. It is possible that categorization of this affordance in terms of structural type could be ambivalent due to the diversity of activities a child can be involved in, while at the leisure time centre. Some of these can be adult oriented (e.g.: homework, school tuition) and others child led (e.g.: play, talk with friends, board games).

Table. 5 Qualitative differences between first and second surveys on identified common affordances for participant 4.

Participant 4	Affordances	Likeability degree		Travel accompaniment		Travel mode		Structural action/activity	
		1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey	1 st survey	2 nd survey
Girl, 14 years old, year 9	Real City	skating		with adults	with other children and with adults	by bicycle	on foot		
		skating		with other children	with other children and with adults	by bicycle	on foot		
	Ideal City	leisure time centre						organized by adults/ organizations	free (do as I want)
		swimming		with other children	with other children and with adults				

Territorial distance

Although there is no exact correspondence between first and second surveys' MCP, most affordances (significant places) are located within the same physical areas of the environment in the two surveys (see Figs. 12-14). The areas and shapes of each MCP would be similar, if not for two affordances located on the far right and left of figure 14 that were marked on the first survey. On figure 15, it is represented the transformed first and second surveys MCP excluding the former two affordances. Herein, most places and daily trajectories are located on common areas that are intersected by the two MCPs. The only visible daily trajectory is the one of the second survey (red line string) that overlaps the first survey's one (blue line string), making it impossible to be visualized simultaneously. Those places that are inside the blue circles are located on the same waterfront area called "Passeio Marítimo de Oeiras". In the second survey, the child told the researcher that the affordance for "being with animals" had not been located in the first survey and that the affordance for "skating" had been misallocated too. Therefore, changes were operated by the child in the localization of these two affordances on the second survey.

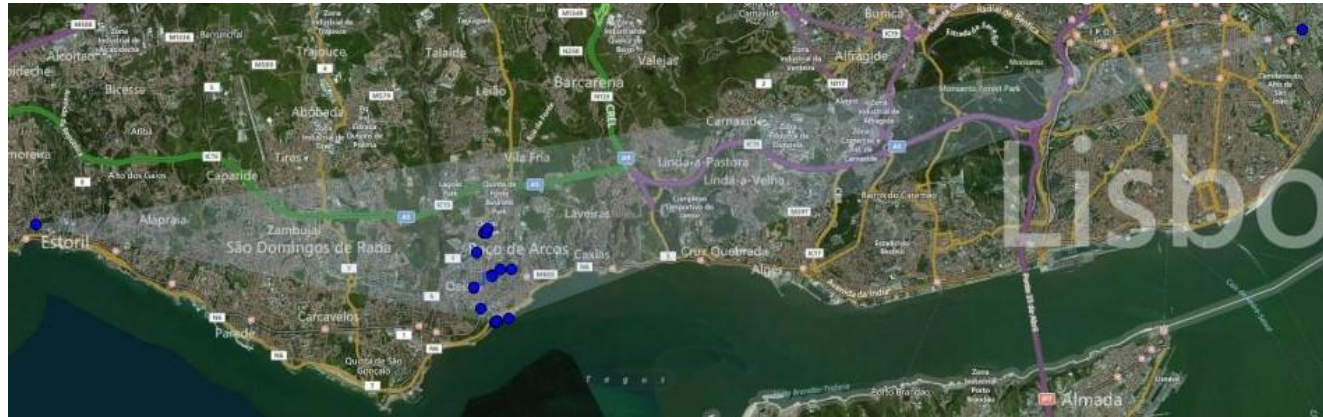


Fig 12- First survey MCP for participant 4

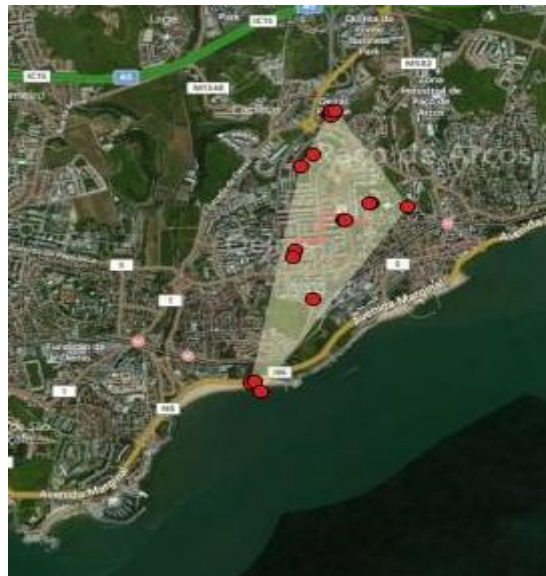


Fig 13- Second survey MCP for participant 4

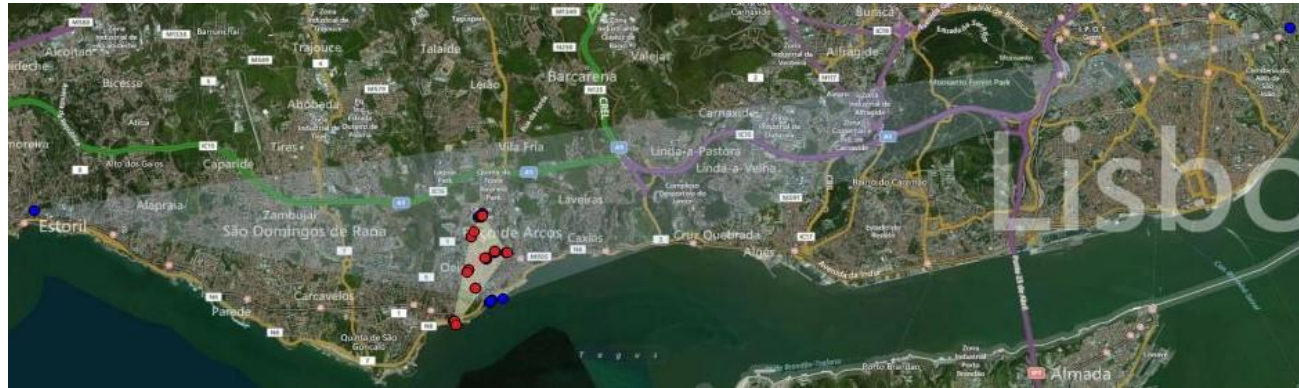


Fig.14- First (blue points) and second (red points) MCP for participant 4



Fig.15- First (yellow points) and second (red points) transformed MCP for participant 4

Appendix 3 - Consents to conduct study



PROJETO DE AUTORIZAÇÃO Nº 193 /2013

I. Do Pedido

Frederico Duarte Lopes notificou à CNPD um tratamento de dados pessoais com a finalidade de realização de um estudo observacional sobre a independência de mobilidade das crianças e jovens.

O objetivo do estudo é caracterizar a autonomia das crianças na cidade de Lisboa, descrever as experiências significativas no seu envolvimento urbano, mapear os padrões de jogo/interação/comportamento/mobilidade da criança e identificar as características físicas do ambiente urbano.

O estudo pretende incluir aproximadamente novecentos alunos, que frequentem o 6.º e o 7.º anos de escolaridade em escolas de Lisboa que queiram participar.

A participação no estudo consistirá no preenchimento de um questionário *online* pelas crianças, em contexto escolar, e de um questionário em papel pelos encarregados de educação.

No questionário são recolhidos dados de caracterização demográfica e solicita-se a localização no mapa dos locais que as crianças frequentam e locais que não frequentam.

Os diretores de turma ou outros professores solicitarão consentimento informado aos representantes legais dos participantes e aos próprios titulares, cuja declaração será conservada em local de acesso reservado pelo investigador principal na Faculdade de Motricidade Humana da Universidade Técnica de Lisboa.

Os dados são recolhidos de forma direta, junto dos titulares dos dados, mediante questionários de autopreenchimento.



No “caderno de recolha de dados” não há identificação nominal do titular, sendo aposto um código de participante. A chave desta codificação só pode ser conhecida o investigador.

Aos titulares dos dados é assegurado o direito de conhecer e corrigir os dados que lhes respeitem.

A segurança das informações é garantida pela manutenção dos dados em local de acesso reservado.

II. Da Análise

Porque em grande parte referentes à vida privada, os dados recolhidos pelo requerente têm a natureza de sensíveis, razão pela qual o respetivo tratamento só pode basear-se no consentimento expresso, esclarecido e livre dos titulares dos dados, ou dos seus legais representantes, nos termos do disposto no n.º 2 do artigo 7.º da Lei nº 67/98, de 26 de outubro (Lei de Protecção de Dados - LPD).

Por esta razão é necessário o «consentimento expresso do titular», entendendo-se por consentimento qualquer manifestação de vontade, livre, específica e informada, nos termos da qual o titular aceita que os seus dados sejam objeto de tratamento, o qual deve ser obtido através de uma “declaração de consentimento informado” onde seja utilizada uma linguagem clara e acessível.

Nos termos do artigo 10.º da LPD, a declaração de consentimento tem de conter a identificação do responsável pelo tratamento e a finalidade do tratamento, devendo ainda conter informação sobre a existência e as condições do direito de acesso e de retificação por parte do respetivo titular.



Os titulares dos dados, de acordo com a declaração de consentimento informado junta aos autos, apõem as suas assinaturas na mesma, deste modo satisfazendo as exigências legais.

O fundamento de legitimidade é o consentimento dos titulares dos dados. Porque haverá recolha de dados de menores, terá de haver consentimento a prestar pelos legais representantes. Impõe-se, ainda, que os menores sejam ouvidos e em função da idade, nos termos da lei, eles próprios prestem a sua anuência à recolha de dados pessoais para participação no estudo. O estudo deve ter em conta o superior interesse dos menores.

A informação tratada é recolhida de forma lícita (cfr. alínea a) do n.º 1 do artigo 5.º da LPD), para finalidades determinadas, explícitas e legítimas (cfr. alínea b) do mesmo artigo), salvo a localização exata no mapa dos lugares onde os menores circulam e habitam.

O estudo pretende recolher a identificação no mapa da residência, do percurso casa-escola, de um lugar onde visita um familiar, do lugar onde passa tempo com adultos, de lugares onde há discussões e conflitos, onde se encontra com amigos, onde há pessoas que metem medo, lugares proibidos, lugares onde está à vontade, onde está com animais, lugares onde tem autorização para estar, lugares onde está em paz e calma, de lugares onde está sozinho, onde conhece pessoas novas, onde o tratam mal, esconderijo ou lugar secreto, onde anda a pé, onde anda de baloiço, onde sobe a muros ou a árvores, onde anda de bicicleta, onde joga à bola, onde corre, onde brinca com água, onde se esconde, onde anda de skate/patins, onde salta, onde nada, onde joga às escondidas e à apanhada, onde costuma pendurar-se, onde brinca com areia ou terra, onde constrói coisas, um lugar seguro/ aborrecido/ barulhento/ sujo/ poluído /desarrumado/ inseguro/ sossegado/ limpo/ calmo/ escuro/ bonito/ feio/ divertido/ arrumado/ não poluído/ bom para se estar/perigoso, onde saio depois de ficar escuro, onde me divirto, lugares para saí e estar, onde faço desporto, onde vai a parques, onde ouve música, onde assiste a espetáculos/concertos, onde vai ao ATL, onde faz compras, onde dança, onde vai comer fora, onde brinca, onde joga computador e



videojogos, onde vai a museus e a exposições, onde não tem nada para fazer, espaços de aventura, onde tem passatempos, onde vai a jardins, onde participa em acontecimentos musicais, onde vai ao cinema e onde vai à biblioteca e lugares de onde sai sozinho e para onde vai sozinho, assinalando o seu percurso.

O mapeamento dos espaços e lugares exatos por onde a criança anda sozinha, brinca e inclusivamente os seus “lugares secretos” são excessivos para a finalidade do estudo, pelo constituem uma intrusão desproporcionada na vida privada dos menores.

Esta CNPD não se opõe a que, em abstrato, se analisem quais os espaços que promovem a confiança dos menores e dos seus representantes legais e aqueles que inspiram insegurança. Contudo, a sua localização geográfica no mapa, com o detalhe que o investigador quer imprimir na recolha dos dados, afigura-se excessiva.

Acresce que a recolha dos dados é feita através da Internet, que é uma rede consabidamente insegura, pelo que não são dadas garantias de segurança no circuito da informação. A adoção de medidas de segurança adequadas tem de ser especialmente atendida quando em causa estejam dados sensíveis, como é o caso.

Deste modo, não se autoriza a recolha de dados no mapa pelos titulares dos dados.

III. Da Conclusão

Em face do exposto, a Comissão Nacional de Protecção de Dados (CNPd) pretende autorizar o tratamento de dados pessoais *supra* apreciado, nos termos do n.º 2 do artigo 7.º, da alínea a) do n.º 1 do artigo 28.º e do n.º 1 do artigo 30.º da LPD, consignando-se o seguinte:

Responsável pelo tratamento: Frederico Duarte Lopes

Finalidade: Estudo observacional sobre a independência de mobilidade das crianças e jovens.



Categoria de Dados pessoais tratados:

- dos alunos: código de participante, dados demográficos (género, idade), tens bicicleta, a família tem carro, meio de transporte para a escola, com quem vai para a escola e com quem regressa a casa e se no caminho entre a casa e a escola há alguma coisa que o incomoda ou que mete medo;
- dos representantes legais: código de participante, sexo, idade (por escalões), profissão e nível de escolaridade.

Entidades a quem podem ser comunicados: Não há.

Formas de exercício do direito de acesso e retificação: Junto do responsável pelo tratamento dos dados.

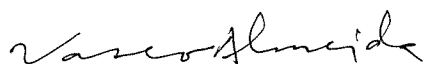
Interconexões de tratamentos: Não há.

Transferências de dados para países terceiros: Não há.

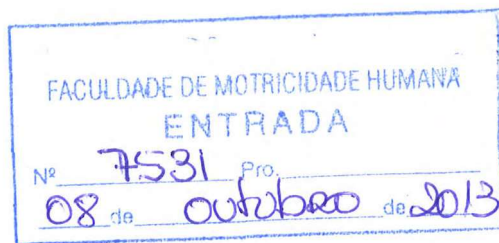
Prazo de conservação dos dados: A chave da codificação deve ser destruída um mês após a defesa da Tese.

Notifique-se a requerente para, em 10 (dez) dias, vir aos presentes autos pronunciar-se sobre este Projeto de Autorização, exercendo o direito de audição que lhe assiste nos termos do artigo 100.º do CPA. No caso de não pronúncia, considera-se para todos os efeitos que a requerente exerceu esse direito.

Lisboa, 30 de abril de 2013



Vasco Almeida (Relator)



*AO DR. Teófilo Lopes
Nº 7531 Carlos Alberto
09/10/13*

07.OUT 2013

Exmo(a). Senhor(a)
Professor Carlos Alberto Ferreira Neto
Faculdade de Motricidade Humana
Estrada da Costa,
1495-688 Cruz Quebrada

Sua referência:

Nossa referência: S-DGE/DSPE/2013/3101

Assunto: Aplicação de inquéritos em meio escolar - Submissão nº 0398100001

Na sequência da sua exposição de motivos por referência ao assunto supra, informamos que foi aprovada em 04.09.2013 a submissão nº 0398100001 com a designação Cidade Ideal: Um jogo de imaginação gráfica.

Com os melhores cumprimentos

O Diretor de Serviços da DSPE

José Vítor Pedrosa

VF/VF



GOVERNO DE
PORTUGAL

MINISTÉRIO DA EDUCAÇÃO
E CIÊNCIA

Os argumentos e documentos apresentados de seguida visam colmatar as lacunas identificadas pela Direção Geral da Educação (DGE) na 1ª avaliação efetuada ao pedido de realização de inquérito no meio escolar “Cidade Ideal: Um jogo de imaginação gráfica”, n.º 0398100001.

A garantia de anonimato dos respondentes, confidencialidade, proteção e segurança dos dados recolhidos, pode ser confirmada na nota metodológica submetida e nos consentimentos informados parentais e das crianças.

Relativamente ao anterior pedido de autorização n.º 0373200001 do estudo "SoftGIS-Lisboa para ti", após a desaprovação da DGE, este estudo foi submetido à Comissão Nacional de Protecção de Dados (CNPd). Esta comissão não autorizou a realização do estudo nas condições metodológicas pretendidas. Foi exercido o direito de audição com vista à alteração desta decisão, no entanto, este não surtiu efeito. Assim, em virtude da decisão final da CNPD, a recolha de dados que se pretendia efetuar tal como estava equacionada não teve continuidade.

Neste seguimento, e atendendo à resposta da CNPD ao direito de audição (ver documento em baixo), foi tomada a decisão de redefinir concetualmente o estudo, de forma a, por um lado, respeitar as indicações e constrangimentos impostos pela CNPD, e, por outro, dar continuidade ao estudo de doutoramento em curso. Esta redefinição implicou redesenhar a proposta de estudo, nomeadamente, nos seguintes aspetos:

- Alargamento do enquadramento teórico do estudo.
- Redefinição da descrição e objetivos do estudo.
- Renovação do conteúdo do questionário online que se pretende usar na recolha de informação a efetuar.
- Redefinição da amostra.
- Alteração do conteúdo dos consentimentos informados.
- Renomeação do título do estudo.

Os documentos em falta para juntar ao processo de reapreciação da DGE do pedido de autorização do estudo “Cidade Ideal: Um jogo de imaginação gráfica, com o n.º 0398100001, são os seguintes:

- Resposta definitiva da CNPD ao direito de audição relativo à proposta de estudo “SoftGis-Lisboa para ti”, n.º 0373200001, anteriormente submetido à DGE.

- Consentimento Informado Parental.
- Consentimento Informado das Crianças.
- Parecer do orientador relativo ao estudo a desenvolver.

ETHICS COUNCIL

MEMBERS

Pedro Teixeira (President)
Filomena Carnide (Vice-president)
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To:

Dr. Frederico Lopes
Faculdade de Motricidade Humana

Date: November 28, 2013

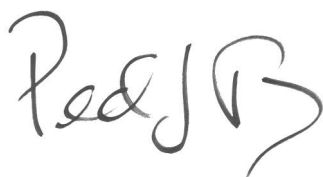
Research Project: *Children's Perceptions of an Ideal City: Representations and Mapping of Mobility, Interaction and Play in Public Space*

CEFMH Approval Number: 24/2013

Recommendations: None

This Council has reviewed the project indicated above. Based on independent reviews by two experts of all information provided by the proponent, we declare that this project is in accordance with Portuguese and international guidelines for scientific research involving human beings, including the 2013 Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects, and the 1997 Convention on Human Rights and Biomedicine (the "Oviedo Convention").

The President of the Ethics Council



Pedro J. Teixeira, Ph.D.

Exmo. (a) Senhor(a) Encarregado(a) de Educação:

No âmbito da investigação de Doutoramento em Motricidade Humana que estou a desenvolver na Faculdade de Motricidade Humana-Universidade de Lisboa, venho **pedir-lhe autorização para o seu educando participar no preenchimento de um questionário online “Cidade Ideal: Um jogo de imaginação gráfica!”**. Este questionário é constituído por perguntas e marcações num mapa da cidade de Lisboa e tem como objetivo:

- **Recolher informação para caracterizar a cidade ideal imaginada pelas crianças e jovens em termos da autonomia, mobilidade, convívio, brincadeira, atividades e sensações que gostavam de ter nas várias zonas da cidade.**

É também importante que tenha conhecimento das seguintes informações:

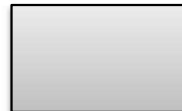
- O questionário é anónimo e confidencial e destina-se a crianças e jovens de ambos os sexos que frequentem o 6º ao 9º ano de escolaridade.
- O questionário será preenchido na (nome da escola) pela criança em presença do investigador, em sessão individual e com a duração máxima de um tempo letivo (50 minutos).
- A sessão para o preenchimento do questionário irá ocorrer num tempo letivo de uma disciplina a combinar com o diretor de turma e/ou professor responsável.
- As informações recolhidas são armazenadas numa base de dados segura cujo acesso é restrito ao investigador.
- Os questionários serão analisados em grupos formados pelo investigador, e não individualmente, e apenas para os fins relacionados com o estudo de doutoramento.
- Uma vez que o estudo esteja concluído, estará disponível para consulta pública.
- O encarregado de educação tem o direito de contactar o investigador com vista a qualquer esclarecimento sobre as informações fornecidas e sua análise e aplicação.
- Caso autorize o seu educando a participar, no momento do preenchimento do questionário, a sua criança irá também assinar uma declaração de participação, e caso ela não queira participar, a sua vontade será respeitada.
- Se assim o entender, em qualquer fase do estudo, poderá desistir do mesmo.

Obrigado pela sua atenção!

O investigador,



(Frederico Duarte Lopes)



Por favor, preencha os campos seguintes e reenvie esta folha para a escola, para que seja entregue ao professor responsável. **Caso autorize o seu educando a participar, por favor preencha também o questionário dirigido a si.**

Autorizo o(a) meu (minha) educando (a) _____ a participar no preenchimento do questionário online “Cidade Ideal: Um jogo de imaginação gráfica!”.

Sim

Não

O Encarregado de Educação

QUESTIONÁRIO PARA OS PAIS OU ENCARREGADOS DE EDUCAÇÃO

1- Qual o seu sexo?

Masculino

Feminino

2- Quantos anos tem?

Menos de 30

30 a 44

45 ou mais

3- Qual a sua profissão atual ou a mais recente?

Você

Parceiro ou Parceira

4- Qual o seu nível de escolaridade (preencha as duas colunas se for o caso)?

	<i>Você</i>	<i>Parceiro ou Parceira</i>
<i>Escola primária</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>9º Ano (antigo 5º ano do liceu)</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>10º a 12º ano (antigo 7º ano do liceu)</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ensino Profissional</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ensino Superior</i>	<input type="checkbox"/>	<input type="checkbox"/>

Olá! O meu nome é Frederico Duarte Lopes. Eu sou investigador na Faculdade de Motricidade Humana (Universidade de Lisboa), onde estou a fazer um estudo sobre como as crianças e jovens imaginam a sua cidade ideal. Para tal, estou a usar um questionário na internet chamado “Cidade Ideal: Um jogo de imaginação gráfica!”. Neste questionário terás que responder a um conjunto de perguntas e fazer marcações num mapa da cidade de Lisboa. Este questionário permite juntar informação sobre as deslocações, convívio, brincadeiras, atividades e sensações que gostavas de ter nos diferentes espaços da tua cidade.

Assim, queria-te convidar a participar neste estudo! Os teus pais já te autorizaram a participar, mas tu agora é que decides se queres ou não fazer parte deste estudo!

Antes de decidires, é importante que saibas cinco coisas sobre este estudo:

1. O questionário na internet que vais responder não é um teste e por isso não estás a ser avaliado.
2. As respostas que deres são anónimas, ou seja, ninguém vai saber que foste tu a responder.
3. As respostas que deres são guardadas num sítio na internet seguro, e só eu é que tenho acesso a elas.
4. As respostas que deres são analisadas e estudadas por mim.
5. Qualquer dúvida que tenhas ou pergunta que queiras fazer sobre o estudo podes fazê-la a mim.
6. Podes desistir do estudo em qualquer altura.

Queres participar no preenchimento do questionário online “Cidade Ideal: Um jogo de imaginação gráfica!” ?

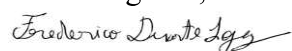
Sim

Não

Nome: _____

Muito obrigado pela tua atenção!

O investigador,



(Frederico Duarte Lopes)

Appendix 4 - Supplementary tables

Table. 1- School-home actual mobility according to age in “LH” group. Percentage of travel modes and travel type of accompaniment according age groups (%)

		School-home mode of travel			School-home travel accompaniment	
		Active	Hybrid	Motorized	Independent	Non-Independent
Age groups	11-12 years old	23.5	29.4	47.1	41.2	58.8
	13-14 years old	41.7	50	8.3	91.7	8.3
	15-17 years old	50	50	0	90	10

Note: Travel modes are mutually exclusive as are travel types of accompaniment

Table. 2-School-home actual mobility according to age in “LBS” group. Percentage of travel modes and travel type of accompaniment according age groups (%)

		School-home mode of travel			School-home travel accompaniment	
		Active	Hybrid	Motorized	Independent	Non-Independent
Age groups	11-12 years old	36.8	0	63.2	33.3	66.7
	13-14 years old	60	20	20	55.6	44.4
	15-17 years old	n/a	n/a	n/a	n/a	n/a

Note: Travel modes are mutually exclusive as are travel types of accompaniment

Table. 3- School-home actual mobility according to age in “LM” group. Percentage of travel modes and travel type of accompaniment according age groups (%)

		School-home mode of travel			School-home travel accompaniment	
		Active	Hybrid	Motorized	Independent	Non-Independent
Age groups	11-12 years old	3.8	11.5	84.6	15.4	84.6
	13-14 years old	0	54.5	45.5	54.5	45.5
	15-17 years old	33.3	66.7	0	66.7	33.3

Note: Travel modes are mutually exclusive as are travel types of accompaniment

Table. 4- School-home actual mobility according to gender in “LH” group (%). Percentage of travel modes and travel type of accompaniment according gender (%)

	School-home travel mode			School-home travel accompaniment	
	Active	Hybrid	Motorized	Independent	Non-Independent
Girls	47.8	30.4	21.7	69.6	30.4
Boys	18.8	56.3	25	68.8	31.3

Note: Travel modes are mutually exclusive as are travel types of accompaniment

Table. 5- School-home actual mobility according to gender in “LBS” group. Percentage of travel modes and travel type of accompaniment according gender (%)

	School-home travel mode			School-home travel accompaniment	
	Active	Hybrid	Motorized	Independent	Non-Independent
Girls	50	8.3	41.7	36	64
Boys	38.5	0	61.5	36	64

Note: Travel modes are mutually exclusive as are travel types of accompaniment

Table. 6- School-home actual mobility according to gender in “LM” group. Percentage of travel modes and travel type of accompaniment according gender (%)

	School-home travel mode			School-home travel accompaniment	
	Active	Hybrid	Motorized	Independent	Non-Independent
Girls	0	27.3	72.7	22.7	77.3
Boys	6.5	35.5	58.1	41.9	58.1

Note: Travel modes are mutually exclusive as are travel types of accompaniment

Table. 7- Actual mobility to meaningful places according age groups in “LH” research group. Percentage of travel modes and travel types of accompaniment according age groups (%)

		Travel modes to meaningful places			Travel types of accompaniment to meaningful places	
		Active	Hybrid	Motorized	Independent	Non-Independent
Age groups	11-12 years old	72.8	4.9	39.8	60.4	62.4
	13-14 years old	60	35.1	31.9	82.5	38.1
	15-17 years old	67.5	30	13.8	85.2	23.5

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Table. 8- Actual mobility to meaningful places according age groups in “LBS” research group. Percentage of travel modes and travel types of accompaniment according age groups (%)

		Travel modes to meaningful places			Travel types of accompaniment to meaningful places	
		Active	Hybrid	Motorized	Independent	Non-Independent
Age groups	11-12 years old	55	3.7	65.8	50.3	64.6
	13-14 years old	81.8	10.2	28.4	63.7	61.5
	15-17 years old	n/a	n/a	n/a	n/a	n/a

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Table. 9- Actual mobility to meaningful places according age groups in “LM” research group. Percentage of travel modes and travel types of accompaniment according age groups (%)

		Travel modes to meaningful places			Travel types of accompaniment to meaningful places	
		Active	Hybrid	Motorized	Independent	Non-Independent
Age groups	11-12 years old	69.3	16.1	48.6	52.5	56
	13-14 years old	80.1	22.8	29.3	69.1	49
	15-17 years old	57.9	55.3	47.4	86.8	30.2

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Table. 10- Actual mobility to meaningful places according gender in “LH” research group. Percentage of travel modes and travel types of accompaniment according gender (%)

	Travel modes to meaningful places			Travel types of accompaniment to meaningful places	
	Active	Hybrid	Motorized	Independent	Non-Independent
Girls	62.2	22.7	30.2	67.6	51.8
Boys	81	19	29.8	87.2	37.6

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Table. 11- Actual mobility to meaningful places according gender in “LBS” research group. Percentage of travel modes and travel types of accompaniment according gender (%)

	Travel modes to meaningful places			Travel types of accompaniment to meaningful places	
	Active	Hybrid	Motorized	Independent	Non-Independent
Girls	66	7.4	55.3	61.9	60.6
Boys	56.2	3.1	61.9	47.3	67.6

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Table. 12- Actual mobility to meaningful places according gender in “LM” research group. Percentage of travel modes and travel types of accompaniment according gender (%)

	Travel modes to meaningful places			Travel types of accompaniment to meaningful places	
	Active	Hybrid	Motorized	Independent	Non-Independent
Girls	76.1	22.2	43.7	53.7	64.9
Boys	71.5	20.1	35.1	70.8	39.3

Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Table. 13- Categories of affordances according to gender in “LH” research group (%)

	Categories of affordances in "LH"			
	Social	Functional	Leisure	Emotional
Girl	40	23.2	22.1	14.7
Boy	33.7	27.2	26.2	12.9

Table. 14- Categories of affordances according to gender in “LBS” research group (%)

	Categories of affordances in "LBS"			
	Social	Functional	Leisure	Emotional
Girl	35.5	25.8	26.6	12.1
Boy	29.9	26.3	28.1	15.7

Table. 15. Categories of affordances according to gender in "LM" research group (%)

Categories of affordances in "LM"				
	Social	Functional	Leisure	Emotional
Girl	34.2	19.5	33.5	12.8
Boy	38.7	13.8	26.9	20.6

Table. 16- Categories of affordances across age groups in "LH" research group (%)

Categories of affordances in "LH"				
	Social	Functional	Leisure	Emotional
11-12 years old	35.9	29.1	18.8	16.2
13-14 years old	41.8	22	30.5	5.7
15-17 years old	31.4	24.6	22.9	21.2

Table. 17- Categories of affordances across age groups in "LBS" research group (%)

Categories of affordances in "LBS"				
	Social	Functional	Leisure	Emotional
11-12 years old	33.7	26.4	25.4	14.5
13-14 years old	31.6	23.2	34.7	10.5
15-17 years old	n/a	n/a	n/a	n/a

Table. 18- Categories of affordances across age groups in "LM" research group (%)

Categories of affordances in "LM"				
	Social	Functional	Leisure	Emotional
11-12 years old	35.2	19.5	32.3	13.1
13-14 years old	33.8	14.9	28.7	22.6
15-17 years old	58.5	3.8	24.5	13.2

Appendix 5 – Supplementary figures

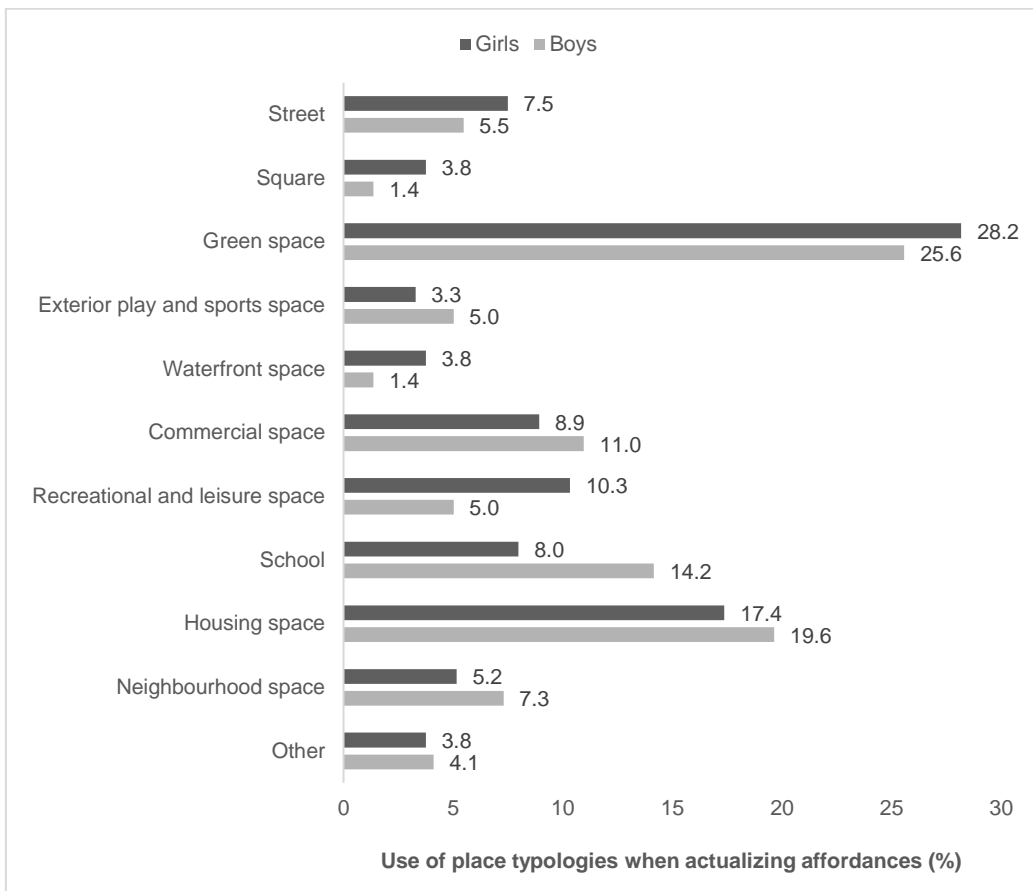


Fig. 1- Urban space typologies variability when actualizing affordances across gender in “LH” research group

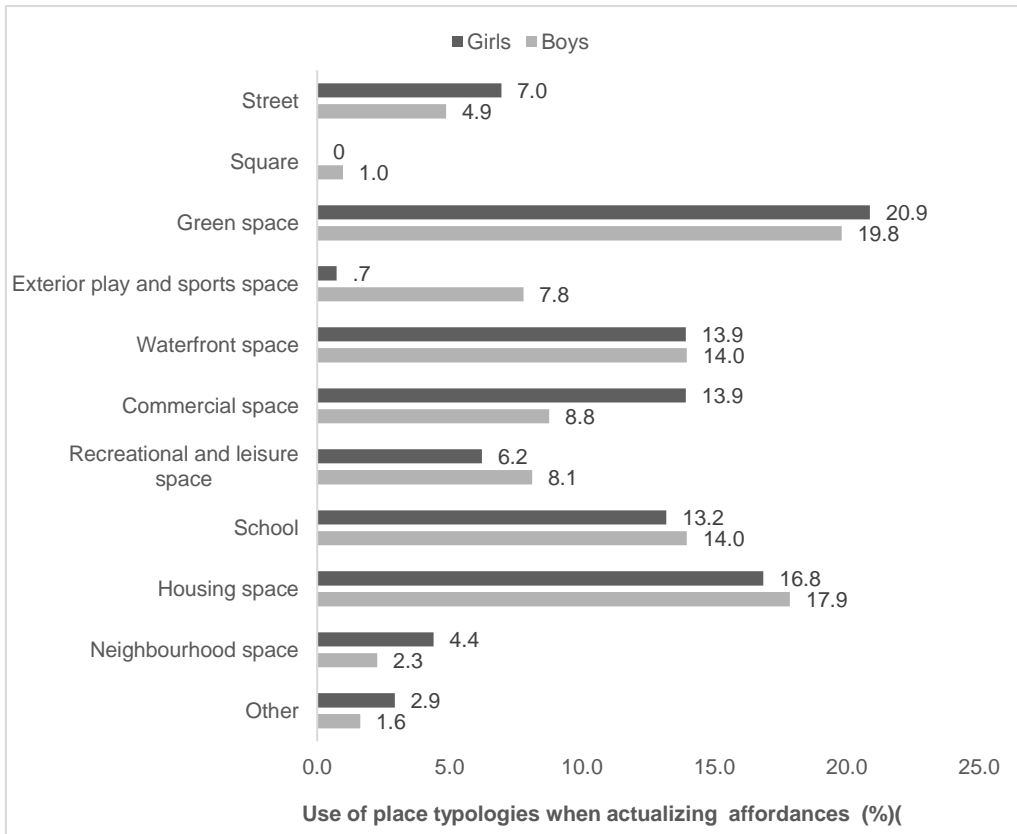


Fig. 2-Urban space typologies variability when actualizing affordances across gender in “LBS” research group

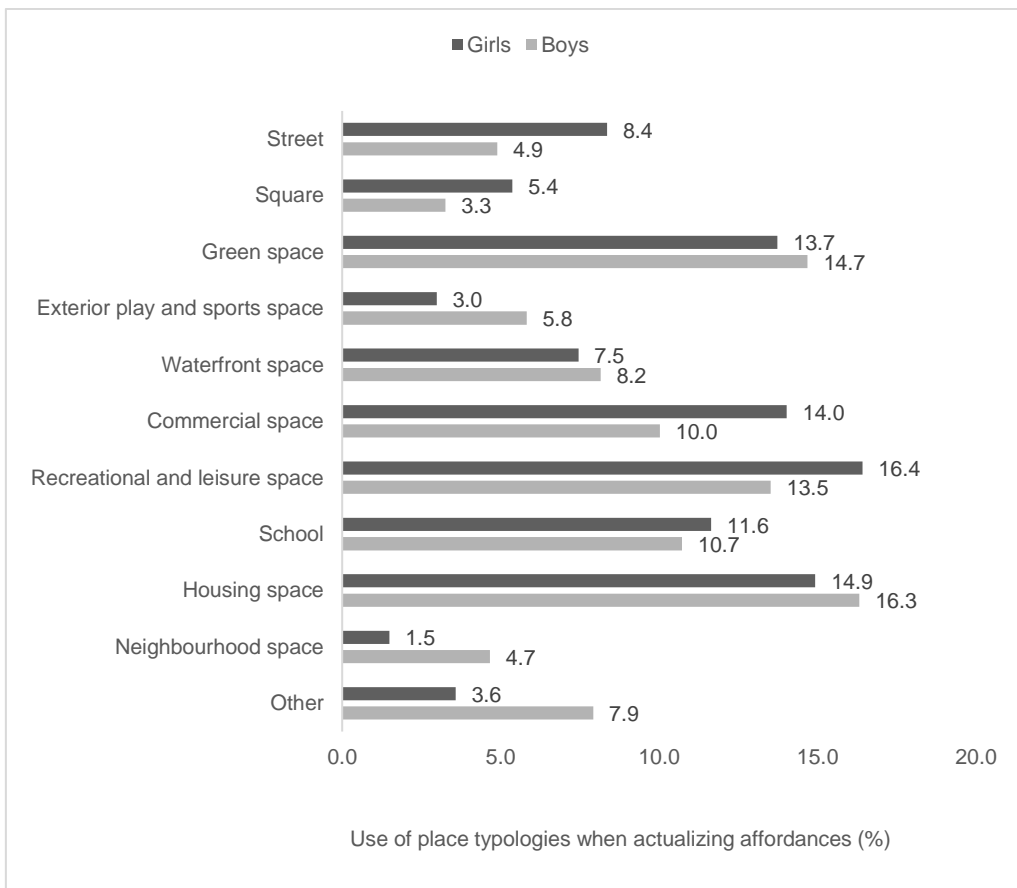


Fig. 3 Urban space typologies variability when actualizing affordances across gender in “LM” research group

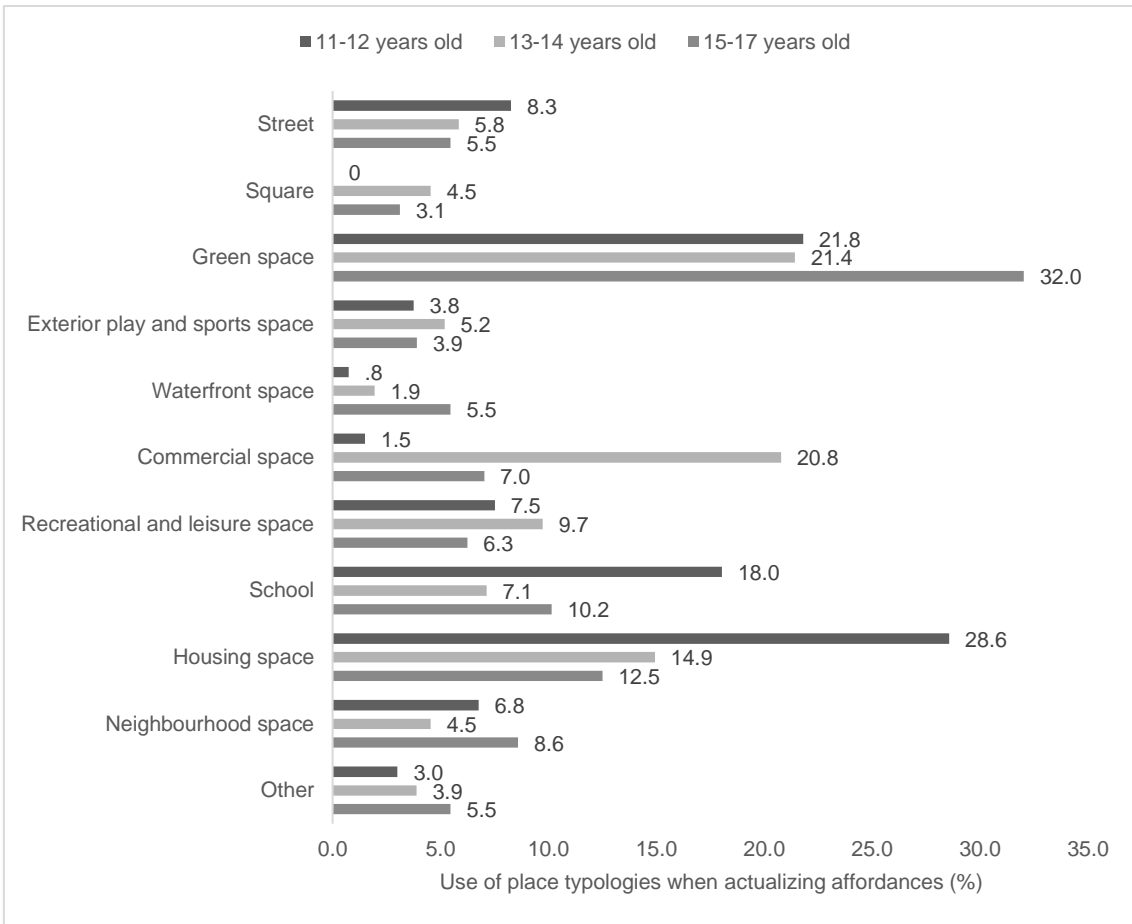


Fig. 4- Urban space typologies variability when actualizing affordances across age groups in “LH” research group

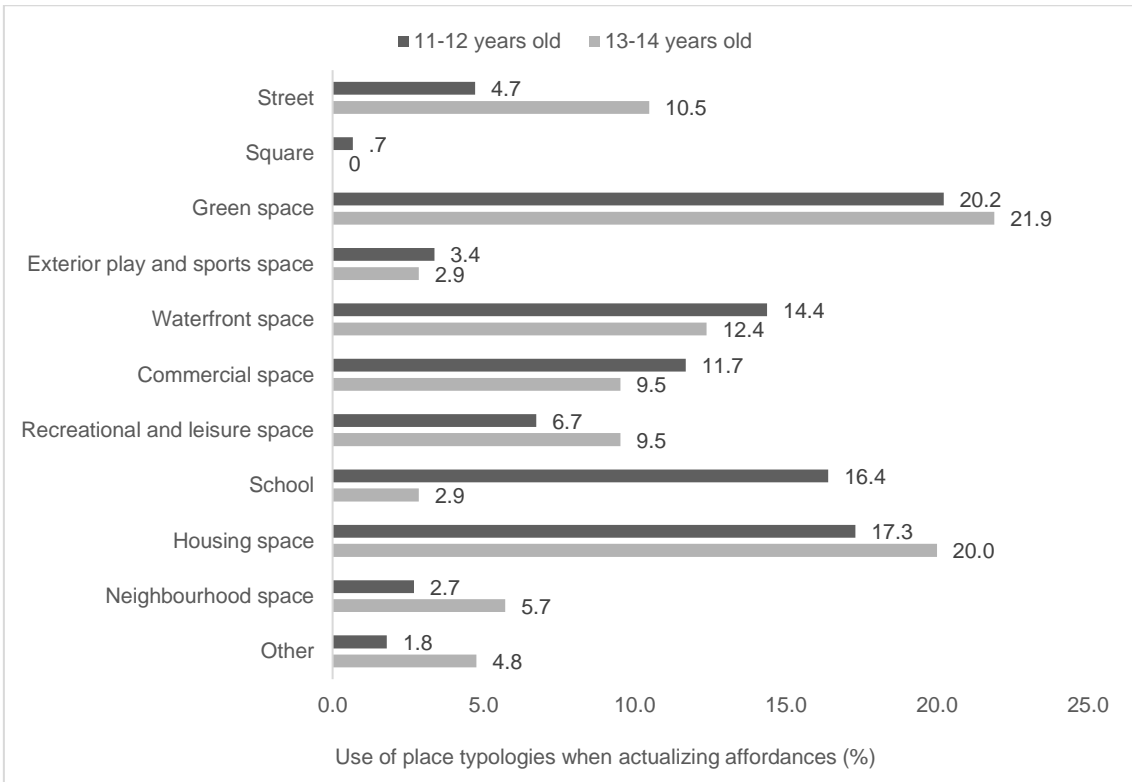


Fig. 5- Urban space typologies variability when actualizing affordances across age groups in “LBS” research group

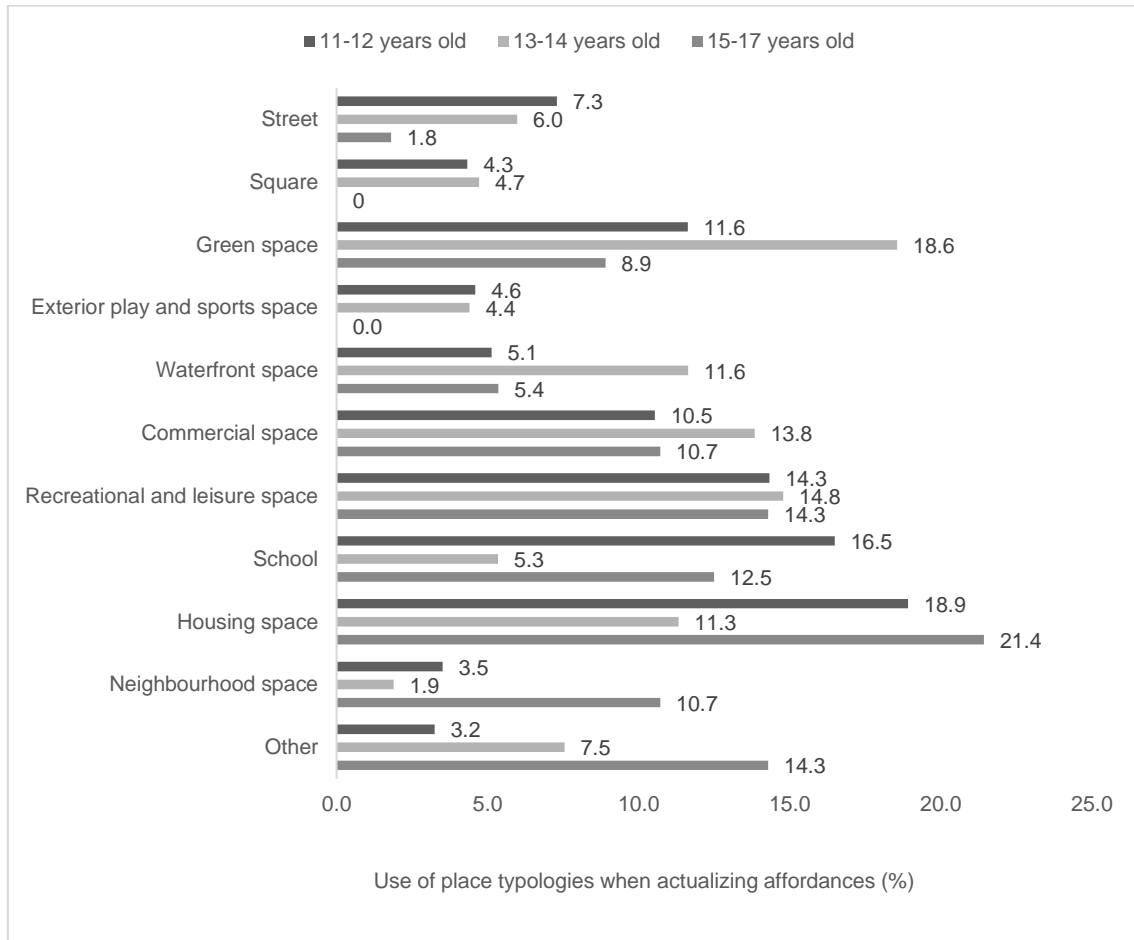


Fig. 6- Urban space typologies variability when actualizing affordances across age groups in “LM” research group

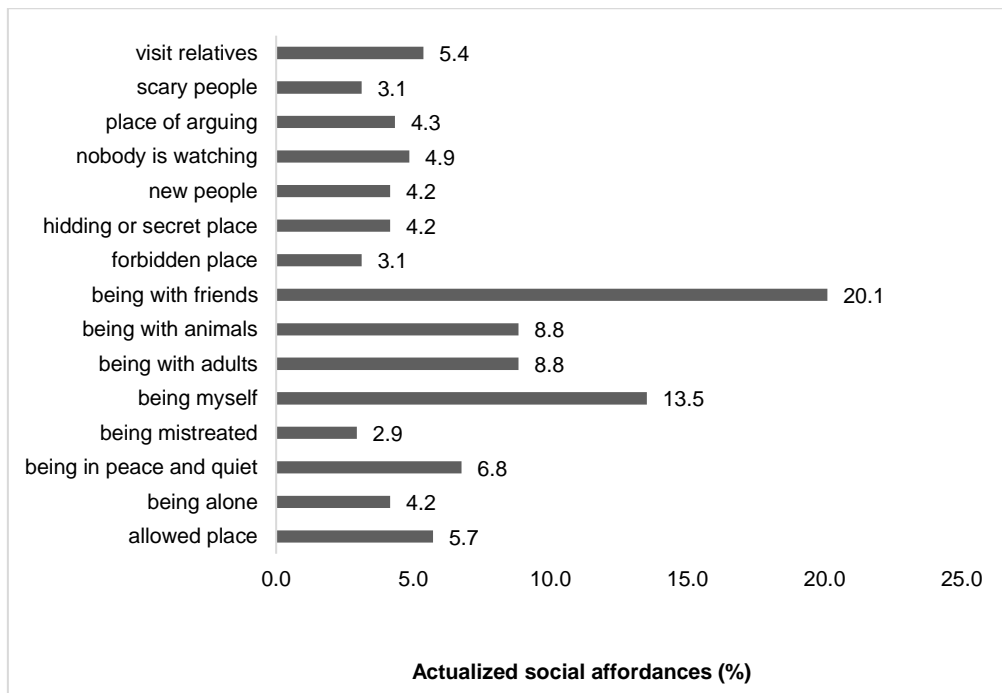


Fig. 7- Actualization of social affordances in “L” sample

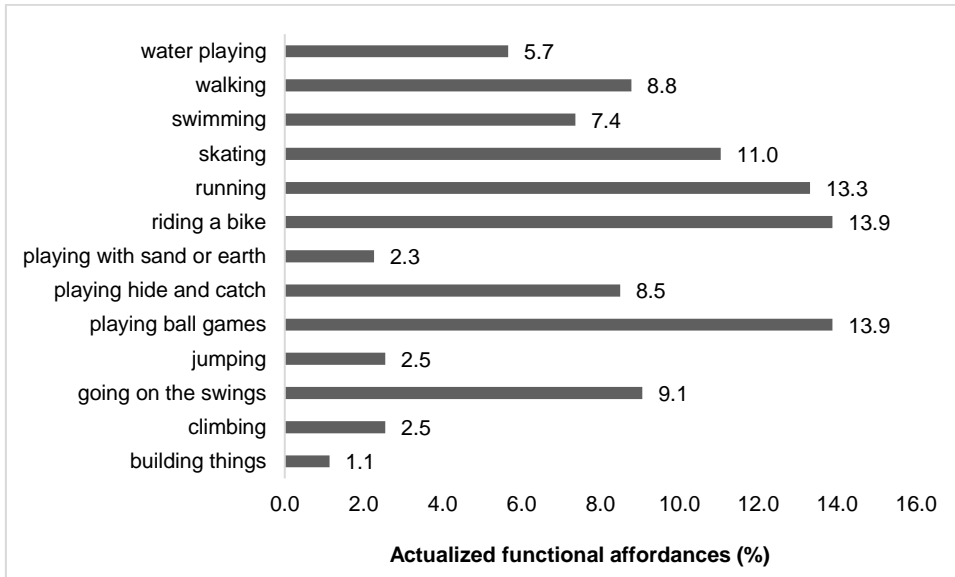


Fig. 8- Actualization of functional affordances in “L” sample

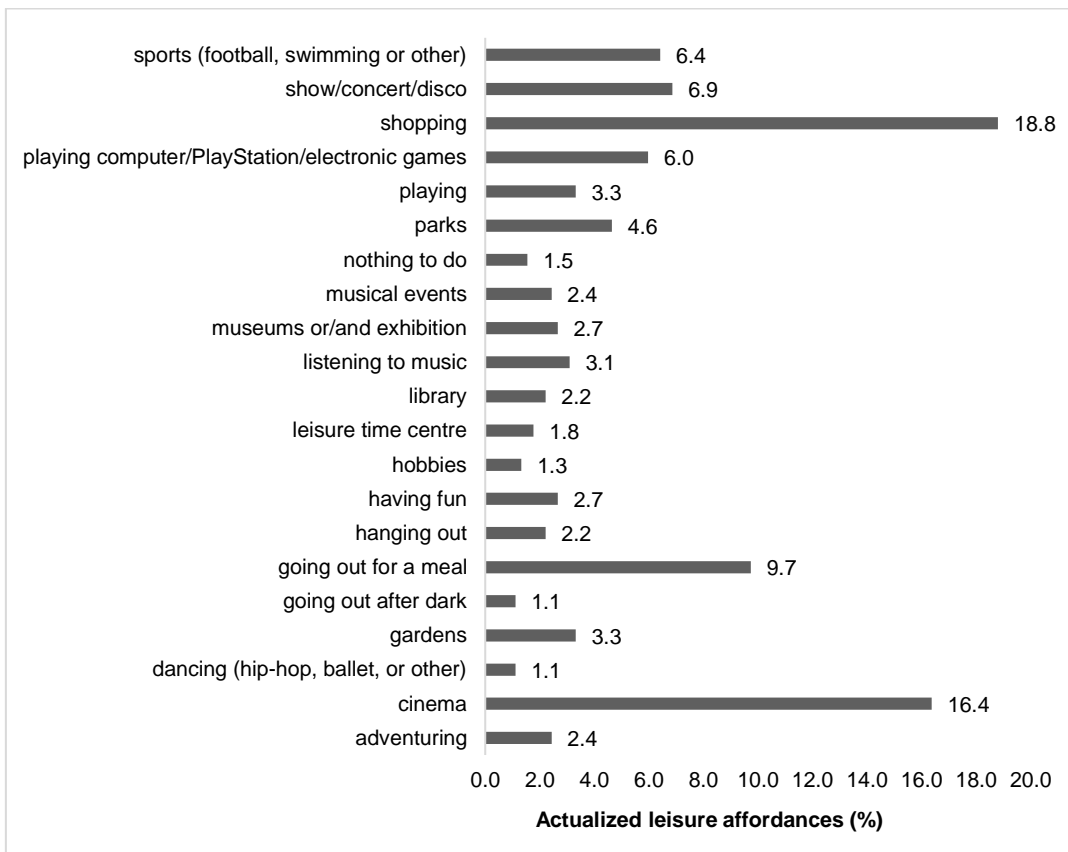


Fig. 9- Actualization of leisure affordances in “L” sample

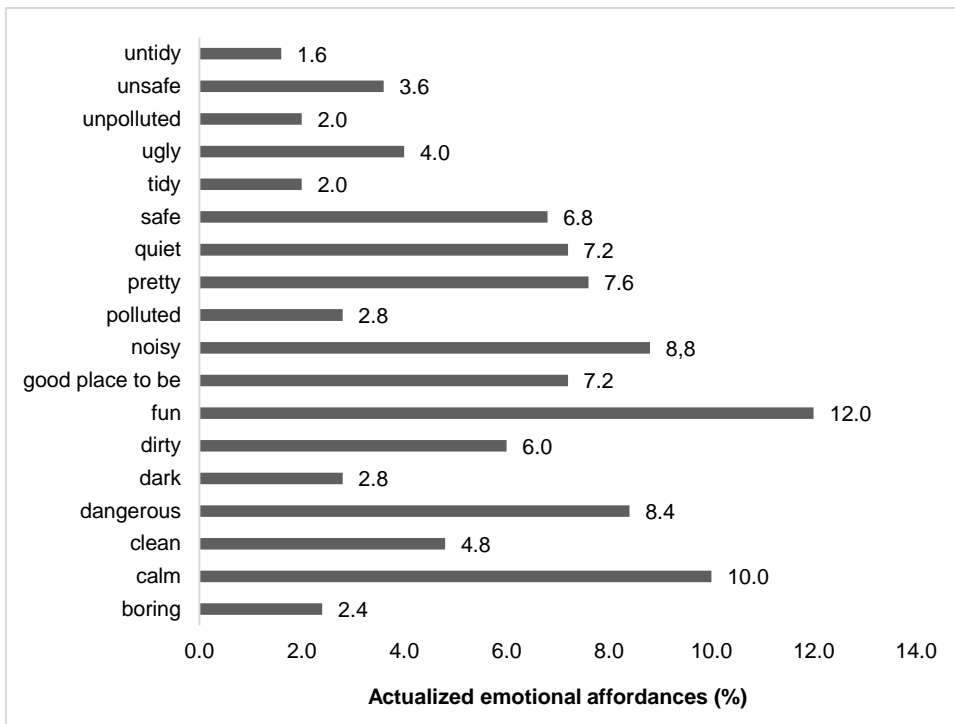


Fig. 10- Actualization of emotional affordances in “L” sample

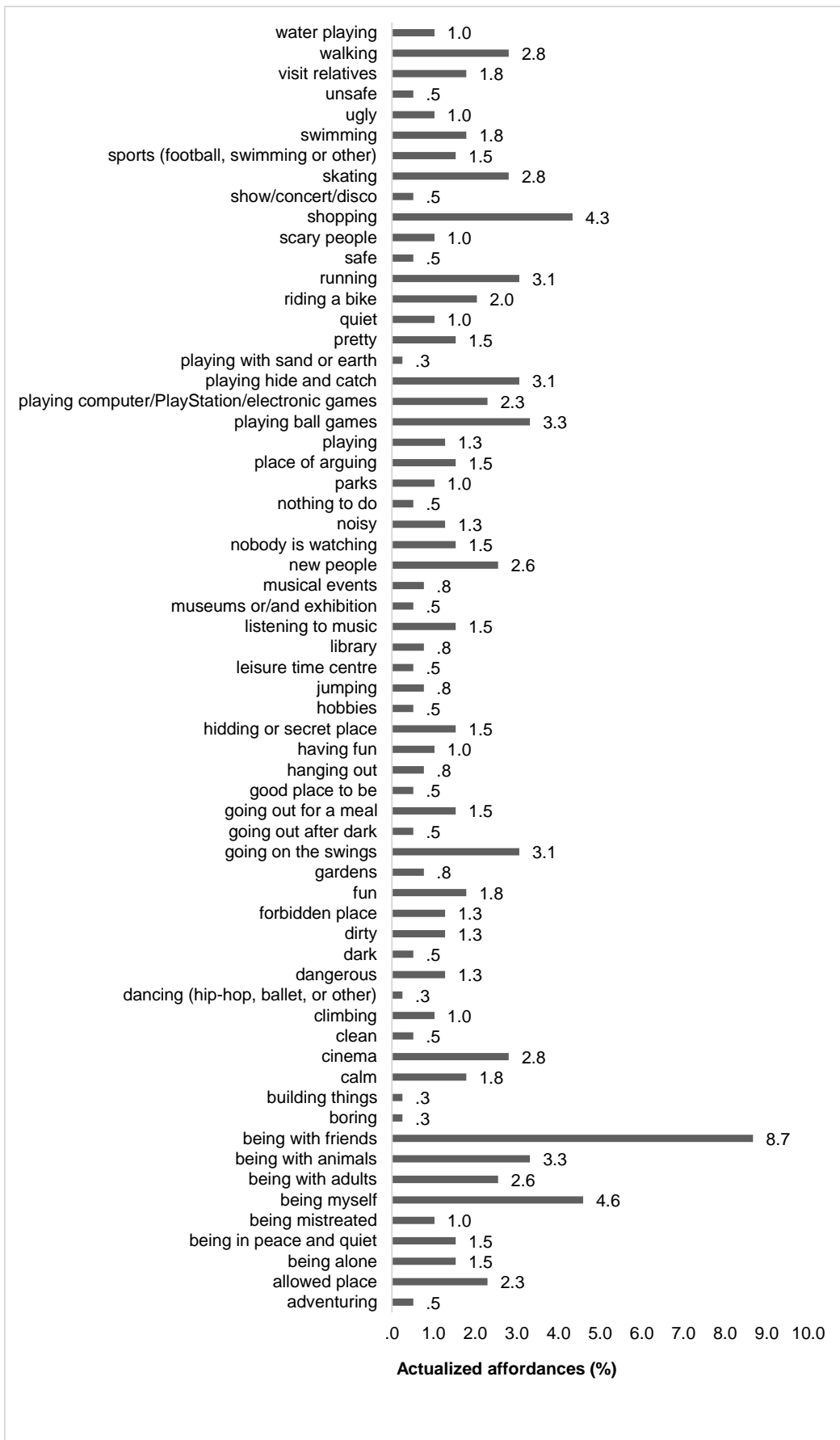


Fig. 11- Actualization of affordances in “LH” sample

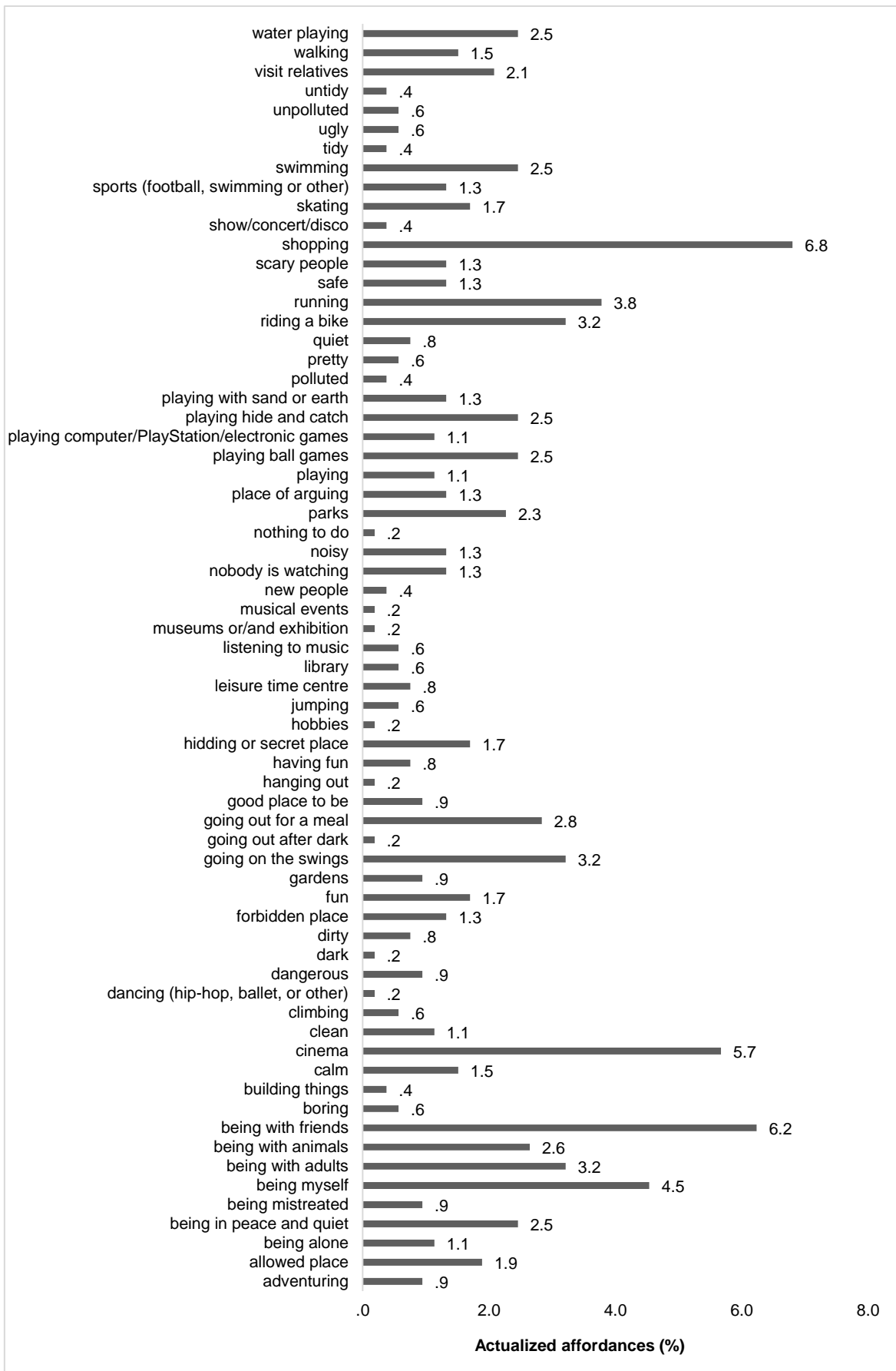


Fig.12- Actualization of affordances in “LBS” sample

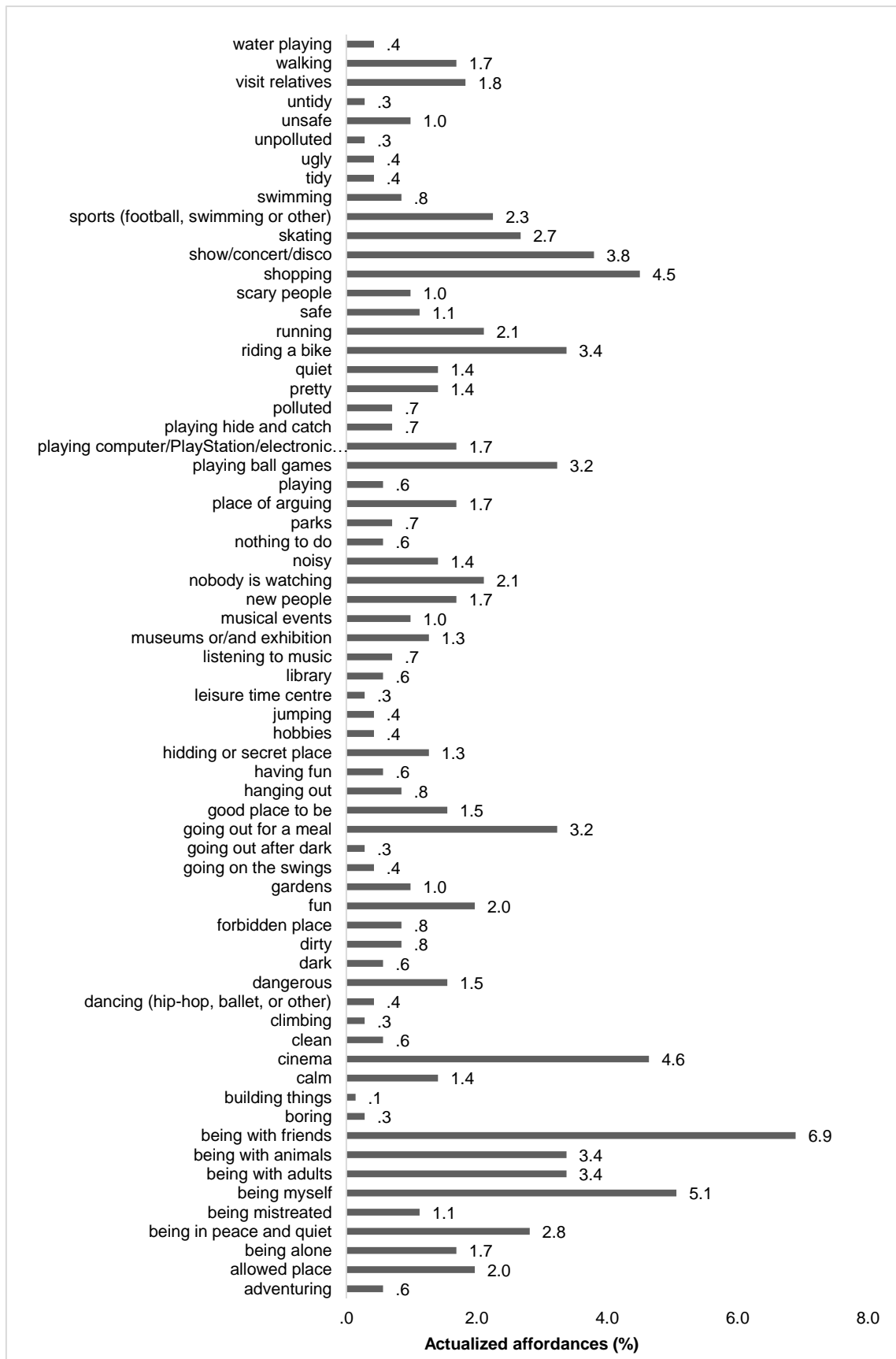
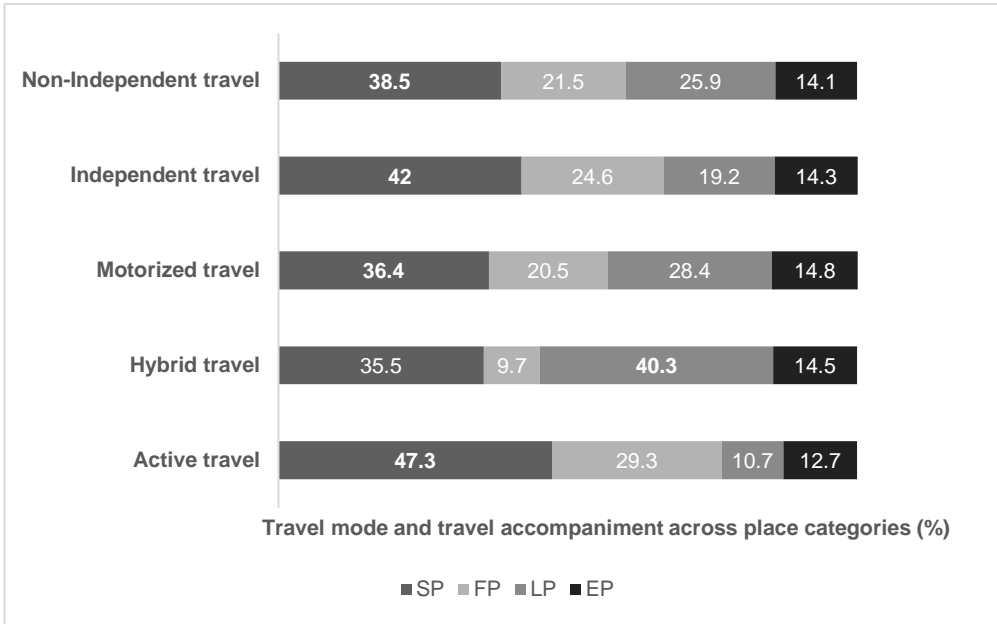


Fig. 13- Actualization of affordances in "LM" sample



Note: The answers on travel modes and travel types of accompaniment are multiple choice and therefore they are not mutually exclusive

Fig. 14- Actual mobility distribution across categories of meaningful places in “LH” group

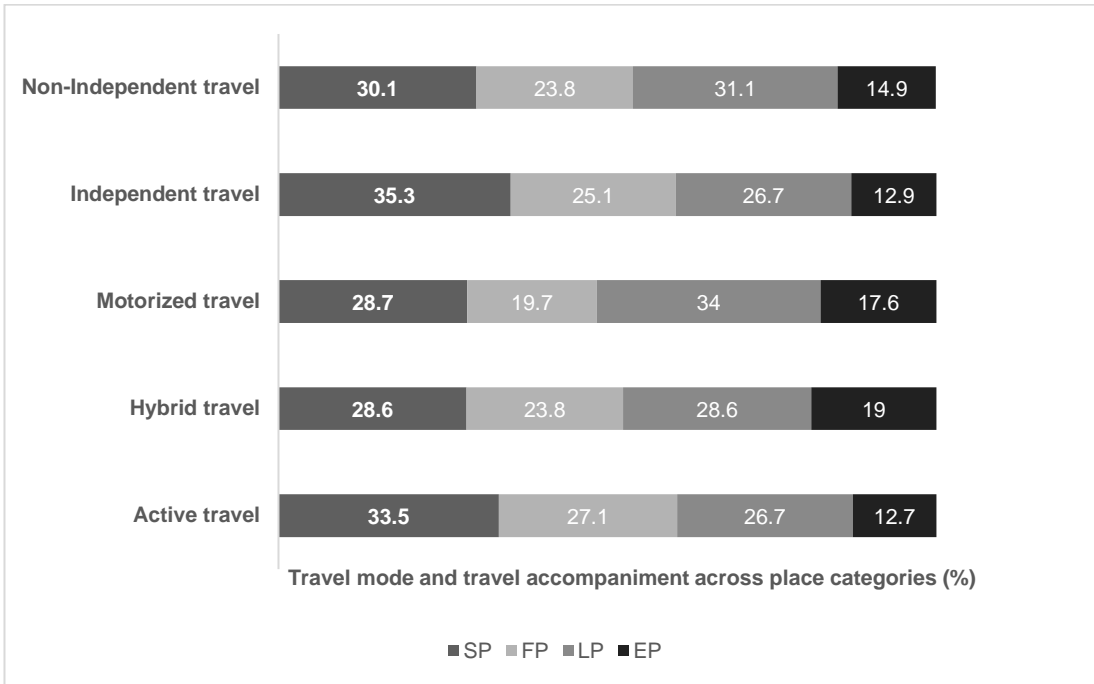


Fig. 15- Actual mobility distribution across categories of meaningful places in “LBS” group

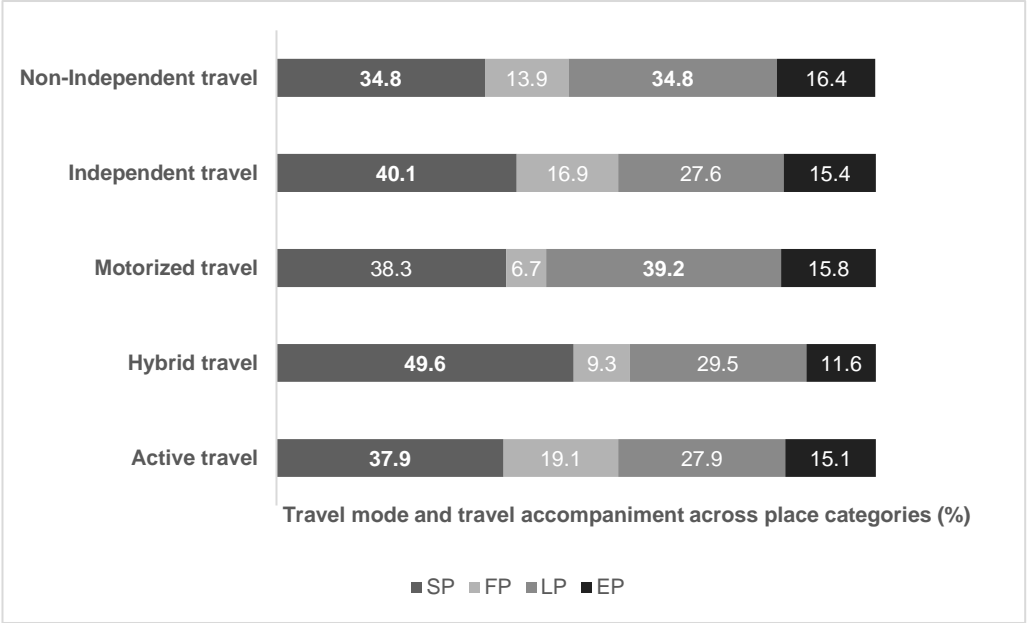


Fig. 16- Actual mobility distribution across categories of meaningful places in “LM” group