

EXPLORING THE INFLUENCES OF A LOW-INCOME NEIGHBOURHOOD



ENVIRONMENT ON CHILDREN'S PHYSICAL ACTIVITY IN CHINA

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ABSTRACT

Background: This study aimed to explore how the physical and social environment of a neighbourhood influenced the physical activity of children from the perspective of children and caregivers. It used a low-income neighbourhood in Beijing as the setting and focused on children in middle childhood. **Methods:** Guided by the Urban Ecological Model for Environment and Health Behaviour, semi-structured interviews (n=28 children and n=26 caregivers) and focus group discussions (n=26 children) were conducted. Content analysis was used to code and categorize data to determine topics and themes. **Results:** Children's and caregiver's overall perceptions and attitudes were about how their physical and social environment lacked the available, accessible and appropriate open space they desired and how it hindered children's physical activity by contributing to their fears of accidental injury and social harm. **Conclusion:** The findings and recommendations from both an urban planning and public health perspective can guide future planning and social policies to promote outdoor play and activity integral to the development of children in vulnerable neighbourhoods.

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1. INTRODUCTION

Physical activity is essential to the overall growth and development of children. They require organized and unorganized forms of play and exercise to thrive physically and to fulfill their need for social interaction. Since children's environment significantly influences the level and quality of their physical activity, it is critical that they have access to a variety of stimulating and secure spaces that afford play. However, the global rise in urbanization has changed the physical and social landscapes of cities that are often characterized by high density, uncontrolled urban sprawl, lack of open space, economic inequalities and an increase in sedentary lifestyles (Galea & Vlahov, 2005:7, UNPOP, 2008:28). These factors pose challenges to children's physical activity and well-being especially in low-income neighbourhoods. Accordingly, the growing body of literature exploring the relationship between the urban environment and children's physical activity recognizes the need to promote physical activity (Bartlette, 2002:4).

The fact that planned space is not always available or even accessible in many low income neighbourhoods in China poses certain challenges to those working to increase children's opportunities for human development and socialization by fulfilling their need to play. The limits and restrictions of the physical environment, parental/caregiver attitudes, and perceptions regarding the safety of their children have also presented other challenges. This paper presents an overview and results obtained from a qualitative study conducted with Chinese children, ages 6-12, their care givers and community workers, about available play space, what is desirable, and how they currently handle the issue of diminished play space.

1.1 Study Background

According to key facts from the World Health Organization (WHO) in 2010, being overweight and/or obese was the fifth leading risk factor for global deaths; data also lists physical inactivity fourth among risk factors for global mortality in 2004. The implications extend to other non-communicable diseases such as cardiovascular disease, cancer, diabetes and mental illnesses (WHO, 2010:8).

Worldwide obesity has more than doubled since 1980. Childhood obesity has become a serious global challenge. Close to 35 million overweight children are living in developing countries and 8 million in developed countries. These children are more likely to be obese adults and develop non-communicable diseases (ibid:8). Once considered a high income problem, being overweight and obesity are now on the rise in low and middle income countries, particularly in urban settings (WHO, 2011). China seems to be following that trend. In 2002, the prevalence of overweight children in China was 27.7% in boys and 14.1% in girls. (Cheng, 2004:365)

Although urbanization offers many benefits to residents living in cities, those living in low-income neighbourhoods within these cities are most disproportionately affected by poor urban planning, low quality housing, lack of greenspace and environmental degradation (UNPOP, 2008:28). Moreover, economic disparities often manifest in spatial patterns of social segregation based on income, placing poorer children's health at greater risk (Hornberg & Pauli, 2007:572). Thus, the most vulnerable children are those living in low-income neighbourhoods where they are more likely to face barriers to physical activity caused by a lack of available, accessible and appropriate open space (ibid:572, Castonguay & Jutras, 2009: 101).

Physical activity not only protects children from health problems, but contributes to their overall mental and social development. Children with adequate activity levels are less likely to experience depression and low self-esteem (Floriani & Kennedy 2008:92). Furthermore, play fosters the building of their social networks (Veitch, Salmon & Ball, 2010:8). Chinese children are under extreme pressure to excel academically and eventually obtain university degrees. Therefore, most children spend the majority of their time doing homework and studying, as opposed to playing or engaging in extra curricular physical activities (ibid:365).

WHO developed a 2008-2013 Action Plan for a global strategy for the prevention and control of non-communicable disease, including a specific component on promoting physical activity. This plan was based in large part on prior recommendations that children ages 5-17 receive at least 1 hour of moderate to vigorous physical activity daily (WHO, 2010:20). The new plan recommendations were:

- i. develop and implement national guidelines on physical activity for health;
- ii. implement school-based programs in line with WHO's health-promoting schools initiative;
- iii. ensure that physical environments support safe active commuting, and create space for recreational activity.

Based on available statistics at the time this study was conducted, only 23.2% of middle school children in Beijing met the 1 hour recommendation (BHB, n.d:27). Cognizant of these facts and recognizing the need to help children in China thrive, it is necessary to further understand and address the relationship between the influences of low income neighbourhoods on physical inactivity.

Existing scientifically tested ecological models suggest that health behaviour is influenced by personal and interpersonal factors and physical and social environments (Sallis, Owen & Fisher, 2008: 468). Literature on children's physical activity can be found in the context of the school environment, parks, playgrounds, greenspace or public space. In spite of the fact that the neighbourhood is known to be an important setting for child development, research on children's physical activity in neighbourhoods is limited (Hume, Salmon & Ball, 2005:1). Although studies on the effects of children's physical activity often examine the influence of their physical environment, few explore the effects of the social environment (Hume et al, 2009:638). While studies documenting health issues in China are expanding, research on physical activity, particularly in the neighbourhood setting, is still lacking (Wen et al, 2010:453). Complicating the issue even more is that currently, there is a lack of research published in English that focuses on low-income neighbourhood environments and children's physical activity in China. Moreover, urban low-income neighbourhoods, where social and physical environmental consequences of urbanization are concentrated, need to be explored to contribute to the discussions and interventions that promote the health of all children living in cities.

1.2 Research Questions

This study aimed to explore how the physical and social environment of a low-income neighbourhood influenced the physical activity of children from the perspectives of children and caregivers. It used a low-income neighbourhood in Beijing as the setting and focused on children aged 6 to 12 years who were able to explore their neighbourhood rather extensively, yet experienced the confines of caregivers' authority (Valentine & McKendrick, 1997:220). The research was designed to answer the following main question:

1. How do Chinese children's and caregiver's perceptions and attitudes about their neighborhood environment influence children's physical activity?

Secondary questions to support the main question are as follows:

1. What are the general views and experiences of Chinese children's physical activity in the neighborhood?
2. What are the general views and experiences about Chinese children's opportunities for and barriers to physical activity in the neighbourhood?
3. What play activities and neighbourhood environment do Chinese children and caregivers desire to have?

2. CONCEPTUAL FRAMEWORKS

In providing context and formulating ideas for consideration in this study, the use of ecological models was employed. These models provided guidance for understanding the emergence of multiple factors and levels of influence that the urban environment has or might have on children's physical activity. Of paramount importance to this study was a literature review conducted on various ecological models commonly used in researching the relationship between individuals and their environment on health behaviour in an interdisciplinary context (Bronfenbrenner, 1994:37). The "Urban Ecological Model on Environment and Health Behaviour" (UEM), inspired by ecological models, consists of a compendium of theories

concerned with human development. It is particularly useful in qualitative studies designed to explore multiple factors and occurrences within social science research dealing with child development (Dwyer et al, 2008:68, Hume et al, 2009:637; Veitch et al, 2006:384).

2.1 Ecological Model Background

Urie Bronfenbrenner's Systems Theory establishes a bio-ecological standard (model) for understanding child development to adulthood within a series of five contexts (micro-, meso-, macro-, exo- and chrono-) for which the child at certain points of development is either an active or passive participant. For the purposes of this study, there is focal concentration on only three of the five systemic contexts (micro-, meso- ad to a lesser extent, macro-). The theory, introduced in the 1970s, created a framework to explain human development and behaviour starting with influences closest to the individual and then radiating outward into larger society. One of Bronfenbrenner's pioneering research activities studied the effects of neighbourhood environment on children's development in Berlin. (Bronfenbrenner 1994:37). In that study, Bronfenbrenner developed the levels of environmental influence and identified their sources.

Recognizing that each system has its own particular significance, the three systems which have the greatest bearing on this research are the microsystem, mesosystem and macrosystem (Sallis, Owen & Fisher, 2008: 468). The microsystem (*i.e.*, family, peers, neighbourhood) is the system in which the individual has the most direct interactions with social agents/actors. It is within this intimate social system, which encompasses the relationships and interactions children have with their immediate surroundings, that individuals are allowed to be active participants in the sense that they are able to help construct and make meaning of their environmental setting (Berk, 2000). It is also within this context that this research involving Chinese children and caregivers with respect to neighbourhood and physical activity situates itself first and foremost. As stated earlier, the microsystem is the layer closest to the child and contains the structures with which the child has direct contact. It is at this level that relationships have a bi-directional impact - both away from and toward the child. For example, a child's parents may affect his beliefs and

behaviour; however, the child also affects the behaviour and beliefs of his parents. Bronfenbrenner calls these *bi-directional influences*, and he shows how they occur among all levels of environment. At the microsystem level, bi-directional influences are strongest and have the greatest impact on the child throughout life.

Second, the mesosystem is an intermediate context which begins to transition the individual more outward socially by making connections between micro-context social agents and other more expansive influences (*i.e.*, church, neighbourhood, school). Hence, connections between the influences a child has come to know in the microsystem begin to interact with other external societal systems that will shape perception even more.

Third, the macrosystem involves the broad social, political, economic and cultural systems replete with laws, customs and values (Bronfenbrenner, 1994). The effects of the broader societal factors of the macrosystem have a cascading influence throughout the interactions of all other systems (Berk, 2000). This statement is especially important because the culture and beliefs in a society affect the structures in which parents make decisions and function.

To complement the Systems Theory's emphasis on the social bio-ecological development and integration into society in social contexts, the Social Ecological Model for Health Promotion accounts for the influence of the built and natural environment on health behaviour. This model has four core assumptions:

- i. health behaviour is influenced by an individual's characteristics and their relationship to the social and physical environment;
- ii. environments are multidimensional - they can be actual (objective) or perceived (subjective), conceptual (political climate) or discrete (spatial structures);
- iii. interactions occur at all levels of aggregation (individual, family, community, society); and

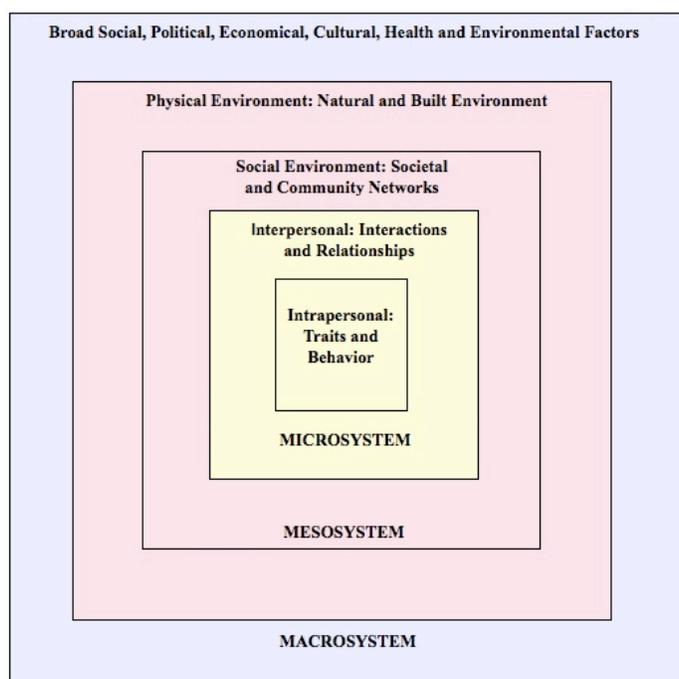
iv. people and their environment engage in a causal loop where people influence their environment and in turn, the environment influences their behaviour (Sallis, Owen & Fisher, 2008:469).

In addition, the multi-dimensional aspect of the Social Ecological Model dictates the need to triangulate methods (Sallis, Owen & Fisher, 2008:473). Although historically this model was more commonly used in health promotion, psychology and social science, the inclusiveness of multi-system factors, such as the physical environment, economics and politics promotes interdisciplinary research (Stokol, 2006: 64).

2.2 Urban Ecological Model Development

This model is particularly suited for those concerned with environment and health issues, or those working in the field of urban planning/design and public health. The Systems Theory and the Social Ecological Model for Health Promotion support the comprehensive study of multi-level and multi-factoral interactions between individuals and their environment and inspired the development of the “Urban Ecological Model on Environment and Health Behaviour” (UEM) conceptual framework used for this study. The word “urban” emphasizes the contribution of the built environment, as opposed to peri-urban or rural settings. This built environment represents its own unique challenges and influences in neighbourhood settings. Unlike the human development which is shaped by natural interactions with social agents, the built environment is manmade and possibly imposed by the overriding macrosystem contacts.

Model 1. Urban Ecological Model of Environment and Health Behaviour



The concept of “Health Behaviour” examines the actions (or inactions) a person (or population) takes to prevent illness and maintain, attain or regain health. Accordingly, this model has the underlying assumption that an individual’s perception and attitude about his environment influences his health behaviour. Although there are many well documented health behaviour models that describe this process, such as the Theory of Reasoned Action (TRA) (asserting that behaviour is determined by behavioural intentions shaped by an individual’s attitudes and norms) (Montagno & Kasprzyk, 2008:68), or the Social Cognitive Theory (SCT) (emphasizing that health behaviour is the result of dynamic interaction and “reciprocal determinism” between individuals, their environment and behaviour) (McAlister, Perry & Parcel, 2008:167), the UEM is not exclusive to one model.

The UEM provided the researcher (the writer, a Master of International Development and Management (LUMID) program student at Lund University with a background in Public Health) and the supporting team (Supervising professor and four students from the Graduate School of Landscape Architecture (GSLA) at Peking University) with a common ground for multidisciplinary and interdisciplinary research.

The UEM uses the Systems Theory’s three levels of influence on individual behaviour (microsystem, mesosystem and macrosystem) and incorporates the Social Ecological Model’s emphasis on the built and natural environment into the mesosystem. All three system levels are interdependent and interrelated to each other (See Model 1). The following uses the UEM to define the relationships among the system levels in the research:

- i. Microsystem: It is concerned with intrapersonal factors or characteristics such as demographics, social economic status, beliefs, knowledge, perception, attitude and values that influence behaviour. Moreover, it concerns the interpersonal dynamics between children and caregivers (parents, grandparents) and how they are affected by the neighbourhood environment (the mesosystem). Since caregivers have the responsibility to

influence children's behaviour, children and caregivers are considered a dyad (Loprinzi & Trost, 2010:129). Therefore, it is important to understand both children's and caregivers' perceptions and attitudes about their neighbourhood environment that influence behaviour.

- ii. Mesosystem: It is concerned with the physical and social environment of the neighbourhood. The physical environment constitutes the natural and built environment of the neighbourhood. The social environment is concerned with participants' immediate social systems, such as friends, neighbors, and community organizations as well as the interactions among the different social networks within the physical environment context. For children, the neighbourhood is a key environment where physical activity takes place. Research into neighbourhood level influence is limited, with most concentrating on the physical environment (Hume et al, 2009: 637). Since physical activity is an important social activity, a comprehensive exploration of the neighbourhood needs to include social factors (ibid:638).
- iii. Macrosystem: represents all other broad social, political, economical, cultural and environmental factors that interact with the mesosystem and microsystem.

3. THEORETICAL FRAMEWORK

This study explores the effects of the mesosystem (neighbourhood physical and social environment) on the microsystem. While the macrosystem is not the focus, relevant issues are reviewed to provide the necessary context. Accordingly, the theoretical framework consisted of a literature review of research, concepts and theories presented in the three systems from an urban planning/design and public health perspective. The theoretical framework supported the analysis and discussion of the findings.

3.1 Microsystem

The physical activity experiences of children vary dramatically according to personal characteristics such as gender, attitude and values. One particularly important characteristic is a child's developmental stage. Child development theories emphasize the significance of parents,

grandparents and siblings in shaping the growth and development of children in early childhood. However, as the child grows and gains independence, his social and physical context broadens (Parke, 2011:10). Through play and physical activity, children develop necessary physical, social and cognitive skills essential to their well-being and function in society. According to Erik Erikson's psychosocial stages of development, children enter the "play stage" at three years of age, when they aim to gain mastery over their environment. Their play and interactions become more social as they moves towards the "industry stage" at three to six years of age where they aim to gain a sense of pride and accomplishment through interactions with parents, teachers and peers (Parke, 2011:14). While Erikson emphasizes the social aspects of development, Jean Piaget's stages of cognitive development describe that school aged children are able to reason logically and organize objects they perceive from their environment (ibid, 2011:23). Although it is important to explore children's physical activity at all ages, school aged children are unique in that they are beginning to gain independence from caregivers and able to explore their social and physical environment more freely. They have a strong capability to describe their perceptions and attitudes about how their environment affects their behaviour. Hence, their voices must be heard.

Accordingly, Holt et al (2008:1022) found developmental differences in children's perceptions of neighbourhood play space. Children (aged 6-12) from low walkability (L-W) and high walkability (H-W) neighbourhoods were asked to draw their perceptions of places to play. Children were stratified into three age groups. The youngest group (aged 6-8) in L-W depicted more in home/yard play compared to the oldest group (age 10-12). In contrast, the youngest group in H-W depicted engaging in less home/yard play and outside the home play than the two older groups (age 8-12). Interestingly, these results suggest that the relatively higher occurrence of cul-de-sacs in L-W areas prevented traffic and may have provided more opportunities for supervised play, while it hindered the walkability for older children with more autonomy for free play.

Consistent with the microsystem theory that children's interpersonal relationships with caregivers may play a significant role in influencing their physical activity, studies that

considered them a dyad found supporting evidence. Loprinzi & Trost (2010) found that parents who favored and supported physical activity were positively associated with children's physical activity at home (ibid:132). Similarly, a study evaluating a model for parental influence on youth reported positive associations between parental support of physical activity and child self-efficacy. However, findings did not support parents' modeling of physical activity to be a sufficient influence on youth; they suggested the need for parents to be more active in their support by providing motivational and instrumental support, such as teaching activity skills (Trost et al, 2003:280).

On the other hand, parents may also hinder the physical activity of children and hence it is important to understand the circumstances in which caregivers negotiate children's autonomy in their play environment. An intrinsic aspect of parenting centers on parents' ability to control and protect their children in public space, particularly those under 12 years of age (Valentine & McKendrick, 1997: 223).

Unsurprisingly, the Chinese believe the future of China is their children. However, government's one child policies in recent decades focused on the "quality" of children rather than the quantity, emphasizing small families. Families living in cities are encouraged to have one child, with variations to allow for more in rural areas (Xu & Minca, 2008:299). Three-generation families are prevalent, especially in urban areas where grandparents are sometimes the primary caregivers (Jiang et al, 2006:10). For this reason, grandparents may significantly impact a child's outdoor activity. Child development theories emphasize the significance of parents, grandparents and siblings in shaping the growth and development of children in early childhood. However, as the child grows and gains independence, his social and physical context broadens (Parke & Clarke-Stewart, 2011:10)

3.2 Mesosystem

Various studies indicate that the neighbourhood environment affects the physical activity of children. However, no clear definition of "neighbourhood" exists. Any attempt should consider the spatial, social, functional and administrative characteristics of an area (APA, 2006:410). It

can be viewed as a geographic community within a city at a scale that supports social interaction and networks. Some of the goals of a neighbourhood are to: provide transportation options; provide housing choices; create opportunities for local employment; improve environmental quality; increase economic and ethnic diversity; increase social interaction and civil participation; and foster recreational activity (ibid:412). Therefore, the definition of neighbourhood differs depending on the context and is often difficult to delineate, especially from the perspective of children (Jones et al, 2010: 236). “What they do and how they do it in a particular place best defines the place for the children” was put forth in one study exploring children’s sense of place in a neighbourhood (Min & Lee, 2006:54). To accommodate the developmental capability of children, some studies use age appropriate methods of mental mapping, drawing or photography to allow them the creative means to express their perceptions and attitude about their neighbourhood (ibid:51, Castonguay & Jutras, 2009:101, Holt et al, 2008:8).

In general, studies about the neighbourhood environment’s effect on children’s physical activity have emphasized both the social environment and physical environment. Nevertheless, there are more studies focusing on the effects of the physical environment than on the social environment (Hume et al, 2009:638). Moreover, since the social and physical factors in the environment are interrelated as to how they affect physical activity, most studies examine a combination of the two. For example, children in a low-income neighbourhood chose the playground as a place they enjoyed both for the social interaction it promoted and the physical stimulation provided by the facilities (Castonguay & Jutras, 2009:106). Regardless, the following literature review distinguishes between the social and physical factors to better understand their individual effects.

The factors in the social environment commonly explored in literature were social networks, community capacity and social fears. Positive perceptions of neighbourhood social networks and capital were both predictors for moderate-vigorous physical activity (MVPA) in children of both genders. Children with positive perceptions reported engaging in 10-13 min/day more MVPA than those who reported less positive views (Hume et al, 2009:640). However, mothers also had social fears regarding the neighbourhood; the most reported being that children would encounter

drug abusers and micro-crime (ibid:448). Another study on children found that preschool children were more likely to like spaces attached to a social memory near a friend's home in contrast to adolescents, who preferred parks, which may reflect their increasing autonomy (Castonguay & Jutras, 2009:107).

The factors in the physical environment commonly explored in literature were availability, accessibility and “affordance” (opportunities) of open space and urban design in the neighbourhood. Availability and accessibility of open space are often discussed in regard to equity between different neighbourhoods of low to high socioeconomic status (SES). Availability is concerned with what open space is present, provided and can be potentially used. Accessibility is concerned with convenience, connectedness and walkability (PPS, 2011). In general, higher availability and accessible space are associated with physical activity. Although several studies in developed countries examine these concepts, those in low-income countries are lacking (Crawford et al, 2008:889; Gilliland et al, 2006:256; Timperio et al, 2007:337). These concepts are especially important in low-income settings where the lack of available and accessible space is more likely to impede children's physical activity.

To understand the appropriateness or opportunities of the built environment on children's physical activity, studies have applied quantitative or mix methods, such as direct observation, survey of large populations or the use of accelerometers and Graphical Information System (GIS) for spatial and behavioral analysis. (Carver et al, 2010:1799, Willenberg et al, 2010:210) Moreover, the concept of “affordance” was coined and developed by J.J Gibson (1979) to investigate how the physical environment can be perceived to provide opportunities for action. In general, it is concerned with the perceived properties of the built and natural environment that stimulates, attracts or affords behaviour, such as playgrounds or natural landscapes (Cosco, Moore & Islam, 2009:514). Additionally, it has the potential to extend to the emotional and cultural opportunities in one's social environment (Kytta, 2004:181). Even though most studies considered affordance as the perception of “positive” opportunities for action (i.e., playgrounds for play), conversely, objects can also provide “negative” affordance for action (i.e., avoiding roads) (Goldstein, 1981:192, Kytta, 2004:180). Although physical activity is often a social

activity and shaped by the social environment, affordance in this study refers to the perceived positive or negative affordance of the neighbourhood's physical environment.

3.3 Macrosystem

The remarkable societal changes that have occurred in China need to be highlighted to appreciate the both the nuanced and the apparent effects on the lives of people and the neighbourhoods in which they reside. China's policy reforms in the late 1970s led to the rapid urbanization of cities characterized by high density, uncontrolled urban sprawl, lack of greenspace, transportation challenges and poor planning and design; essentially, urbanization created a distance between people and their natural environment. (Li et al, 2005: 326). Beijing's landscape holds a history of around 3000 years with most of its modern development contained in the old town before 1950. The urban greenspace consist of parks, forest and farmland (Li et al, 2005: 328).

According to the UN Population (2010) China will reach an urbanization rate of 65% by 2030, an increase of 300 million people, (ibid:5), many of whom make up floating populations of migrant workers. China experienced the largest migration in its history from 1979 to 2009, in which the migrant population increased from 6 million to 211 million in cities and will continue to remain a challenge to human development (Ibid:3). Currently, Beijing has a population of approximately 19.6 million people. About a quarter of its migrants of its current population settled between 1992-2002, in transitional low-income neighbourhoods (Li et al, 2005: 328, NBSC, 2011). These neighbourhoods are categorized into three main types: dilapidated inner-city neighbourhoods, declining worker's villages and "urban villages", which are areas of collectively owned rural territory engulfed by urban sprawl (He et al, 2010:329). Urban villages are distinct in that they provide reasonable rent in unregulated housing for the influx of migrants (ibid:329). While the desire for a better life has attracted migrant families to settle in poor communities, most are further disadvantaged due to their lack of a local "hukou" or household registration (needed to access public housing, health insurance, education and employment pertaining to a specific city) (He et al, 2010:331).

All school aged children are legally required to attend school and the importance of academic achievement has been documented to be valued over physical development; with the exception of children of some high-income “western” influenced parents who encourage sports, Chinese children spend more time on school work than their American and European counterparts, (ibid: 10). Furthermore, the western influence on children’s routine use of computers, playing video games and watching television have contributed to physical inactivity (Jiang et al, 2006:13). Additionally, along with economic development, the increased use of cars discourages walking and biking, while the overall increase in traffic may influence parents to place restrictions on children’s outdoor activities for fear of accidents (ibid:34, Carver, Timperio & Crawford, 2008:218). Thus, children, particularly those from migrant families are often exposed to unfavorable environments and social hardships that affect their development. Evidently, any solution or intervention to address short- and long-term environmental or social barriers to children’s physical activity need to consider China’s broader context. As such, the integration of public health, urban design and planning strategies, which emphasizes the interrelatedness of ecological systems needs to be applied (Boarnet & Vlahov, 2008:387)

4. METHODOLOGY

We sought to design a study that would explore the perception and attitude of children and caregivers about the interplay between physical activity as influenced by social interactions within the context of the physical neighborhood environment.

4.1 Approach

This is a qualitative research method to be analyzed using descriptive statistics. The study used a combination of focus group discussions (FGD) and interviews to explore children’s and caregivers’ views. Both focus group discussions and interviews used semi-structured questionnaires. Interviews with children and caregivers (parents or grandparents) and focus group discussions with children included drawing exercises aimed at exploring the “essence” of participants’ experiences with limited interpretation from the researcher.

Interview sample size for various types of studies can range from 5-60 individuals for both purposeful and theoretical methods, and approximately 5-25 individuals for phenomenological studies (Creswell 1998:61, Guest, Bunce & Johnson, 2006:60). Although sampling until saturation is the convention, Ryan and Bernard (2004) explain that saturation depends on i) complexity of data, ii) researchers' experience and fatigue, and iii) number of analysts involved (Guest, Bunce & Johnson, 2006:77). In this study, purposeful stratified quota sampling was used by dividing the neighbourhood into eight sections and recruiting participants from each area until saturation was reached (See Table 1). Although the Hukou (resident) status of participants may influence their physical activity experiences, it was not considered in the sampling and not routinely asked due to the possibility of being a sensitive topic.

As a result, semi-structured interviews were conducted with n=54 participants of which 26 were caregivers (11 male and 15 female) and 28 were children (16 males and 12 females with an average age of 9.5 years). Approximately half of adults (n=12) and children (n=8) reported being migrants with n=4 and n=11 respectively with unknown status (See Table 2). Out of the total, 14 children and 11 caregiver interviews were conducted by the writer and another researcher. The interviews ranged from 10 to 35 minutes. A total of 31 eligible participants declined to take part in the interview because they were not interested, did not have time and one person did not believe the authenticity of the information letter from the university.

As a result, four FGDs with 5-10 children ages 6-12 (11 female and 15 males) were conducted, two in each neighborhood, totaling 27 children. Number of declines from recruitment were not recorded by government administrators. Of children that arrived, two were not interested and declined to participate before the FGD began. One child declined to participate in the drawing assignment. The writer assisted on all FGD along with 2-3 other researchers. One researcher would administer the questionnaire, while the others recorded field notes or assisted with the drawing assignments. The FGDs ranged from 60-90 minutes and were audio recorded.

4.2 Site Selection Methodology

This study setting was chosen by the interdisciplinary research team (with expertise in public health, social science, ecology and urban design) to be a disproportionately vulnerable and marginalized neighbourhood in the Haidian District of Beijing. Two adjacent neighborhoods (See

Figure 1. Neighbourhood Boundaries, 2010-2011

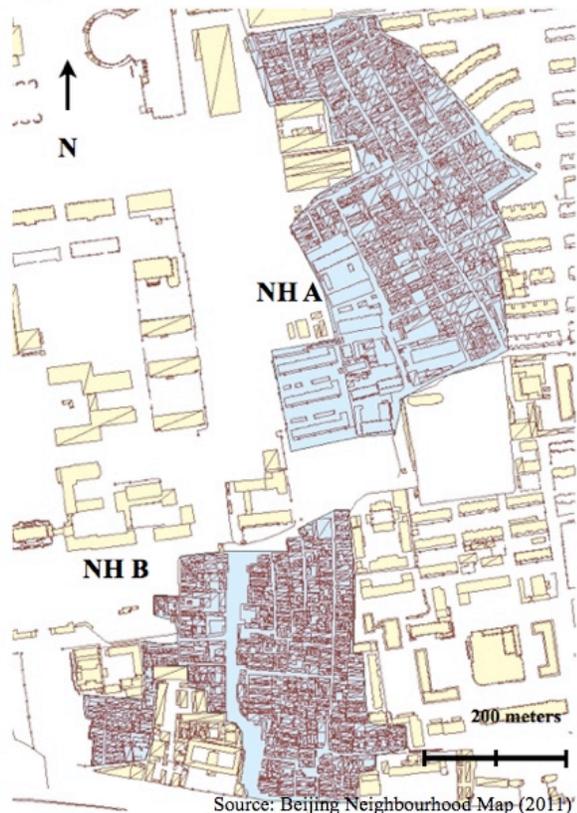


Figure 1. for neighborhood (NH) A and B) located in the city of Beijing were chosen as defined by the smallest government designated administrative boundaries. For the purpose of this study, the neighbourhoods, which reflect the same type of land density, architecture, greenspace ratio, and human demographics, were considered as one neighbourhood (the mesosystem) for two reasons: (1) Geographically, both neighbourhoods' physical environment contrast their surroundings, which consists of large enclosed parks, universities, government institutions and multi-level apartment complexes with high land value. (2) Demographically, the surrounding social environment consists largely of higher income residents, many of them being staff of the nearby prestigious institutions.

Spatial data about the study setting were collected using direct observation and digital and raster maps. Furthermore, since children's perception of their neighborhood boundaries may differ from that of adults, the neighborhood will be referred to by name, or with statements such as "around your home" or "walkable areas from your home."

Based on a review of numerous studies about the relationship between children's physical activity and the built environment, large systematic or direct systematic observational methods were used to produce quantitative results. These studies chose tools and procedures to guide

systematic observation of the built, natural and social environment (Floyd et. al., 2008:299; Sallis, 2009: 87-89). Although the scope of this research is not to conduct formal observation, systematic observation using the System for Observing Play and Recreation in Communities (SOPLAC) tool developed by McKenzie & Cohen (2006) and photo mapping were conducted by the writer to assess the neighbourhood environment. Government documents about the neighbourhood demographics were not accessible; instead the writer obtained information from three key informational interviews with neighbourhood government authorities.

4.2.1 Physical Environment

The neighborhood's outer boundaries are clearly defined by retaining walls, gates, shops, restaurants, markets and major multi lane roads (See Figure 1). Using digital maps and a remote sensing photograph of the neighbourhoods, the green space ratio was calculated for visible green cover using ArcGIS. The percentage of greenspace to ground area in the neighbourhood is 15.3%. The percentage of greenspace in buffer zone areas set at various distances from the neighbourhood borders are as follows: 35.6% at 50 meters, 44.0% at 100 meters and 48.4% at 500 meters. Greenspace ratio of adjacent to neighbourhood space are: 2.3:1, 2.9:1 and 3.2:1, respectively.

The majority of the housing are one level single homes attached to other units with a few multi-level apartments with a courtyard. The density is high with three main types of layout: linear layout; irregular layouts and houses surrounding a semi-private courtyard (any space that is gated or enclosed by a wall, often as narrow as alleys as a result of being occupied by makeshift rental housing). Most share public outdoor squatter toilets and some share public kitchens. There is one private courtyard with a grass lawn used for educational programs. The neighborhood has two public open spaces allocated as exercise parks with various stationary machines designed for the elderly population. Pathways in the neighborhood consist of hutongs (alleys), small streets for pedestrians and a few large paved roads for cars; there are no traffic lights.

4.2.2 Social Environment

Historically, the neighbourhood was a rural village before urban sprawl incorporated them into the city. These areas are now referred to as “urban villages”. Prior to the 2008 Beijing Olympics, the government had planned to transform the neighbourhood into a greenbelt, reflective of the master plan for greening the city. In anticipation, many of the neighbourhood residents moved elsewhere and rented their homes to migrant workers. The population of neighbourhood A and B are 4,000 and 10,000 in which 2,000 and 7,200 , respectively, are migrants without permanent resident status in Beijing. Neighbourhood A has approximately 100 children aged 6-12 years, but the number of children in Neighbourhood B is unknown.

Migrant workers often have low social economic status and work in labor-intensive, low-paying jobs. Since some rural residents are not restricted to one child, some of them have more than one child and may not have the means to support a family in the city due to living expenses such as health and education fees.

4.3 Data Collection and Sampling

In some qualitative research methods, the data collection and analysis occur separately where the analysis occurs after data collection has been completed. Though this study is descriptive in nature and does not aim to build theory, the research process was inspired by the grounded theory approach which allowed for a cyclical activity of collecting data, analyzing, and verifying findings throughout the entire research process. This inductive and deductive process led to the development of themes and findings (Strauss & Corbin 1999:74) (See Analysis section). The study used a combination of FGDs and interviews to explore children’s and caregiver’s views. Both FGDs and interviews used semi-structured questionnaires, which supported a structured approach to interviewing and analysis among team members while allowing for flexibility to investigate topics of interest (Bryman 2004:437). The FGDs had questionnaires that targeted group experiences and attitudes to encourage discussion, in contrast to individual questionnaires that explored individual views and experiences. In addition, the FGDs included a drawing assignment to assist with the discussion. Interview questionnaires were developed from

procedures described by Bryman (2004:447) that detailed the cyclical process of revising and testing questions as reflective of the Grounded Theory approach. All FGDs and interviews were audio recorded unless participants declined. Data collection took place between November 2010 to March 2011.

4.3.1 Focus Group Discussion

Focus group discussions were conducted to gather collective meaning from children about the phenomenon of physical exercise in relation to their neighborhood. This method, which is useful for gathering in-depth information on specific topics was critical in challenging preconceived notions of what researchers thought were important areas to explore (Bryman 2004:476). The information gathered was used to improve interview questionnaires. In addition, children were asked to draw their current and ideal neighborhood during the FGD and discuss their perceptions and attitudes individually with a researcher. Using drawing as a technique for mental mapping and a platform for exploring children's views about their environment is a creative method to triangulate in data collection. Several studies exploring children's view about their environment and physical activity have used drawing to better understand children's views (Pearce et al, 2009:615, Holt et al, 2008:4). While drawings can represent children's visual perception of their surroundings, attitudes were explored by asking clarification questions and discussing the meaning of their drawings during and after completion (Holt et al, 2008:7) (See Drawing 1).

Recruitment of children for the FGDs was done in collaboration with government administrators in neighbourhoods A and B. The administrators explained the study to parents a week before and provided a room in their office building for the FGDs. The parents were aware that the study was voluntary and that children would receive snacks and a small gift (exercise equipment worth approximately 1.50 USD) for their participation. Verbal informed consent was also obtained from the parents and children before the FGDs. Bryman (2004:477) states that one FGD is unlikely to suffice, while too many may increase complexity in the analysis. Therefore, FGDs

with 5-10 children ages 6-12 years were done until “theoretical saturation” of all analytical categories had been discussed and no new information emerged.

4.3.2 Interviews

According to Kvale (1996:98), interviewing is not just used as an auxiliary method to gain general knowledge as some believe, but a powerful tool in itself or in combination with other methods. Therefore, pilot interviews and FGDs were used to guide the development of comprehensive questionnaires to explore the research questions (ibid, 1996:100). Children and caregivers both were given questionnaires that included open and closed ended questions (demographic, multiple choice and Likert scale questions) to guide and prompt exploration. When possible, all survey questions were asked and additional questions to explore emerging themes were used. (See questionnaire). A map of the neighbourhood and surrounding area was included to assist with locating participants’ residences and activity areas.

Children aged 6-12 years and caregivers with children of that age (may not be of the same family) were enrolled and interviewed by one or two researchers. Caregivers (parents, grandparents or guardians) were interviewed because they are known to significantly influence the level and type of activity that children engage in (Loprinzi & Trost, 2010:129). Furthermore, caregivers’ perception of children’s neighbourhood environment can provide valuable societal context and insight about urban design that children can not articulate. Since caregivers play a vital role in the lives of young children and have the responsibility to encourage and restrict certain behaviours, children were asked about their interpersonal relationships with their caregivers, as required by the UEM. Since interviews were kept anonymous, it is not known if children from the FGD also participated in the interviews. Nevertheless, since these methods complimented each other by focusing on different aspects of the research question, there should be little, or no effect on the findings. Therefore, each child that participated in the FGD and interviews were assumed as unique cases (See Table 2).

4.4 Urban Ecological Model and Methods

The Ecological Model on Environment and Behaviour was used to guide the development of the research question, data collection methods, analysis and reporting. The following outlines how the different systems in the model correspond to the research process and concepts being studied.

- i. Microsystem: this system represents the child and caregiver dyad. Sampling of participants included both children aged 6-12 years and caregivers with children of that age.
- ii. Mesosystem: this system represents the physical and social environment. A description of the neighbourhood is stated in the methods section under “Settings”. Semi-structured questionnaires included a balanced set of questions related to both the physical and social aspects of the neighbourhood.
- iii. Macrosystem: although the focus of the study is not on the macrosystem, broad societal and environmental factors were indirectly explored or analyzed as they emerged from participants’ discourse, such as accessibility, open space outside the neighbourhood, migrant issues, the one child policy and land use.

4.5 Involvement of Investigator

This research was self-funded and contributed work to support a larger study funded by China’s Natural Science Research Foundation and led by a professor at the Peking University Graduate School of Landscape Architecture. The study is titled "The Characteristics of Neighbourhood Space and How It Acts on Children's Perception and Outdoor Physical Activity” (Funded Jan 2011-Jan 2014). The writer worked under the supervision of the professor and was appointed four student researchers to assist with data collection and language translation when necessary. Background data on the setting were collected and analyzed by the writer using key informant interviews, Graphical Information System (GIS) software (with the assistance of a GIS specialist) and the System for Observing Play and Leisure Activity in Youth (SOPLAY) observational survey tool (McKenzie & Cohen, 2006). The writer trained and led the research team on all data collection activities. The writer conducted all FGDs and half of all interviews

with the assistance of at least one student. The professor assisted on one FGD and a quarter of the interviews. The other quarter of the interviews were done by students. Interviews and FGDs (except one) were tape recorded and transcribed by the writer and used as secondary data. The writer analyzed all data and verified preliminary codes, categories and themes with the professor on several occasions.

4.6 Analysis

Data analysis started by identifying significant statements related to the research questions that describe the experiences of participants about the phenomenon under study. As inspired by the grounded theory approach, the cyclical process of data collection and analysis was conducted simultaneously where the data collected was analyzed to inform topics and themes to be explored in subsequent interviews. After saturation of data was determined, all FGDs and interviews were transcribed into English by the writer with language assistance when needed.

This study used qualitative content analysis to analyze text from the FGDs and interviews. The structured and systematic procedures detailed in Graneheim & Lundman (2004:107) provided a framework where codes, meaning units, and condensed meaning units were abstracted and analyzed to form themes and sub-themes. The field notes, audio recordings and transcripts were reviewed for coding and identification of meaning units and themes. Preliminary findings were discussed and discrepancies resolved with other team members for triangulation. The process ended with the collective integration of all findings to discuss the effects of the neighbourhood's mesosystem on microsystem (child and caregiver dyad) experiences. The themes and sub themes that emerged from the participants discourse were used to structure the "Findings" section of this paper. Moreover, this paper presented the findings and discussion in different sections to distinguish the "essence" of participant's experiences before the findings were examined in the context of current literature and the writer's interpretations.

4.7 Ethical Considerations

Working with any human subject population particularly vulnerable low-income populations in Beijing requires a sensitivity to ethical issues and conduct. Many countries have ethics committees in their institutions that review and approve research protocols to ensure that ethical protocols were upheld. This process is especially important for qualitative researchers who often collect detailed data about their subjects' lives and may be unaware of the potential consequences of their research (Silverman, 2005:42). Although some universities and institutions have an ethical body in China, the department of Landscape Architecture at Peking University does not currently subscribe to a formal process for reviewing ethical issues in research. However the highest consideration was given to research participants by this researcher, who is certified to conduct human subject research in accordance with international standards and recommendations for doing so. Emphasis on principles of autonomy, benevolence and justice informed the entirety of the research (Siedman, 2006:58). Careful consideration was also given to the rights of individuals to withdraw from the research at any time they chose to.

This research study posed less than minimal risk to participants. Generally speaking, there are two types of risks to participants; risks during and risks after participating in interviews or focus group discussions (Siedman, 2006:64). The research topic may not initially appear to be a sensitive or controversial topic that could cause harm. However, confidentiality of the data and privacy were maintained throughout the study. Only the researcher had access to the data which was kept in a secure location to ensure its reliability. Meetings were held about ethical issues and the requirement to obtain informed consent was established to mitigate potential risk to participants (Kvale, 1996:112). No identifiable data was recorded and verbal consent was obtained, though not individually documented, by the researcher.

4.8 Trustworthiness

Concepts that describe the validity or level of truth of quantitative research are commonly known as internal validity, external validity, reliability and objectivity. Similarly, concepts that describe

“trustworthiness” that correspond to “level of truth” in qualitative research are credibility, transferability, dependability and confirmability, which relate to results that are more interpretive rather than descriptive (Miles and Huberman, 1994:279). Triangulation of methods and consultation with multiple researchers from multi-disciplinary backgrounds provided a strong basis for credible research (Creswell, 1998:208). During the analyses, findings were systematically checked for coherence. Furthermore, inconsistent findings and negative cases were sought out to ensure comprehensive view points. To address the transferability of the findings, topics and themes were discussed in relation to the UEM and current literature. Recommendations will be made on how the findings are applicable to similar settings or populations (Miles & Huberman 1994:279). To ensure that the research was dependable, the writer confirmed preliminary findings throughout the research process with codes and categories for meaningful parallels (Miles & Huberman 1994:279). To avoid unacknowledged biases and judgments so that results present the “essence” of participants’ experiences, an audit trail of the data collection, analyzes and reporting process were kept transparent and ethical principles were followed (Miles & Huberman 1994:278). Since the research approach was phenomenological, the practice of “bracketing” supported objectivity.

5. FINDINGS

The collective findings from the analysis of the interviews, FGDs and drawing assignments revealed some interesting findings about how the neighbourhood influenced children’s physical activity. The quotes presented were obtained from interviews and FGDs, while the descriptive statistics refer to data collected during the interviews unless stated otherwise. A general overview about the children’s physical activity experiences precedes the findings of the main research question.

5.1 Physical Activity in Context

Physical activity (tǐlì huódòng), sports activity (tǐyù huódòng) and physical exercise (tǐyù duànliàn) or (yùndòng) in the Chinese language all have relatively the same meaning and are

often used interchangeably. The children in this study tended to regard the word “play” as encompassing physical activity, exercise, sports and games, as well as indoor leisure activities such as “playing on the computer”, with the exceptions of walking for transport and physical education class at school.

5.1.1 Type and Level

Children identified 40 different types of physical activities and the locations where these activities take place (See Table 3). All, except three activities involved at least one other person. Most activities occurred within the neighbourhood courtyards, followed by roads, front door of home and the exercise facility park for the elderly. More variety of activities were reported for areas within the neighbourhood as compared to those outside the neighbourhood (with the exception of school). However, the frequency of visits or duration of activities are not known.

Almost all the children stated that they acquired enough physical activity at school during the week and on the weekend. Most of the children reported having physical education classes at school approximately three times a week, while a few of the children received daily physical education classes. Nevertheless, the majority of them wanted to have more time for activities on weeknights, but many were unable to manage their homework load. Some of the children preferred to watch television or play computer games instead of going outdoors. Most of their extended play periods occurred on the weekends. A few parents commented that China is experiencing a growing problem with obesity due to increasingly sedentary lifestyles.

I work too much/.../we have a lot of stress in life. We have less time to play. His homework is more of a concern so we focus more on his studies. Now there are more overweight kids.

When adults were asked if their children received enough physical activity for healthy development, about half said yes, of which three caregivers believed the school provided adequate physical activity and two caregivers had enrolled their children in martial arts. The other half of the caregivers gave reasons for the inadequate amount of physical activity, which

were similar to those stated by children: a lack of play space; not enough kids to play with in the neighbourhood; academic achievement taking precedence; extensive television and computer use; and parents lack of resources to support children's physical activity. A father and migrant worker talked about the challenges of supporting his daughter's physical activity:

This question is hard to answer/.../It depends on the family. If you're from Beijing, they have resources. They have time to support their child's physical activity. Like me, a migrant...as her parent, I want her to be happy and to have physical activity everyday with a balanced daily schedule...but my economic resources are not able to support this. This is hard to answer. It depends on the family.

5.2 Neighbourhood Environment's Influence on Children's Physical Activity

The structure of the main findings follow the two topics (what was talked about) and five themes (what was said about the topics) that emerged from the content analysis of interviews and focus group discussions with children and caregivers.

Topic 1. Open Space

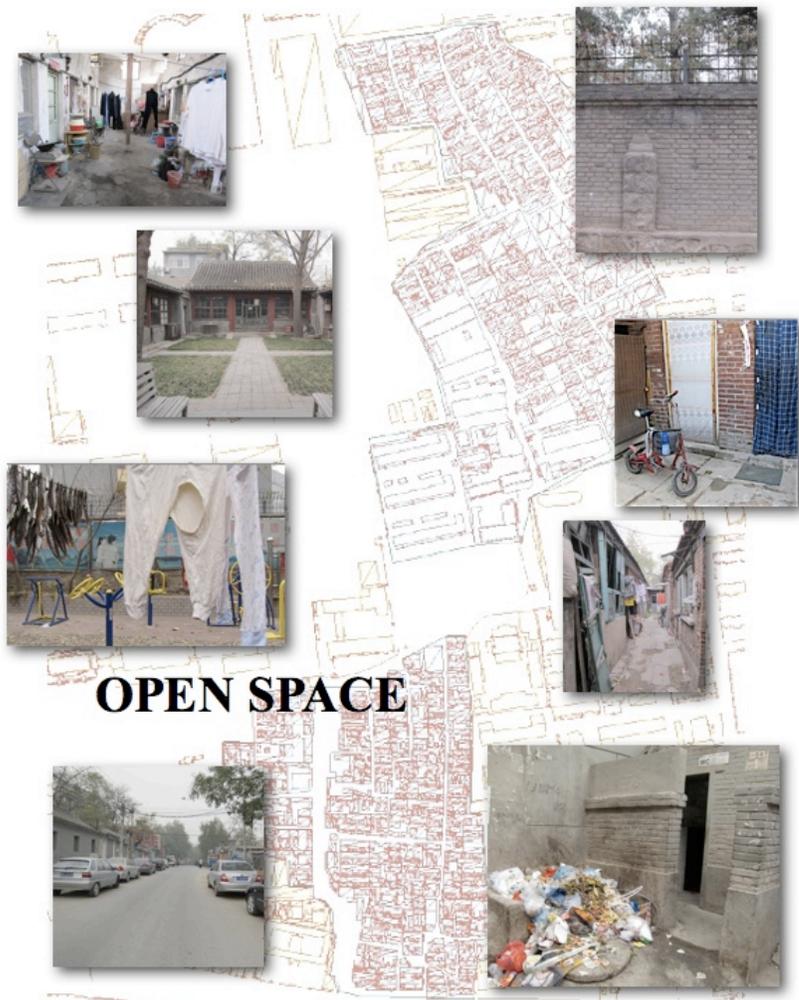
Two problems were revealed about open space: lack of places for physical activity and lack of places for social interaction, which is foundational for physical activity, since it is a social experience. What was available has low affordance in five areas.

Theme 1. Lack of Open Space in the Neighbourhood

Open space appropriate for children's physical exercise was limited in the neighbourhood. Since physical activity was essentially a social experience for children, public open space was seen as important to both the promotion of physical activity and social interaction. In turn, a strong social fabric has the potential to support physical activity in children.

Limited space for physical activity

Children and caregivers indicated that the lack of open space in their neighbourhood hindered physical activity. Since the neighbourhood's built environment was characterized mostly by single level houses facing a street or a group of houses sharing a courtyard (usually a narrow pathway) leading to a street, most families did not have a semi-private open space. Only children living in the one of the five apartment complexes shared large semi-private parking lots or courtyards where they could play. The only public open spaces with no access restrictions were two small



exercise parks designed for seniors. Both are approximately 750 square feet with concrete surfaces and five to seven simple exercise machines. Although most of the children used the exercise parks, only four children indicated it as their preferred play area. In the words of a migrant father who had lived there for five years:

Besides going to exercise parks (for seniors), there isn't any place around here for exploration. Besides houses and alleys, what else is there to discover? F

Alternative spaces for play

Since there was a lack of public, semi-private and private space for children, they were innovative in their use of available space. Areas not intended to be play spaces are used for various types of activity. Apart from the two exercise parks for the elderly, the only area that the public can access are roads. The narrow hutongs (alleys) connected to homes and courtyards, small streets and roads that allowed for vehicles all are used for children's activities. When children were asked where they most often played and liked to play, almost half indicated either an alley or road. Not only do children use roads for activities that suit paved and flat surfaces, such as biking and skateboarding, roads also supported activities such as hide and seek, football, skipping, "random" running and even chasing games such as "shoot the Japanese". Moreover, semi-private spaces such as parking lots and courtyards of government offices, apartment complexes are also used for activities. Because these spaces are semi-private, their accessibility is contingent on whether the residents allow them to use the space. Thus, their access is inconsistent at best. One 11 year old girl told a story about why she is now hesitant to play in the "Number 4" courtyard (belonging to an apartment complex) that she often visited.

I like the number 4 courtyard. You can bike around because the area is quite large/.../But someone broke a pot, and they blamed it on us. So now we don't like to go...Number 4 is closest to me/.../(the courtyard) has grass and trees. No flowers, but they do have some fake ones.

The location of the neighbourhood is unique in that it is surrounded by large plots of greenspace, which mitigates what was lacking in the neighbourhood. About half of all children indicated that they spent most of their time playing and exercising outside their neighbourhood in adjacent parks, playgrounds, fields and sports facilities of large institutions. Almost all the caregivers had taken their children to one of the two large city parks nearby at least a few times each year. The renowned "Summer Palace" park is considered walkable (15 minutes to 30 minutes) and a favorite for the adults. One grandfather spoke proudly:

Well, I feel this neighbourhood is my ideal neighbourhood. I've been here most of my life. Where else can you go. You have large fields, Summer Palace, good environment.

The housing, you get use to living in low housing, you don't want to be in a large apartment where you have to climb up and then you don't want to come back down.

In contrast, children seemed to prefer smaller parks with playgrounds and sports facilities that they considered walkable (about 10 minutes) and could go to without adult supervision. None of the children's drawings of their neighbourhood included the Summer Palace or large city parks.

Limited space for social activity

Physical activity is a valued social activity for children. Most of the physical activities that children enjoy require two or more participants (See Table 4). Almost all children preferred to play with friends or classmates, with the exception of five who would rather be with parents or siblings; none of them wanted to play alone. A twelve year old boy told of how he was often supervised by adults but would rather play with friends:

We go (to the park) with other people's parents because my parents are busy. I'd rather play with school friends, that's interesting. Adults don't know how to play, they are stiff.

Adults also recognized the importance of friends in promoting play and activity in children. In addition, some of them shared a desire to interact with their neighbours along with their children. However, a lack of public space hindered their social interactions with neighbours, which consequently reduced the social and play opportunities for their children.

When children and caregivers were asked if their neighbourhood environment was friendly, 76% (n=19) of adults and 80% (n=20) of children answered "yes". The adults who answered "no" were mostly migrants. They explained that the neighbourhood had too many transients and strangers and that some local residents "looked down" on migrants.

Theme 2: Limits in Accessibility to Adjacent Open Space

Children and caregivers talked about the challenges of accessing adjacent parks, playgrounds and sports facilities. Similar to children’s experiences of having inconsistent accessibility to semi-private spaces within their neighbourhood, they shared that accessibility to semi-private and private open space is dependent on one’s relationship with the gate keepers, having special privileges, one’s willingness to trespass, and the availability of personal time and economic resources. Since about half of all children indicated that they most often play in locations outside the neighbourhood, they are often confronted by the uncertainty of their activity outings. Because the boys have no entrance passes to the university’s sports field, they often attempt to bypass the attention of the guards. One mother explains:

In winter, they will bring a ball to the university’s exercise field and pretend they are from that community or else they (the security guards) won’t let them in.

Public open space

There are no public parks, playgrounds or sports facilities within 1.0 km of the neighbourhood with unrestricted access. The six most visited places by children were public, semi-public and private (See figure 2 and Table 5). The public spaces had entrance fees or were gated and only for viewing. Some of the semi-public places, such as the playground in the

Figure 2. Neighbourhood and Adjacent Open Space, 2010-2011 (Corresponds to Table 5)



Google Map, 5-18-2011

Table 5. Accessibility of Neighbourhood Adjacent Open Space, 2010-2011

Label *	Open Space	Ownership	Regulation of open space
A	University park and sport facility	Private and Semi-Private	Gated and guarded with operational hours, Some non-gated
B	Apartment complex	Semi-Private	Gated and unguarded, no operational hours.
C	Government Educational Institution	Private and Semi-Private	Gated and guarded with no access; non-gated
D	Summer Palace City Park	Public	Entrance Fee, gated and guarded with operational hours
E	Old Summer Palace City Park	Public	Entrance Fee, gated and guarded with operational hours
F	Green Belt	Public	Gated and unguarded and non-gated

* Corresponds to location on Figure 2. In descending order of children’s most to least visited places outside neighbourhood.

courtyard of the adjacent apartment complex, were often visited by children due to having few restrictions. The private spaces were not accessible unless entry was granted by the security guards or a child trespasses. Basketball being one of his favorite activities, a boy disclosed how he trespasses into the sports facility:

I go (sports facility) every other day...You can get in from there the south gate. But you don't always get in.

A man revealed how his grandson's access to the park inside the government institution was dependent on the goodwill of the security guards:

Only in the past 10 years, you can't go in. Before you could always go in. They had a door there. There's a big park. It was not blocked/.../They always had them (security guards) before but they weren't so strict because they knew us. Now they changed guards.

Despite the fact that some children benefit from this privilege, a few children complained that it was “not fair” that certain children are allowed to use private spaces because of the relationship their parents have with the gatekeepers. Lastly, given that the neighbourhood is completely surrounded by major multi-lane roads, caregivers do not allow children to visit the public parks beyond them without supervision. Thus, children's accessibility to open space within and around their neighbourhood is challenged by both physical and social factors.

Theme 3. Affordance of Neighbourhood Open Space is Limited.

The affordance of the neighbourhood's physical environment to promote children's physical activity is limited. In addition to the challenges of living in a high density neighbourhood with low greenspace coverage (define in methods), children and caregivers describe that the affordance of available space, such as roads, courtyards and exercise facility were low. To better understand the specific areas in the environment that were perceived to have negative affordance, participants were asked what was lacking and how their neighbourhood could be improved. Children's five most frequent suggestions in ascending order were to provide: playgrounds,

parks, plants and nature, a cleaner environment and sports facilities. With some similarity, caregivers wanted: a cleaner environment, playgrounds, plants and nature, improved infrastructure and bike lanes (See Table 6). As a whole, the themes that emerged from the interviews and children's drawings revealed five main topics about the affordance of open space in their neighbourhood: overall affordance of open space, ground surfaces, activity facilities, infrastructure and cleanliness.

Overall affordance

When children were asked if they thought their neighbourhood environment was interesting on a Likert scale, their responses were as follows: 45% very interesting or interesting (n=9, where one stated very interesting), 35% average (n=7), 15% not interesting or boring (n=5 missing; n=7 no response). However, caregivers who responded to the same question had a markedly unfavorable perception of their environment. Only 10% of caregivers described their neighbourhood as interesting (n=2, where none stated very interesting), 20% average (n=4), 70% not interesting or boring (n=14 missing; n=6 no response). Furthermore, when adults were asked if they thought the environment was conducive to their children's explorative play and activity, 75% (n=15) of 20 who responded chose not very conducive, or definitely not conducive for exploration.

In addition to children's voiced desire for nature and greenspace during interviews and focus groups, most of the children's drawings illustrated that they valued trees, water bodies, flowers, natural ground surface and small paths. However, greenspace was not always appreciated. A twelve year old boy shared his frustration that his courtyard was unsuitable for a particular sport.

We tried to play badminton here too but there's no empty space. But today was the best...the wind was good and blew a birdie down (from a tree)/.../from a few years ago. My dad bought me about 50 of them/.../but they're all gone now...all in the bunches.

When children's first drawings of their current neighbourhood were compared with their second drawings of what they desired in their ideal neighbourhood, almost all of them depicted an

increase in greenspace, playgrounds, sport facilities and clean streets; as well as a decrease in large roads. Moreover, many of them included water ways, ponds with fish. (See Drawing 1).

Ground surface

The type of ground surface that children preferred was dependent on the activity they wanted to engage in. For example, some of the children that liked to use the playground facilities shared that they were sometimes afraid of falling on the concrete surface. However, a few of the children that enjoyed biking and skateboarding complained about the lack of hard and smooth surfaces to ride on. Surprisingly, though many of the children appreciated natural ground surfaces such as dirt, sand, pebbled streets as seen in their drawings, only a few of the children mentioned wanting grass surfaces to play on (See Drawing 1). Lawns were often fenced off and intended for viewing. Some of the children were taught not to step on grass, as one conscientious seven year old explains:

I don't like the large grass fields...Because I'm afraid of stepping on it. If I step on it, I will ruin it/.../then it will be "Game Over"/.../I just like small grass because they are so green and I like green and pink and orange.

The neighbourhood does not contain an adequate amount of different ground surfaces to support the desired activities of children.

Physical activity facility

A majority of the children and caregivers have used the exercise park. It is a featured landmark in most of the children's drawings that explored the perceptions of their current neighbourhood.

One major complaint voiced by caregivers and children referred to the exercise facilities for seniors not affording children a safe and exploratory environment. Furthermore, children's

playgrounds are non-existent in the neighbourhood and only available in surrounding neighbourhoods. One parent stated that:

Around here, there are no play facility for kids. No other suggestions beside that (playgrounds)/.../There are some adult exercise parks but none for kids around here. Facilities for children are quite far away.

Infrastructure

Being a transient “urban village”, the neighbourhood’s architecture reflected the constant flux as local residents move away and rent out their property. Renovation and construction of new buildings to accommodate the process of urbanization and the increase of migrant population has resulted in accessible and potentially dangerous sites for children. Building material and debris, such as dust, building equipment and ditches decrease the possibilities for safe physical activity around these areas. Consequently, some children and caregivers mentioned these areas as dangerous and off limits. One child described her experience:

I don't like playing outside...the environment isn't so nice. Sometimes from the construction of houses, the wind blows up the sand/.../there's a lot (of construction) around here.

Cleanliness

One of the most obvious physical characteristics in the environment is the poor management of waste. Garbage can be seen along the road side, scattered around the open market areas and piled outside the public toilets. These public areas, which have the potential to afford social and play activities, are objectionable and even offensive to the senses. Sometimes, people use the public spaces for their private use, such as hanging up laundry and sausages to dry. Two children protested the disorderly and unpleasant conditions:

Just (don't like) the garbage and toilet area/.../(the smell) it makes me dizzy.

It's (outdoor ping pong table) quite far and the last time I went, there was a market there. Sometime the people selling things take over the space. Or they hang their clothe up in the area.

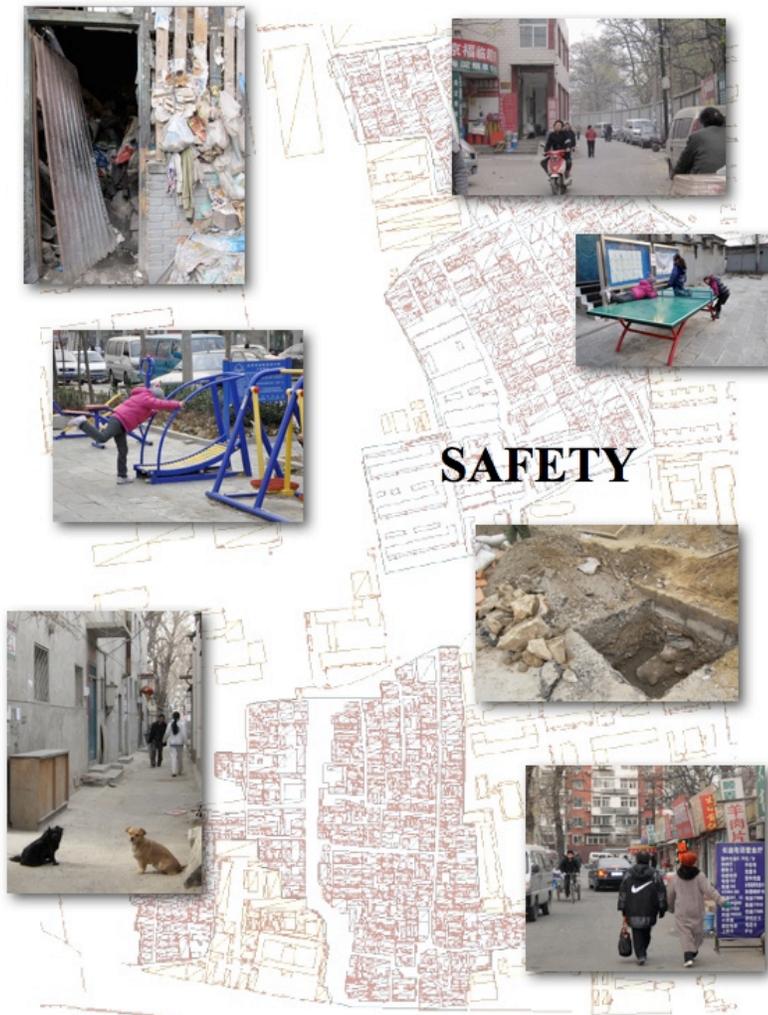
Comparable to the views of children, caregivers not only view the waste and filth as unpleasant, but hampers their children's activity opportunities by taking up physical space. Moreover, aesthetically speaking, a few adults felt it was visually degrading and contributed to their lack of pride in the neighbourhood as one statement implied: "There's no place in Beijing as dirty as here". A migrant worker with an eight year old daughter makes the points that:

The environment is not so good, there's no space. No particular place to play. The exercise park (for the elderly) is occupied by the market at night. There's a lot of people there. It's too crowded and messy.

Topic 2. Safety

China's One Child Policy permits city residents to have one child and rural residents to have two without penalty. Most of the parents, both migrants and local residents, had one child. Parents shared that having only one child greatly influences how they parent and fulfill their role as protectors. They are vigilant about the risk of harm in the neighbourhood. Generally, caregivers have more safety concerns than children. Many of the parents identified more than one dangerous area or factor in the neighbourhood environment, whereas most of the children only identified one. Adults' safety concerns greatly influenced the level and type of restrictions they placed on children.

All caregivers had rules about either the level of supervision required for children's activities or where children were permitted to go. When asked about places in the neighbourhood they would not allow their children to play, about half mentioned roads with cars, followed by anywhere far from home and places with many strangers. Accordingly, these responses were reflective of areas they deemed to be dangerous (See Table 7).



Children’s and caregiver’s safety concerns influenced and often dictated the type of physical activity children engaged in and where those activities took place. Only 19% (n=5) of 27 (missing n=1) of children and 23% (n=6) of all adults reported having no perception of dangerous areas in the neighbourhood, which indicates that a majority of them had some issue with safety. Overall, the findings surrounding safety issues were either about their fear of “accidental harm” (*i.e.*, accidents or injury) that emphasized factors in the physical environment, or their fear

of “deliberate harm” (*i.e.*, abduction or assault) that related more to social issues.

Theme 4: Fear of accidental harm

Adults’ concerns regarding accidental harm were mostly related to major accidents involving cars. However, only some children were concerned about cars; a few of them reported large streets as their most visited and preferred area for play. Children were concerned about minor injuries from narrow or poorly managed streets and construction sites.

Physical environment injuries

Not only does waste and construction decrease the amount of usable space and lower the affordance of open space for physical activity, it increases the perceived risk of injury. Moreover, narrow pathways and poorly managed roads have caused minor accidents for a few children. Some caregivers were concerned that the exercise park machines for the elderly were inappropriate for children and therefore increase their risk of injury. A father of an eight year old boy shared his unease:

Children do not have enough exercise but I'm afraid to let him play here. Like the exercise park, he might get injured by the equipment. The equipment here is not appropriate for kids his age.

Threat of cars

Of the 20 caregivers who mentioned at least one dangerous area in the neighbourhood, 95% of parents stated that roads with cars were dangerous, while only 38% of the 21 children with safety concerns indicated that roads were dangerous. Many caregivers stated that roads were the main reason they restrict their children's play locations.

If they (parks) were only around 10 minutes away, I would feel better. It's not that she can't find parks, but there are cars. So on average, we only go (to parks) during the weekend. Around here, there's no space. She goes to the exercise park (elderly), but it's quite far...and there are a lot of cars there everyday.

Unfortunately, to visit any of the three large city parks within walking distance of the neighbourhood, children are required to cross multi-lane roads. This fact prevents some older children from having the permission to visit without adult supervision. Furthermore, many children mentioned wheeled exercise equipment such as skateboards, scooters and bikes, which they prefer to use on paved streets and roads instead of narrow alleys. For safety reasons, concerned parents wanted a bike path.

Theme 5: Fear of deliberate harm

Adults' concern regarding deliberate harm was mainly related to their fears of abduction. In contrast, very few children mentioned the fear of being abducted. Rather, some had general fears of social harm such as being accosted by adults, bitten by dogs or attacked by "things" in the dark.

General social harm

Only a quarter of children were concerned about social harm. Children described avoiding areas because of a specific situation, such as a drunk man, a mean neighbor or hiding from security guards when trespassing. In contrast, adults tended to have a general fear of children playing around crowds with many strangers. One mother illustrates an uneasy atmosphere:

The exercise park by the market/.../there are a lot of cars there everyday. Also a lot of people/.../you don't feel a sense of safety. The kid might be hit by a car, or someone might knock into her.

Some children reported a fear of dogs and would not play near them. One child remarked that "there are too many stray dogs here". However, a few children who had dogs as pets enjoyed playing and running with them, which promoted physical activity. A few adults commented about their children's fear of dogs. Nevertheless, none of them expressed concern that dogs would harm their children. In addition, some children were afraid of the dark, especially dark alleys. Their fears tended to be undefined but a few mentioned being harmed by people or imagined "things". Visiting the toilet at night was unnerving for one boy.

I'm afraid just when I'm going to the toilet in the alley. It can be dark. There's one (toilet) for three homes, sometimes they have lights, sometimes they don't. During the summer I'm not afraid, just winters/.../it gets dark earlier.

A few adults reported that they did allow their children to play outside after dark but did not refer to children's fear of the dark; none of the children protested this restriction.

Abduction

Caregivers described three situations that they perceived would increase children's risk of abduction: crowded places with strangers (making surveillance difficult), places with questionable people (*i.e.*, internet cafes), and anywhere far from home. Ironically, a few children said that crowded areas provide a sense of security; one girl specified that the crowd at the market made her feel safe to play alone. Many of the parents feared the risk of their children being kidnapped when playing outdoors, which influenced their level of supervision.

These children, no one leaves them alone. They are all supervised now. We all have one child, who would feel safe to leave them unsupervised?

There are fewer children here/.../every child is precious, you hold tightly to them. Who's going to let them loose/.../not like in the village, you can have two kids.

Contrary to the parents' sentiments, only one seven year old boy voiced a fear of being abducted when asked why he felt unsafe playing alone:

Because in case I don't see a car, or if someone comes and takes me.

Forty four percent (n=11; missing n=1) of parents would not allow their child to play alone without friends or adult supervision. Although about half of all caregivers permitted their children to play alone, all children had some level of restriction on where they could play. On the other hand, 70% (n=18; missing n=1) of children reported that they would feel safe playing alone, which may indicate a sense of security in their environment

6. DISCUSSION

This study suggests that the environment of a low-income neighbourhood in Beijing pose challenges to the physical activity of children. Although there were characteristics of the neighborhood that supported children's physical activity, children's and caregiver's overall perceptions and attitudes were about how their physical and social environment lacked the available, accessible and appropriate open space they desired and how it hindered children's physical activity by contributing to their fears of accidental injury and social harm.

Some may argue that this study parallels the work of others that have written regarding the urban environment's affects on children in low-income neighbourhoods. However, as substantiated by the ecological model, the broad societal factors that shape the neighbourhood environment and the lives of people in a developing country, and specifically China is different than that of a developed country. Although a growing body of literature on the influences of the urban environment on children's physical activity exist for developed countries, there seem to be no English text written for China and limited if any about the topic for developing countries; the reason may be reflective of the prevailing health problems related to physical inactivity in Western countries. Furthermore, since available studies are largely quantitative, this study may fill an important gap in the English literature.

6.1 Open Space

The lack of open space for play and socialization in the neighbourhood was a focal theme for children and caregivers. Their perspective that accessibility to open space was important for the support of children's physical activity is well documented in literature (Davison & Lawson, 2006:3; Roemmich et al, 2006:437; Wheeler et al, 2010:151). Although children and caregivers shared their desire for more open space, particularly for playgrounds and greenspace (See Table 6) only a few families have access to semi-private spaces. The only public open spaces with no restriction on access were two small exercise parks designed for seniors. As a result, children used spaces in the neighbourhood unintended for play such as parking lots, roads or courtyards of government offices.

When children are not playing in their neighbourhood, they play in adjacent parks, playgrounds and sports facilities of large institutions. Caregivers were also appreciative of having many parks in the area, two of which were world renowned city parks considered to be at a walkable distance (with in 30 minutes). Since these spaces were gated and have access restrictions or entrance fees, gaining access on a consistent basis was sometimes challenging (See figure 2). Studies showed

that the availability and accessibility of open space in low-income neighbourhoods are often affected by societal factors. They suggested that availability of space may not indicate accessibility and the provision of quality play space (Crawford et al, 2008; Ellaway et al, 2010; Timperio et al, 2007:335). Likewise, children shared that access to public parks, playgrounds or sports facilities were often restricted by an entrance fee, access card or guarded by security. Accessibility was dependent on their relationship with the gate keepers, having special privileges, or their willingness to trespass. Given that the neighborhood was surrounded by major multi-lane roads, caregivers would not allow children to visit the public parks beyond them without their supervision. Thus children's accessibility to open space within and around their neighborhood is challenged by both physical and social factors. Moreover, caregivers (many which were migrant workers) shared that their lack of personal time and difficult financial situations hindered them from taking their children to these parks. One study examining income disparities and access to parks stated that economic barriers to accessing play or recreational space for families in low-income neighbourhoods may be common (Abercrombie et al, 2008:13). As such, a solution to address this disparity would be to provide higher numbers of quality accessible parks in low-income communities to accommodate those with less resources (ibid, 2008:13).

Physical activity is a valued social activity for children. Most of the physical activities that children enjoyed required two or more participants (See Table 3). Almost all children preferred to play with friends or classmates. Similar to the children in this study, Castonguay & Jutras (2009:106) explained that children in a poor neighbourhood preferred places such as the playground for their social experience as well as for the physical stimulation provided by the facilities. Adults also recognized the importance of friends in promoting play in children. In addition, some of them shared a desire to interact with their neighbors along with their children. Consequently, the lack of public space that hindered the opportunities for caregivers to build social networks resulted in reduced social and play opportunities for their children. Franzini et al (2009:275) reported that favorable social environments in the neighbourhood were positively associated with children's physical activity. They found that adults report of a strong social

environment (social cohesion and collective networks for supervision of children) had a stronger relationship to supporting physical activity for children than factors in the physical environment (ibid:275). Hence, providing accessible open space in neighbourhoods may support socialization and activities for children and their caregivers.

Available and accessible open space, regardless of ownership that allow children to enter without the intention to discriminate and with reasonable restrictions need to be provided in deprived neighbourhoods to provide physical and social space supportive to children's physical activity. Moreover, providing space for socialization may be particularly important for China's "urban village" neighbourhoods characterized by transient and diverse ethnic groups with limited time to socialize. Collaborative urban planning and policy development will be important to ensure equitable and sustainable use of space for growing urban communities (CEH & Tester, 2009:1597; Abercrombie et al, 2008:13).

The affordance (provisions) of the neighborhood's physical environment to promote children's physical activity was limited. In addition to the challenges of living in a high density neighborhood, children and caregivers described that the affordance of accessible space, such as roads, courtyards and exercise facilities were low. Although these areas had the potential to support play, they were often littered with garbage or debris from construction; these conditions deterred children or were deemed unsafe by caregivers. Interestingly, the issues of affordance are related to the concepts of accessibility of space and safety. In other words, for an environment to have high affordance for physical activity, it must have adequate/appropriate play space and be perceived as a safe environment. By addressing the physical environment's urban design problems, it is possible to promote accessibility of space and mitigate safety concerns.

As a whole, the interviews and children's drawings revealed that areas in the physical environment that lacked affordance were, ground surface, physical activity facilities and infrastructure. Since children engaged in a variety of activities that required the support of different surfaces, such as soft areas under playground equipment or smooth surfaces for

skateboards, the abundance of concrete paths and surfaces were not conducive to certain activities. Moreover, they spend a large portion of their time on the streets and alleys. Comparable to many of the experiences of children (aged 7-12) in a study on appreciation of outdoor space in a poor neighbourhood, a surprising finding was that streets and alleys were perceived to have high affordance contrary to other studies. It seems that children from deprived areas are more likely than children from wealthier areas to play in their neighbourhood. As such, streets and alley may be an important affordance for activities close to home (Castonguay & Jutras, 2009:108). This indicates that maintaining neighbourhood streets and providing a variety of ground surface may be a simple design solution to support play.

The only public spaces in the neighbourhood were two physical activity facilities intended for the elderly. Although almost all the children played in the exercise park area and some enjoyed the machines, they also complained that it was boring or not age appropriate. The fact that grandparents, especially in a Chinese migrant community, play a big role in the caregiving, it would seem advantageous to integrate playgrounds for children with the exercise parks for the elderly (Xu & Minca, 2008:299, Jiang et al, 2006:10).

6.2 Safety

Being a transient “urban village” neighbourhood, the renovation and construction of new buildings to accommodate for the increase of migrant population has resulted in potentially dangerous sites that are easily accessible to the children. Consequently, some children and caregivers mentioned these areas as dangerous and off limits. Moreover, when asked to indicate dangerous environments in the neighbourhood, “dirty or messy areas” and “construction” were mentioned by both adults and children (See Table 7). One of the most obvious physical disorders in the environment is the poor management of waste. Comparable to the views of children, caregivers felt that the filth was visually degrading and contributed to their lack of pride in the neighborhood. In a review by Davison & Lawson (2006:12) on the built environment and children’s physical activity, some studies suggested that “disorders” (i.e., garbage, graffiti) were

associated with lower levels of physical activity. However, one report suggests that a general lack of tidiness may not be a strong hinderance to physical activity. Nevertheless, apart from the influence on physical activity, children and caregivers view these disorders as a safety issue.

The areas indentified as dangerous by 95% of caregivers was the road for fear of car accidents, while only 38% of the 21 children had this concern, which was expected since some children engage in activity on roads. Based on a review of literature on neighbourhood safety and children's physical activity, studies from multiple countries revealed similar concerns about road safety among parents with some studies indicating a negative association with children's physical activity (Carver et al, 2010:220). On the other hand, concerns about road safety among youth were inconclusive, with some studies reporting no association between perception of fears and physical activity level (ibid:221). The review's most striking comparison was road safety between children and caregivers, which reported that both clearly have road concerns; Although it was parents perception of road danger that resulted in the children's restricted mobility. Likewise, the caregivers from this study voiced similar restraints on their children (ibid:222). Various interventions, from education, policy, regulations and urban design projects have been documented to address this widespread concern. Regarding the neighbourhood in this study, some caregivers had complained of the multi-lane streets that surrounded and separated them from the large city parks. Adding pedestrian lights or overpasses to avoid crossing completely may be viable solutions (ibid:223).

About 30% of parent's identified areas of danger were related to deliberate harm by strangers. However only a few children voiced concern over strangers. This finding seems to agree, in part with the work of Carver, Timperio and Crawford (2008:220) that report parent's concern about strangers being greater than that of children. While Chinese parents are not different from any other well meaning caregiver when it comes to protecting and wanting the best for their children, they do manifest some anxiety because of macrosystem context decisions that are not discussed or talked about in other cultures. For example, data from this study suggests that a source of caregiver concern stems from adherence to China's one child policy. While statements about this policy were not critical of the policy, it does suggest that the decisions to allow their child

participation in physical activity by caregivers is a conscious and deliberate thought process as most of the caregivers have only one child. Caregivers shared the importance of the surviving and thriving of their children as part of their familial legacy and security. This finding represents significant insight as to how policies outside of the family and individual dominate their personal decisions even when it comes to decisions about their children and physical activity. More research needs to be conducted about how to address their anxieties which is beyond the scope of this paper.

6.3 Limitations

This study had some limitations. The sample size was small and not generalizable to other settings. It should be noted that this study and the themes identified within it offer an excellent pilot study which could be further expanded to be more generalizable in scope. Due to budget and time constraints the study was also unable to fully explore other themes which emerged through data analysis. It would be hoped that more time and resources could be put to those themes (i.e social stigmatization and isolation, sense of belonging, transiency). It is my recommendation that more prospective research be conducted so as to create more models to provide a much more comprehensive picture of the challenges faced by children and their families living in low-income neighborhoods in China.

7. CONCLUSION

Research has shown that children generally enjoy active play and exercise in a variety of organized and unorganized ways that requires an adequate amount of space sufficient enough to fulfill their needs to play and socialize within the confines of their neighborhood. It is not surprising that children living in a low-income neighbourhood are confronted by many factors in their social and physical environment that pose as barriers for outdoor play and exercise. Although children are resourceful and creative in discovering opportunities for play in their environment, they need and desire places near their home that allow for safe and stimulating exploration. What children and caregivers shared about the lack of open space and safety concerns in their neighbourhood may add valuable insight to scarce literature on children's

experience in low-resource settings, particularly within the context of China. Rapid urbanization coupled by uncontrolled sprawl has created challenges in China's physical and social landscape. The "urban village" being a blend of the old and new, visibly reflects the flux. Since children's environment significantly influences the level and quality of their physical activity, it is then all the more crucial that children are given the opportunity to share and teach about what they need and desire from their surroundings. The fact that children living in urban low-income settings are often confronted by limited space and social factors that dictate a sedentary lifestyle poses challenges to those working to mitigate the increase in health problems in this population. The findings and recommendations from both an urban planning and public health perspective can guide future planning and social policies to promote outdoor play and activity integral to the development of children in vulnerable neighbourhoods.

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9. APPENDIX

Table 1. Spatial Distribution of Interview Participants in Neighbourhood (NH) A and B, 2010-2011

Location in NH*	NH A	NH B	Participant
Caregiver			
NW	3	1	
NE	6	1	
SW	3	6	
SE	1	3	
Missing	1	1	
Total Caregiver	n=14	n=12	n=26
Children			
NW	1	5	
NE	2	2	
SW	3	9	
SE	1	5	
Missing	0	0	
Total Children	n=7	n=21	n=28
Total	n=21	n=33	n=54
Participant			

* Locations for interview sampling in four quadrants of each NH.
N=North E=East S=South W=West

Table 2. Distribution of Participants for Interviews and Focus Groups in Neighbourhood (NH) A and B, 2010-2011

Interviews	NH A	NH B	Total Participants
Caregiver			
Male	6	5	11
Female	8	7	15
Total Caregivers	n=14	n=12	n=26
Children			
Male	3	13	16
Female	4	8	12
Total Children	n=7	n=21	n=28
Total Interviews	n=21	n=33	n=54
Focus Groups			
Children			
Male	6	9	15
Female	7	4	11
Total Focus Groups	n=13	n=13	n=26
All Participants	n=34	n=46	n=80

Table 3. Children's Physical Activity Type, Sociability and Location, 2010-2011

Activity Types [*]	Sociability		Within Neighbourhood				Adjacent to Neighbourhood			Other	
	Self	Group	Front of Home	Court -yard	Road	Exercise Park	Play-ground	Private [^] Space	City [^] Park	School	Beijing Area ^{**}
Adult exercise park	x	x				x					
Amusement park		x							x		x
Badminton		x		x							
Basketball		x		x							
Biking	x	x		x	x						
Chasing game	x	x	x	x	x	x	x	x	x	x	
Climb walls	x										x
Dance	x	x		x							x
Draw	x		x	x						x	
Enjoy scenery	x	x									x
Hand ball		x								x	
Hide and seek		x	x	x	x	x				x	
Hike mountains		x							x		x
Jumping games	x	x	x	x	x					x	
Kick jian tze	x	x	x	x	x		x	x	x	x	
Kick sand bag	x	x	x	x	x					x	
People watch	x	x									x
Ping pong		x				x		x			
Play fight		x	x	x						x	
Playground	x	x					x		x		x
Play with dirt/sand	x	x		x	x						
Play with dolls	x	x		x							
Play with toys	x	x		x						x	
Playing with dog	x	x		x	x						
Random running		x	x	x	x	x	x	x	x	x	
Role play		x		x						x	
Run race		x	x							x	
Seesaw	x	x				x	x				
Shop	x	x									x
Skateboard	x	x			x		x		x		
Skip rope	x	x	x	x						x	
Slides	x	x				x	x				
Soccer		x			x					x	
Swim	x	x									x
Sword and guns		x	x	x	x						
Talk with friends		x		x	x					x	
Tennis		x						x			
Walk or stroll	x	x	x	x	x	x	x	x	x	x	
Weave basket	x		x								
Yo yo ball	x	x	x	x	x	x	x			x	
Total	25	38	14	22	15	9	9	6	8	17	9

^{*}Activities reported at least once by children during FGD/interviews. Characterized by "Sociability" who's involved and where the activity occurs.

^{**} Places not within walking distance of Neighbourhood. [^] For description of Private Space (or Semi-Private) and City Park see Table 5.

Table 4. Identified Physical Activities Most Desired by Children and Caregivers For Neighborhood Support, 2010-2011 (Children n=24, Caregiver n=16)*

Activity (Children)	No.**	Percent^	Activity (Caregiver)	No.	Percent
Playground activity	7	23.3	Team sports	6	31.6
Team sports	7	23.3	Free or group play	5	26.3
Exercise	4	13.3	Outdoor education event	2	10.5
Bike or skateboard	3	10.0	Bike or skateboard	1	5.3
Free or group play	3	10.0	Exercise	1	5.3
Run and chase	2	6.7	Games	1	5.3
Games	1	3.3	Martial arts	1	5.3
Park activity	1	3.3	Park activity	1	5.3
Play in nature	1	3.3	Playground activity	1	5.3
Shopping	1	3.3			
Total suggestions	30	100	Total suggestions	19	100

*Number of respondents, excluding "no suggestions" (Children n=4 and Caregiver n=6) and missing responses (Children n=1 and Caregiver n=4). Total may be > than respondents due to one or more suggestions made by a respondent. **Number of responses may be > respondents due to one or more responses indicated by one respondent.^ Percentage calculated based on responses.

Table 5. Accessibility of Neighbourhood Adjacent Open Space, 2010-2011

Label *	Open Space	Ownership	Regulation of open space
A	University park and sport facility	Private and Semi-Private	Gated and guarded with operational hours, Some non-gated
B	Apartment complex	Semi-Private	Gated and unguarded, no operational hours.
C	Government Educational Institution	Private and Semi-Private	Gated and guarded with no access; non-gated
D	Summer Palace City Park	Public	Entrance Fee, gated and guarded with operational hours
E	Old Summer Palace City Park	Public	Entrance Fee, gated and guarded with operational hours
F	Green Belt	Public	Gated and unguarded and non-gated

* Corresponds to location on Figure 2. In descending order of children's most to least visited places outside neighbourhood.

Table 6. Suggestions to Improve Neighbourhood Environment for Children's Physical Activity 2010-2011 (Children n=24, Caregiver n=16)*

Site (Children)	No.**	Percent^	Site (Caregiver)	No.	Percent
Playground	8	25.8	Cleaner environment	6	21.4
Park	5	16.1	Playground	6	21.4
Plants and nature	5	16.1	Plants and nature	4	14.3
Cleaner environment	4	12.9	Improve infrastructure	3	10.7
Sports facility	4	12.9	Bike lane	2	7.1
Amusement park	2	6.5	Improve transportation	2	7.1
Better markets	2	6.5	Open space	2	7.1
Support social activity	1	3.2	Support social activity	2	7.1
			Park	1	3.6
Total suggestions	31	100	Total suggestions	28	100

*Number of respondents, excluding "no suggestions" (Children n=1 and Caregiver n=6) and missing responses (Children n=1 and Caregiver n=4). Total may be > than respondents due to one or more suggestions made by a respondent.**Number of responses may be > respondents due to one or more responses indicated by one respondent.^ Percentage calculated based on responses.

Table 7. Dangerous Environments in the Neighbourhood for Children's Physical Activity, 2010-2011. (Children n=21, Caregiver n=21)*

Site (Children)	No.**	Percent^	Sites (Caregiver)	No.	Percent
Road with vehicles	8	33.3	Road with vehicles	19	46.3
Stray dogs	3	12.5	Crowded areas	5	12.2
Construction	2	8.3	Far distances	4	9.7
Dark	2	8.3	Internet café	3	7.3
Dirty or messy areas	2	8.3	River or lake	3	7.3
Narrow or poor roads	2	8.3	Strangers	2	4.9
River or lake	2	8.3	Dirty or messy areas	2	4.9
Mean adults or guards	2	8.3	Construction	1	2.4
Poor infrastructure	1	4.2	Dark	1	2.4
			Poor infrastructure	1	2.4
Total suggestions	24	100	Total suggestions	41	100

*Total number of respondents excluding "no dangerous area" (Children n=6 and Caregiver n=5) and missing responses (Children n=1).**Number of responses may be > respondents due to one or more responses indicated by one respondent.^ Percentage calculated based on responses.

9.4 Questionnaire i) Caregiver

编号_____时间_____地点_____

“邻里特征及其对儿童感知及户外体力活动 影响机制研究”

访谈问卷——北京市大有庄邻里儿童感知及体力活动情况调查

亲爱的朋友:

该研究受“邻里特征及其对儿童感知与户外体力活动影响机制研究”国家自然科学基金的支持，特选择北京市海淀区大有庄邻里为研究案例，旨在了解中国大城市当前“城中村”类型的居住地中儿童的活动环境质量。我们的研究结果将为政府改善这类居住地户外环境提供依据，感谢您的参与和支持！

——北京大学‘41001089’号国家自然科学基金研究组

1. 性别: 女 男

Gender: female male

2. 年龄: _____;

Age

3. 您在这里住了多长时间? _____年;

How long have you lived here? _____ years

4. 您有孩子/孙子(女)吗? _____;

Do you have children/ grandchildren?

5. 您一般让您的孩子在家附近哪里活动? 为什么?

Where in the neighborhood do you usually let your child play? Why?

6. 您一般不让您的孩子在家附近哪里活动? 为什么?

Where in the neighborhood do you generally not let your child play? Why?

7. 当您还是小孩的时候, 您会在家附近哪里活动? 为什么? 你觉得您玩的方式和现在小孩玩的方式有什么不同?

When you were a child, where did you play? Why? Do you think is there any difference between the way you played and the way children play now?

8. 孩子们在家活动吗? 进行什么活动?

Does your child play at home? If so, what activities are enjoyed at home?

9 您在家附近会看到许多孩子吗？他们在哪里？他们都在做什么？跟谁在一起？

Do you see many children in your neighborhood? Where are they? What do they do? Who are they with?

10. 您夏天和冬天让孩子或看见孩子在您家附近哪里活动？常做什么活动？

Where do you let your child play or see other children play in this neighborhood during the summer? Winter? What do they do in summer and winter?

11. 您孩子身体如何？最近一次得病是什么时候？

How is your child's health? When did he/she last get sick?

12. 您常带孩子去其它地方活动吗？怎样去那里？做什么活动？

Do you often take your child to other places to play or exercise? How do you get there? What activities does your child do there?

13. 您让您的孩子独自在家附近活动吗？为什么？

Do you let your child play alone in your neighborhood? Why?

14. 您家附近哪里您觉得危险而不让孩子去活动？

Where in the neighborhood do you not allow your children to go because you believe it is dangerous?

15. 您觉得您的孩子要健康成长每天的活动量够吗？

Do you think your child's daily physical activities are enough for his/her healthy growth?

16. 您觉得您家附近的整体气氛很友好吗？

Do you think the atmosphere in your neighborhood is friendly?

是 否

YES NO

17. 您希望孩子在家附近做什么样的活动？您对您家附近环境的改善有何建议？

What activities do you hope for your child to do in your neighborhood? Do you have any suggestions for improving your neighborhood?

9.4 Questionnaire ii) Children

编号_____时间_____地点_____

**“邻里特征及其对儿童感知及户外体力活动
影响机制研究”**

访谈问卷——北京市大有庄邻里儿童感知及体力活动情况调查

亲爱的朋友:

该研究受“邻里特征及其对儿童感知与户外体力活动影响机制研究”国家自然科学基金的支持，特选择北京市海淀区大有庄邻里为研究案例，旨在了解中国城市居住地中儿童的活动环境质量。我们的研究结果将为改善这类居住地户外环境提供依据，感谢您的参与和支持！

——北京大学‘41001089’号国家自然科学基金研究组

1. 性别: 女 男

Gender: female male

2. 您在这里住了多长时间? _____年;

How long have you lived here? _____ years

3. 您有孩子/孙子(女)吗? _____;

Do you have children/ grandchildren?

4. 您一般让您的孩子在家附近哪里活动? 为什么?

Where in the neighborhood do you usually let your child play? Why?

5. 您一般不让您的孩子在家附近哪里活动? 为什么?

Where in the neighborhood do you generally not let your child play? Why?

6. 如果您是孩子, 您会在家附近哪里活动? 为什么?

When you were a child, where did you play? Why?

7. 孩子们在家活动吗? 进行什么活动?

Does your child play at home? If so, what activities are enjoyed at home?

8. 您在家附近街道会看到许多孩子吗? 他们都在做什么, 跟谁在一起?

Do you see many children on the streets near your home? What do they do? Who are they with?

9. 您看到孩子们都在哪里活动？他们跟谁在一起，在做什么？

Where do you usually see children playing? What do they do? Who are they with?

10. 您夏天和冬天让孩子或看见孩子在您家附近哪里活动？常做什么活动？

Where do you let your child play or see other children play in this neighborhood during the summer? Winter? What do they do in summer and winter?

11. 您孩子身体如何？最近一次得病是什么时候？

How is your child's health? When did he/she last get sick?

12. 您常带孩子去其它地方活动吗？怎样去那里？做什么活动？

Do you often take your child to other places to play or exercise? How do you get there? What activities does your child do there?

13. 您让您的孩子独自在家附近活动吗？为什么？

Do you let your child play alone in your neighborhood? Why?

14. 您家附近哪里您觉得危险而不让孩子去活动？

Where in the neighborhood do you not allow your children to go because you believe it is dangerous?

15. 您的孩子可以很方便的步行到达附近的便利店、公共交通站点、朋友家、活动设施、半自然区域吗？

Can your child conveniently walk to nearby stores, bus stops, friends' homes, exercise facilities and semi-natural areas?

很方便； 方便； 一般； 较不方便； 不方便；

Very convenient; convenient; average; inconvenient; very inconvenient

16. 你觉得你家附近的环境对孩子来说有趣吗？

Do you think your neighborhood's environment is interesting for your child?

很有趣； 有趣； 一般； 没趣味； 很无聊；

Very interesting; interesting; average; not interesting; very boring

17. 你觉得你家附近的环境对孩子进行探索性的活动有利吗？

Do you think your neighborhood's environment is conducive to children's exploratory activities?

有利； 较有利； 一般； 不利； 十分不利；

Very conducive; conducive; average; not really conducive; not conducive at all

18. 你觉得你家附近的环境对孩子来说整体是危险的吗？

Do you think the neighborhood's environment is dangerous for children?

十分危险； 较危险； 一般； 较安全； 很安全；

Very dangerous; a little dangerous; average; safe; very safe

19. 您觉得您的孩子要健康成长每天的活动量够吗？

Do you think your child's daily physical activities are enough for his/her healthy growth?

20. 您觉得您家附近的整体气氛很友好吗？

Do you think the atmosphere in your neighborhood is friendly?

是 否

YES NO

21. 您希望孩子在家附近做什么样的活动？您对您家附近环境的改善有何建议？

What activities do you hope for your child to do in your neighborhood? Do you have any suggestions for improving your neighborhood?

22. 年龄：_____； 职业：_____； 教育程度：_____。

AGE; PROFESSION; HIGHEST LEVEL OF EDUCATION ATTAINED

Drawing 1. Children's Drawings of Current and Ideal Neighbourhood

A) Draw what your neighbourhood...

1 A



This girl talked about living in an apartment with a courtyard where she plays. The green dot in the oval represents a small fenced lawn.

B) Draw your ideal neighbourhood...

1 B



She desires that her home would be brightly decorated with butterflies. Along this road are neighbours a friends home, a playground and a small river.

2 A



This boy described his neighbourhood with various areas with toilet, garbage and one park and an open area with trees in the neighbourhood

2 B



He desires trees in between each apartment. Boxed text represent playgrounds and exercise parks at each end his street. Less roads and more organized structure characterized the difference.

Drawing 1. Continued

3 A



This girl talked about the dirty and unpleasant environment. Garbage is everywhere, particularly on one road she walk along to school.

3 B



She desires an apartment with a parking lot, but realized she shouldn't have drew cars because they are polluting. Behind is a public park.

4 A



This boy depicts his neighbourhood as a network of roads and landmarks of houses, trees, shops and open space.

4 B



He desires to live in an apartment building with pebble roads and grass beside an amusement park. A flying machine will clean the air instead of trees because trees suck up oxygen.

