

EATING AS A PLANNED ACTIVITY: AN ONGOING STUDY OF FOOD CHOICE AND THE BUILT ENVIRONMENT IN SYDNEY

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Abstract: As more people move into cities, the world is embracing an 'urban-style' diet associated with multiple harms such as the spread of lifestyle diseases, including diabetes and obesity. Food choice is a multi-determined, situation-dependent phenomenon. Despite individuals' food choice is often seen as a result of different psychological and socioeconomic backgrounds, evidence suggests that the built environment influences people's lifestyle preferences including food choices. Although the number of publications regarding food issues has grown rapidly, it remains unclear how the built environment influences residents' food choice. A deeper understanding of this behaviour could reveal under-researched aspects of a healthy built environment. In this paper, the significance of new insights in the built-environment perspective in food choice research is addressed. This on-going study contributes to the understanding of the availability and accessibility of healthy food in cities. It focuses on how the urban form influences people's food choice in metropolitan Sydney. A mix of quantitative, qualitative and spatial research methods is applied to identify urban form barriers to the utilisation of healthy food in urban settings. This includes spatial statistical analysis to sample study areas, and in-depth interviews to explore participants' food choices and the influence of the built environment. This analysis has implications for urban planning and policy making for healthy cities.

1. Introduction

Public knowledge of and interest in food has never been greater. Topics related to food are being discussed in multiple disciplines such as public health, cultural studies, economics and history on different occasions. At the same time, our current food systems, most prominently in urban areas, are associated with multiple harms such as the spread of food-related chronic diseases, including type 2 diabetes (T2D) and obesity (Wallinga, 2009). In Australia, for example, around 90 percent of the total population lives in urban areas, with 63 percent of the adults and 25 percent of children overweight or obese (Australian Bureau of Statistics (ABS), 2012). If current trends continue, over two-thirds of Australians would be overweight or obese by 2025 (Walls et al., 2012). Although the public is constantly being educated to eat 'wisely' through Australian national diet campaigns like 'Go for 2 & 5', the food choice behaviour along with food preferences is still rather unhealthy for most Australian urban and suburban dwellers.

Despite that the individual's food choice is often seen as a result of different interrelating factors, evidence suggests that the built environment influences people's lifestyle preferences including their diet choices (Booth et al., 2001; Popkin et al., 2005; Walker et al., 2010; Kent and Thompson, 2014). These studies, however, tend to focus on the extreme situations whereby infrastructure and services supporting healthy lifestyle choices are largely inadequate and scarce; from a food perspective, for example, 'food deserts' (neighbourhoods with limited access to healthy food) are often reported. Previous studies have missed out on a variety of other ways in which the built environment shapes

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food choices. That being so, there is currently very little known about food choice in the built environment where multiple food options are available.

In recent years, the growing interest in food systems in planning profession highlights the need for understanding food behaviour in the built environment. The concept of food systems in communities and metropolitan areas, being absent for many years in the planning field, has notably emerged since 2000 (Pothukuchi and Kaufman, 2000). Along with the goal of promoting sustainable urban development, the re-localisation of production-consumption chain in food systems was 'led by disparate groups... into a broad-based multidisciplinary movement' (Pothukuchi, 2009, p.349). As individual food choices determine the food consumption patterns, it is clear that a deeper understanding of food choice can reveal a significant aspect of a healthy built environment and planning strategies for food systems.

The current limitations in understanding how the built environment influences people's food choice is the fault line I address in this paper. This on-going study focuses on how the urban and suburban built environment affects residents' food choices in metropolitan Sydney, where a fifth of the Australian population lives. Understanding the link between the built environment and our choices begins with building the framework about our food choice behaviours.

2. Conventional answers of the food choice determinants

What we know about food choice behaviours is based on different separate research domains such as food chemistry, nutrition science, sociology, psychology and public health studies during the last century. The issue has grown in importance in light of the priority for the population dietary change in the recent years with multiple physical and social harms, and the understanding of the determinants that affect our choices has been identified for interventions considering health issues. Since the food choices are multi-determined, situation-dependent phenomenon (Rozin, 2005) influenced by a broad range of interrelating factors, both socially and physically, none of the determinants we know currently is intended to explain what we choose to feed ourselves.

An initial study by Lewin (1943), a pioneer of social psychology, suggests that taste, health, social status and cost may be involved in food choice. Each factor along with its related values was examined in later studies in different research domains, and since then, the drivers for what we choose to eat are developed in various disciplines.

Biologists and physiologists investigate food choice determinants by tracking physiological processes (e.g. energy balance, gastrointestinal and brain mechanisms) and specific signals or needs (e.g. hunger, thirst) (Köster, 2009). Even though these factors respond the question 'why do we eat', the answer is in itself not exhaustive, as food is not only a basic need for people (Mela, 1999).

Researchers in psychology develop more sensible and detailed models and theories to describe food choice, yet 'some often encountered fallacies' (Köster, 2003, p.359). Theory in regards to motivation- and decision-making for food, for example, recognises the search for stimulation as a central driver of food choice. Although positive findings were found when testing the theory, not all stimuli show such results (Pliner, 1982). To fix the model or theory, attempts for more comprehensive portraits of food choice process have been made by adding influences from other factors into frameworks, however, without empirical investigation or practical application, food choice remains not well

understood (Shepherd, 1999). Besides that, as Köster (2003) indicates that since sensory food consumer science is a young research domain of less than fifty years, the psychological analysis of food choice may often be trapped in some fallacies.

Like any other complex behaviour with both individual and social factors, public health and food science researchers tend to focus on factors related to health and nutrition status. As studies show the inequalities among the population with food-related chronic diseases among different socioeconomic position backgrounds (Paeratakul et al., 2002), most of these studies focus on the socioeconomic gradient to poor health. In the Australian context, for example, the low-income groups and aboriginal Australians are highly targeted. Turrell et al. (2002) interviewed residents in Brisbane, Australia, of various socioeconomic levels, and found that people from socioeconomic disadvantage groups tend not to purchase foods high in fibre and low in fat, salt and sugar, while higher status groups were more likely to shop according to nutrition recommendations. Brimblecombe et al. (2014) explored the social context of food choice (e.g. knowledge, health and resources) and the factors perceived to shape it with Aboriginal adults in Northern Australia. A study with middle-income Caucasian Americans, however, shows more complicated process other than cost and nutrition knowledge (Furst et al., 1996). Likewise, using grocery receipts to avoid self-report errors, Cullen et al. (2007) reports differences in food purchasing based on socioeconomic status. Although quantitative and qualitative methods have been adopted for investigating the factors for food choice related to poor health, it remains unclear.

Researchers in other domains and disciplines, such as sociology and economics, also try to solve the puzzle by providing evidence from their aspects such as culture, tradition and marketing strategies. However, as these factors belong to different research traditions and disciplines, 'each of these disciplines claims to have at least a partial answer' (Köster, 2009, p.70). As a result of the mono-disciplinary nature, 'although admittedly it is slightly modulated by influences from the other factors' (Köster, 2009, p.70), most of these studies have failed to demonstrate the interactions between different determinants. Additionally, because different individuals develop different strategies to resolve the frequently shown conflict among these factors (Connors et al., 2001), the determinants may also vary in different life stages and the weight of each may differ from one individual or group to the next.

3. The need for the built environment research

Prior literature has emphasised that food choice is a multi-faceted process. The central question of food choice research, as discussed in almost all related studies in different degrees, concerns 'why does who eat what, when, and where' (Köster, 2009, p.70), yet the answer to the 'where' question is not well developed. This is perhaps due to the lack of interdisciplinary research; researchers outside of the geographical research society, being trained in general scientific research techniques, usually have little knowledge in spatial reasoning (Goodchild and Janelle, 2010). This led to a methodological deficiency in previous studies: some did not consider the spatial factors, and some failed to demonstrate the environment-individual bond.

In recent years, further recognition of the importance of the environment in shaping lifestyles has been reported, whereby academics have just begun to understand how the environment influences individuals (Booth et al., 2001). Given the fact that the majority of the population are living in urban settings, the influence of the built environment is often discussed. On one hand, the built

environment characteristics are commonly defined as 'situational context within which behaviour takes place' in their frameworks, independently of other factors including sociodemographic, cultural and social characteristics (see e.g. Furst et al., 1996; Booth et al., 2001; Brimblecombe et al., 2014). Although, geography and planning texts after World War II have provided comprehensive portraits of the links, visible and invisible, between environmental characteristics and others such as socio-demography, cultural factors and social status (see e.g. Taylor, 1998; Hall, 2002; Thompson and Maginn, 2012; Tuan, 2012). Thus, the current food choice studies may undervalue the influence of the built environment. For example, research of socioeconomic disadvantage and the poor health suggests that the 'epidemic' of diet-related chronic diseases may be partly caused by environment-related characteristics in socioeconomic disadvantage neighbourhoods (see e.g. Inagami et al., 2006; Jetter and Cassidy, 2006; Daniel et al., 2009). On the other hand, as our connections with the built environment are mostly invisible and implicit, it is difficult to admit and trace in food choice studies.

The lack of discussion on food choice from the built environment's point of view has significant implications not only for the food choice research but also for the planning research and practice. Although urban food system is becoming one of the central topics to be considered on the planning agenda in the last fifty years (Pothukuchi, 2009), the food choice in the urban area remains unclear. Studies of food systems starts with the metaphor of 'food deserts', where access to fresh food is limited; the experience of food deserts can be driven by the limited availability to fresh food and limited access to transport (Shaw, 2006; Walker et al., 2010). For example, about two million American households were reported living over a mile from a supermarket and having limited access to automobiles (United States Department of Agriculture, 2009), and similar outcomes were also found in other anglophone countries including the United Kingdom, Canada and Australia (Whelan et al., 2002; Smith et al., 2004; Lu and Qiu, 2015). Although not all research has found a link between healthy food access, diet and obesity (Jeffery et al., 2006; Li et al., 2009), living in food deserts often comes with unhealthy diet (Morland et al., 2002; Rose and Richards, 2004) and may lead to an increase in obesity risks (Morland et al., 2006; Powell et al., 2007).

In recent years, attempts to target advocacy efforts for food deserts predominantly include the provision of a range of alternative healthy food options such as wholesale groceries, community gardens, farmers' markets and urban farms, along with the goal of promoting sustainable urban development, and the re-localisation of production-consumption chain. These attempts have optimised our food system by providing the potential for food production, increasing the accessibility and availability for healthy food in urban area and improving the economic and energetic efficiency (see e.g. American Planning Association, 2007; Ericksen, 2008; Ackerman et al., 2014). As these studies were mostly focusing on extreme cases with limited choices where healthy food was neither sufficient nor accessible, the understanding of food choice in the majority of urban built environments, where plentiful food options are available, is still unclear.

A similar situation may also be found in healthy built environment studies. As the key built environment characteristic supporting human health in regards to food is distinguished as providing healthy food options, the main discussion on this topic is to make environments welcoming healthy eating options, which focuses on achieving the accessibility to healthy food on a community scale (Kent and Thompson, 2014). While food consumption is one of the key activities in food systems and a healthy built environment, the research needs to go a step further, looking not only at the availability of food options, but other built environment factors that shape food choice.

Given these points, my attempt is to theorise the relationship between the built environment and food choice. The proposed aim of this on-going study is to present a theory 'about' food choice in the built environment rather than a theory 'of'.

4. A roadmap for food choice study in the planning field

As proposed above, my endeavour is to address a theory about food choice in the built environment by recognising that food choice is a multi-determined, situation-dependent phenomenon, influenced by a range of interrelating factors. While the planning research and practice is normally public-interest driven and aims at creating liveability, it can play a larger role in modifying everyday routines and regular behaviour by understanding how we behave in the built environment and developing a spatial consciousness in the context of day-to-day matters for both professionals and the people without built-environment academic training (by which I mean all of us).

We live in a city-centric culture where a lot of the time we assume that food is everywhere to be found in variety and convenience: from markets, cafés, restaurants, and even cinemas. On one hand, we take food for granted and the planning professionals tend to ignore the food system. As the nature of the planning practice, starting with perceived market failure (e.g. affordable housing, effective transport) (Pothukuchi and Kaufman, 2000), if the problem is not clearly stated, it is hard to integrate food-related issues into planning practice. On the other hand, no other public issue is as essential to every individual as food systems. In the event where food systems were broken, communities regardless of gender, age, cultural background, or cultural level would be significantly affected; this makes food systems fit for understanding how the urban surroundings involve and implicate in our everyday activities. As noted by Casey (2001, p.684), 'In effect, there is no place without self and no self without place' (Casey, 2001, p.684).

Planning studies have a traditional focus on observing behaviour, which is assumed to reflect the environment; and analysing the environment, which work by enabling or limiting choices. By applying the system thinking into planning, cities are being evaluated as systems consisted of different elements including individuals and infrastructures that work together to make cities 'cities'. The concepts of the systems theory can help find the explanation: the explanation of a certain problem or elements is from the understanding of the parts in relation to the whole (Chadwick, 1978). In this case, due to the complex and conflicting nature of all food choice determinants, the food choice behaviour is the problem in the system (i.e. the built environment) that could be best understood in the context of diversity in urban settings rather than in isolation (i.e. a linear cause-effect explanation). In addition, to solve the tensions in current literature, I employ grounded theory methodology to address my attempt to generate new theoretical frameworks, reason being it operates in exposing existing theoretical tensions and thus aims to build theoretical suggestions grounded in the context of new data and based on the observation (Strauss, 1998; Bryant and Charmaz, 2007; Aldiabat and Le Navenec, 2011).

Under the guide of systems theory and grounded theory, it is clear that food choice, the behaviour itself, is the centre of the study rather than the individuals who make the food choice, or the built environment where choices occur. Therefore, neither the individual itself, along with the individual characteristics such as cultural background and socioeconomic position nor the difference in urban settings is intended to explain the central question 'why does who eat what, when, and where'. As

the strong critiques are drawn from practice theory, individual attitudes in decision-making cannot solely explain the behaviour as it is not a simple linear process (Urry, 2012).

In brief, I propose that food choice is a product of practices that is shaped by the individual, the built environment and multiple other factors. Instead of investigating isolated single factor, I propose a framework that helps understand the complex food choice in the real world. As previously discussed, four main problems ought to be resolved:

- There are insufficient cases outside of food deserts, where food options are plentiful;
- There is not enough interdisciplinary research;
- There is a lack of spatial thinking and spatial reasoning techniques;
- There is an inadequacy in methods to collect data on perceptions influenced by the built environment.

Based on the problems above, the proposed framework in this study should be interactive in the way that the influences of the built environment can be perceived, described and documented for analysis. The framework and the research plan should be made in accordance with the complexity of the food choice that no such thing can solely explain or determine the behaviour. Furthermore, two main features should be recognised in the framework:

- the dynamic nature of the choice behaviour;
- the implicit nature of the built environment influences.

Collectively, four major aspects help to shape my framework in this study. First concerns the availability, types and perceptions of food outlets in an area. The built environment contexts (e.g. zoning, building types, infrastructure and urban facilities) provide various opportunities and constraints to food activities such as providing physical spaces for food supply, distributing and purchasing (American Planning Association, 2007). One type of food outlet may be fixed as one setting while another may not, such as a fast food outlet without table service would normally be considered more flexible than restaurants (Stewart et al., 2004); likewise convenience stores are small as compared to fresh food grocers which consume a larger capacity for chillers/freezers. Apart from that, the perception related to the availability issue is also important as the error and bias often occurs in spatial behaviour (Golledge, 1997).

Secondly this paper will explore the accessibility to food and how it works in shaping choice. As largely discussed in food desert and food insecurity research, the limitation to fresh food is often associated with limited access to transport (Walker et al., 2010). In an area with multiple food options, however, the question of accessibility is largely ignored in current research. While there is currently no direct evidence to support the relationship, studies on automobility demonstrate that built environment factors such as topography, traffic situations, parking systems and pedestrian conditions have impacts on the method people choose to travel (Kent, 2013), which may also have impacts on food choice behaviour.

Another aspect is how built environment factors (other than above) attract or repel consumers. As we attach meaning to particular places and spaces, certain urban settings and moments may generate specific knowledge and experiences which affect the behaviour (Lynch, 1960). Lastly, this study also aims to investigate how food activities are integrated into other daily routines. Since daily routines are often shaped by built environment factors such as job/housing balance and street

layout, it is worth exploring the food choice as part of daily routines in urban settings. In this study, the four aspects will be tested.

5. Research design

5.1 Study Area

The Sydney metropolitan area is considered as the study area to explore the relationship. Sydney is the capital city of New South Wales, and the most populous city in both Australia and Oceania. It is home to 4,627,345 people or about 20 percent of the Australian population. Sydney is rather a low-density city in comparison to other major cities worldwide, with approximately 40 local government areas consisted into six subregions that 'tend to share similar characteristics (economic, transport, infrastructure linkages etc.)' (Department of Planning and Environment, 2014, p.139).

The Greater Sydney boundaries, along with the Statistic Area Level 1 as the cadastre, in ABS' geographical framework was selected for analysis. Since the Greater Sydney region also includes large tracts of the rural hinterland and do not define the built up edge of cities (ABS, 2011), I arbitrarily apply the threshold of 150 inhabitants per square kilometre adopt from Organisation for Economic Co-operation and Development method (Organisation for Economic Co-operation and Development, 1994) to define urban areas using the latest 2011 cuenes. Figure 1. shows the population density of selected study area using *ArcGIS for Desktop Advanced Version 10.3*.

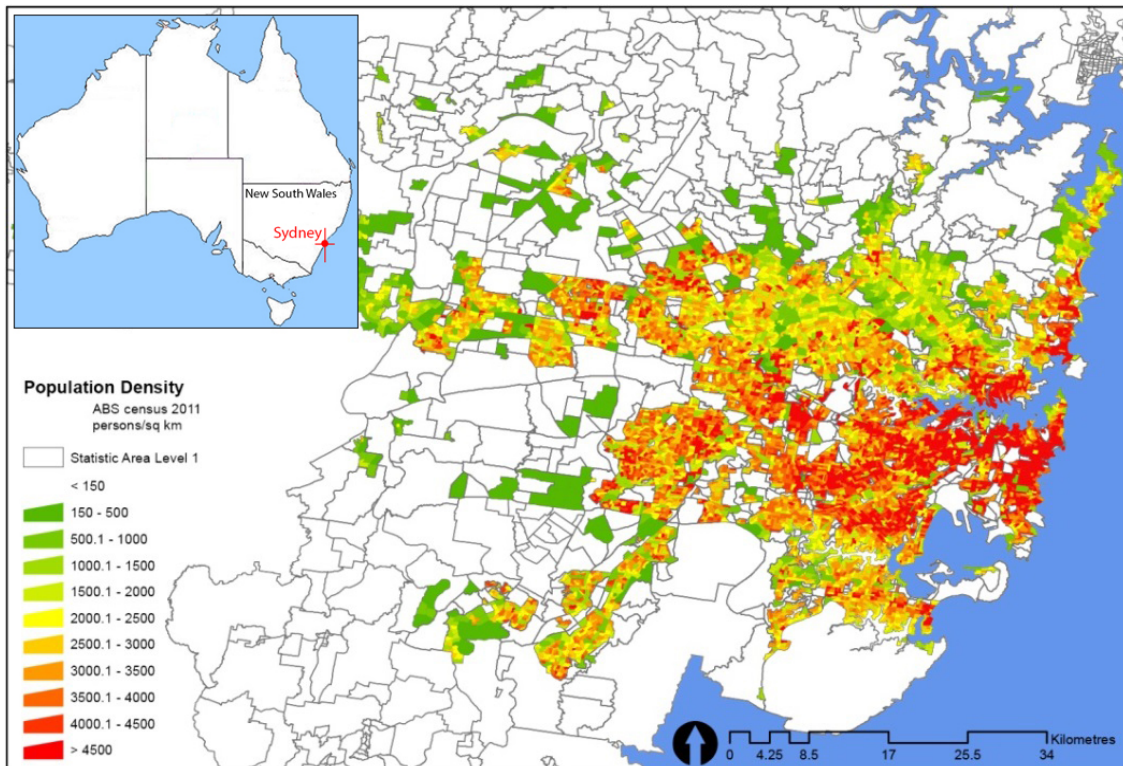


Figure 1. Population density in study area. Source: ABS, 2011

5.2 Research process

The study will conduct in two phases:

- The first phase of testing the hypothesis that the food choices can be explained by the characteristics of the built environment, using spatial statistical analysis technique;
- A second phase of purpose sampling and collecting data using in-depth interviews.

In this study, the built environment characteristics are hypothesised to influence residents' food choice. The first phase is to verify if the two variables, the built environment and food choice, are related or not. It aims to find out how 'likely' our food choices are related to the built environment. Many geographers have utilised spatial autocorrelation to measure the degree to which one characteristic is similar to others nearby, in order to understand the likelihood that if it is a result of a random process. This method, however, needs analysable values. Thus, an indicator to measure food choice is required. The indicator selection is based on the criteria that it should provide evidence to assess the outcomes of food choice and it should be numeric and access for public; the spatial incidence of T2D is selected as the indicator for food choice. This data is sourced from the National Diabetes Services Scheme (NDSS) (NDSS, nd). The technique in this study to testing the hypothesis is to generate Moran's I score using *ArcGIS for Desktop Advanced Version 10.3*. figure 2. demonstrates the difference in the spatial incidence of T2D.

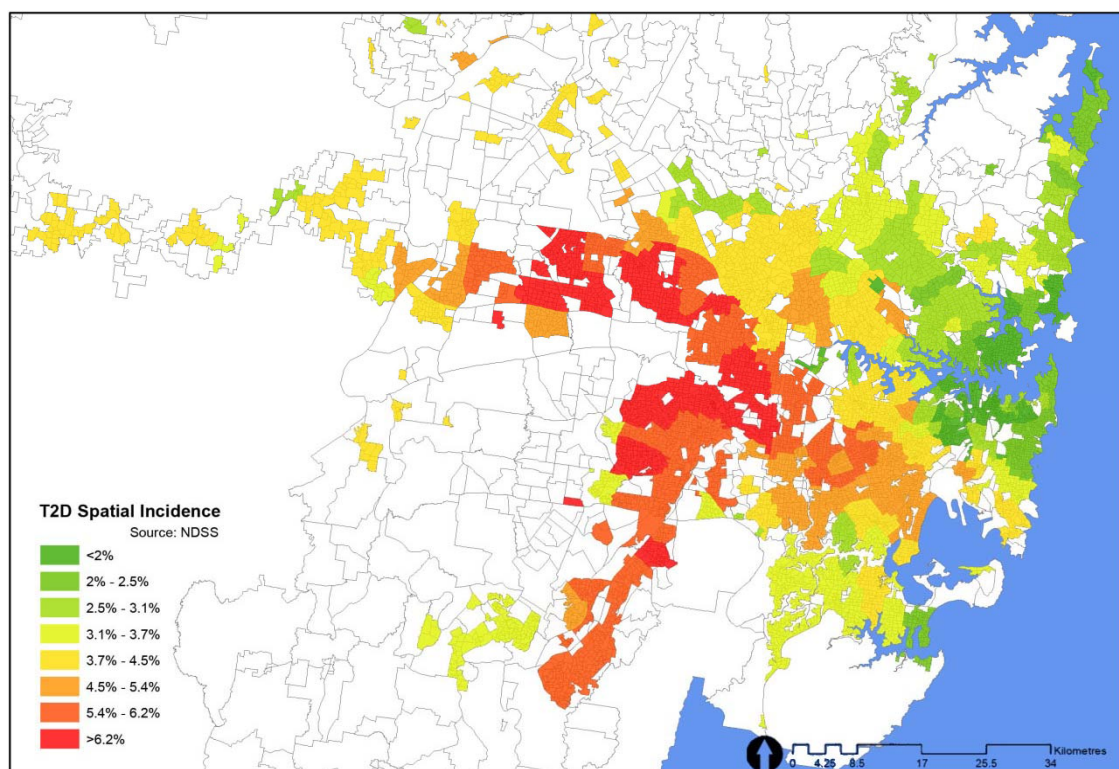


Figure 2. spatial incidence of T2D. Source: NDSS

The reliability and rationality of using T2D incidence as the food choice indicator are drawn from the literature to date in diabetes research. The linkage between food choice and T2D is proved and accepted. Low fibre and high fat sugar/protein food choices, such as high in red and processed meat; fried foods, beverages in high sugar, and fibre depleted wheat flour, all generate a delay in satiation

promoting excessive intakes of energy, saturated fats, sodium and simple carbohydrates or sugars (Gulliford and Ukoumunne, 2001; Psaltopoulou et al., 2010). These unhealthy food choices are linked to poor insulin sensitivity and glucose homeostasis, intra-abdominal fat deposition and high body mass index (BMI), which are all risk factors for T2D (Wolfram and Ismail-Beigi, 2011). In contrast, food consumption of non-starchy vegetables and whole grains on a regular basis decreases fasting blood glucose and improves glucose metabolism, which significantly reduces the risk of T2D (Carter et al., 2010; Psaltopoulou et al., 2010; Wolfram and Ismail-Beigi, 2011). Despite the fact that T2D has genetic and family-related risk factors, lifestyle modification and healthy diet behaviour can overwhelm biologic risk by preventing or delaying its incidence (Chaturvedi, 2007). Hence, the T2D incidence can indicate the utilisation of healthy food and the food choices.

The second phase is to select locations of purposive sampling to recruit participants for qualitative research. The criteria for purposive sampling are based on the difference in the measure for food choice (spatial incidence of T2D) and the similarity in socio-demographic characteristics. The selection here is pure to provide a source of participants to the following interview, not to make statistical inferences; starting from here I turn to use the qualitative research methods. A flyer about this study will deliver to mailboxes in selected locations for recruiting participants.

The primary method followed by for data collection is semi-structured in-depth interviews. I aim to focus on understanding the food choice in the context of built environment settings. With this in mind, a neighbourhood auditing will perform in order to discuss in details in interviews. I can describe, for example, the topography of streets, the condition of traffic and the location of food outlets. An interview guide is developed after pilot interviews which aim to identify key concepts for the main data collection. Interviews will be recorded with a digital voice recorder, and then transcribed. Once finished, I will use the computer-aided qualitative data analysis software program QSE NVivo 10 for data analysis.

6. Conclusions

Addressing food choice issues needs the insight of the built environment. With the goal of promoting liveable cities, researchers in planning society should contribute to food choice studies. This study will attempt to give a real world understanding of how the food choice is being influenced by the built environment. It will also identify urban form barriers to the utilisation of healthy food in urban settings in Sydney.

The mixed methods proposed in this study could be applied to a range of behaviours to understand how the built environment works on them. In this study, the methods give a new way of thinking about food choice, as the decision is made in the built environment, and factors affecting the choice may also imply in and affect by it.

On the other hand, the principal limitation of this study is that the linkage and associations may be insufficient to establish causality due to the nature of built environment research. Another limitation is that using the spatial incidence of type 2 diabetes as the indicator for food choice may conceal other food choice characteristics. Moreover, since the research is conducting in Sydney, the incoming results may not be applicable to the wider population and all urban settings.

Nevertheless, this study will highlight the relationship between the built environment and food choice to help built environment professionals to unravel the complexity and to encourage a healthy lifestyle in the future policy-making process.

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8. References

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