



The foodscape: Classification and field validation of secondary data sources

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ARTICLE INFO

Article history:

Received 18 August 2009

Received in revised form

2 December 2009

Accepted 8 February 2010

Keywords:

Food environment

Foodscape

Classification

Secondary data

Obesogenic environments

ABSTRACT

The aims were to; develop a food environment classification tool and to test the acceptability and validity of three secondary sources of food environment data within a defined urban area of Newcastle-Upon-Tyne, using a field validation method.

A 21 point (with 77 sub-categories) classification tool was developed. The fieldwork recorded 617 establishments selling food and/or food products. The sensitivity analysis of the secondary sources against fieldwork for the Newcastle City Council data was good (83.6%), while Yell.com and the Yellow Pages were low (51.2% and 50.9%, respectively).

To improve the quality of secondary data, multiple sources should be used in order to achieve a realistic picture of the foodscape.

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1. Introduction

Unhealthy diets are linked with numerous chronic diseases including obesity, which has been described as one of the largest societal challenges we face (Foresight, 2007). In relation to obesity, environmental factors influence both sides of the energy balance equation; energy intake, in terms of the food environment, and energy expenditure, describing physical activity and the environment. In terms of disease prevention and the promotion of health it is important to establish *which* aspects of the food environment are amenable to change. This paper will focus on the food environment, a relatively new field of research (McKinnon et al., 2009).

Environmental exposures such as the availability and accessibility of food interact with individual factors, such as taste, familiarity/habit and health to drive food choice (Contento et al., 2006). The relationship between the food environment and obesity is complex (Wang et al., 2006). While there is little research linking food access with obesity as an outcome measure in any age group (White, 2007), understanding the relationship between what we eat and the environmental context in which these food choices are made is essential to the development of long term obesity prevention strategies (Holsten, 2009).

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Food choices are made within our respective food environments. The food environment, or 'foodscape', encompasses any opportunity to obtain food and includes physical, socio-cultural, economic and policy influences at both micro and macro-levels (Townshend and Lake, 2009; Lake and Townshend, 2006). Glanz et al. (2005) have hypothesised the food environment to incorporate four different elements; community (type and location of food outlets); consumer (availability of healthy options, price, promotion and nutritional information); organisational (home, school and workplace); and informational (media and advertising). This paper focuses on the community food environment and the reality of the 'foodscape'.

Collecting data on the food environment relies on the identification of the specific type of outlet and its location (Story et al., 2008). This identification of the type of food outlet can be described as the classification of the food outlet. Research has tended to develop classification systems dependent upon the data sources available to them. Studies have used existing classification systems such as local council lists (Macdonald et al., 2009), government agency lists (Wang et al., 2008) as well as commercial directories (Burgoine et al., 2009) or combinations of these (Wang et al., 2008). While studies that involve visiting the food outlets can base their classification on the availability of certain foods within in these outlets (White et al., 2004). In order to look at the neighbourhood food store environment in the US Wang et al. (2008) adapted the North American Industry Classification System and the Food Marketing Institute definitions to create 11 categories of food outlets including grocery stores, bakeries and pizza shops. They used the secondary data sources available to them to classify the food outlets using their 11 point tool.

Morland and Evenson (2009) also modified the North America Industry Classification System codes to describe the types of food stores and food service places located in their US based study area. They used 10 categories in total; five categories for food stores and five for food service places (i.e. restaurants, fast food restaurants, etc). In the UK, Burgoine et al. (2009) based their three point classification system of the longitudinal food environment on the Yellow Pages classification system which was their data source. White et al. (2004) developed 19 categories for shops selling food and described the difficulties in distinguishing between shop types. However, as they were visiting the outlets their classifications could be based on the foods available in these outlets. This is a new area of research and few studies have reported on the development of the food outlet classification system which has been used.

Methods to identify the type of outlet and its location can either be 'intermediate' or 'direct' (Booth et al., 2005). Intermediate refers to the use of secondary data sources (e.g. telephone directories, business directories, government listings), for example, in the UK, Burgoine et al. (2009) used paper Yellow Pages to establish the historical food environment retrospectively and Maddock (2004) used the US Yellow Pages to identify fast food outlets. The direct method often refers to an audit of a specific area by trained observers (Booth et al., 2005), as used by several UK studies (White et al., 2004; Donkin et al., 2000). This direct method can also be referred to as 'ground truthing' (Sharkey, 2009) or as 'field validation'.

In the US Wang et al. (2006) conducted a study that explored the strengths and limitations of historical food environment data from government and commercial sources. The authors urged caution when choosing sources of secondary data, and in current (rather than historical) studies recommend the use of observation techniques to assess the validity of secondary data sources. Similarly, in Canada, Paquet et al. (2008) aimed to establish the validity of sources of data on food stores and physical activity establishments that were obtained from commercial database and Internet searches. However, Paquet et al. (2008) did not identify or validate restaurants or takeaways (considered in this current study) and so fell short of assessing representations of the total food environment.

In the UK, most types of food business (including mobile vans, catering businesses run from home) need to be registered with the environmental health service at the relevant local authority at least 28 days before they plan to open (Food Standards Agency, 2008b). After registration environmental health protection officers will visit the business and then carry out routine visits. The regularity of these visits depends on the risk category of the business and can vary from every 6 months, every 12–18 months up to every 3 years or more frequently as the result of a complaint (Food Standards Agency, 2008a). There is a legal requirement and legislation for businesses to notify the local authority of closures (The European Parliament and of The Council of the European Union, 2004). Therefore Public Health and Environmental Protection Records held by local authorities are constantly being updated and should be a useful and fairly accurate source of secondary data when exploring the food environment.

This study had two aims; firstly to develop a culturally relevant and detailed system of classifying the entire food environment (foodscape) for our current and planned research. This classification system would be used to record and describe the foodscape. The aim was to develop a tool that could be used to classify the food environment from both direct field observations and secondary data sources. This tool is urgently required for studies in the UK to have a classification system that encompasses the retail (shops) and service (restaurants) food environment. Secondly to test the acceptability and validity of three secondary sources of food environment data (Public Health and Environmental

Protection data obtained from Newcastle City Council and two forms of commercial search directories [Yellow Pages and Yell.com]) within Newcastle-Upon-Tyne, using a field validation method.

Being able to identify and classify the community food environment (type of outlets) is an important first step for most studies exploring the relationship between the food environment, food intake and adiposity, particularly in relation to the topic of obesogenic environments. Rigorous measures of the food environment are needed in order to explore links between the food environment, individual intake and health indicators (Lytle, 2009). The work described in this paper is the first UK study to explore the field validation of secondary data pertaining to the existence of food outlets from commercial records (Yellow Pages) and from a Local Government Source (Public Health and Environmental Protection Records).

2. Methods

2.1. Classification of the food environment

A literature review was conducted using Ovid Medline with the following search terms: business directories, yellow pages, food environment and food availability/access. In addition searches of existing classification systems for example those used in research studies, those used by commercial organisations (such as the yellow pages) and the classification system used by the local authority.

This review identified problems in incorporating the large variety of food outlets present. Previous work tended to focus on specific types of outlet, for example retail outlets that sell food (like convenience stores or supermarkets) or focus on service or out-of home food outlets (like restaurants or fast food outlets). Few attempt to classify *all opportunities* to obtain food and provide a tool that can capture the entire food environment or foodscape. Of the other classification systems examined, Yell.com (2008) and Newcastle City Council (2008) had the most extensive and detailed classification systems with 71 and 88 categories, respectively, allowing detailed scrutiny of the food environment. However the classification systems used within these data sources were too expansive for our purposes and included classification categories not open to the public (for example staff canteens). The literature review and evaluation of commercial and local authority classification systems revealed that the classification methods used to date did not meet the aims of this study and those of our planned research. Given the lack of suitable tools we set out to develop a new food outlet classification system, which could be used by our team and other researchers in the UK to build a picture of the food environment.

While the classification system took its basis from existing classification systems (mainly Newcastle City Council, 2008 and Yell.com, 2008) the field validation element of the study (described below) helped to further develop the classification system by allowing further insight into the types of food outlets present and the kinds of food vended within these outlets. During the field validation study, photographs were taken of the outside of a number of businesses to aid with the classification process and to help define categories as well as sub-categories.

After much consideration and discussion a new comprehensive 21 point food outlet classification tool was developed (Table 1). This tool includes 77 sub-categories (not listed, but available on request from the author), which may be used when collecting 'direct' data and the researcher is present in the outlet. For example 'restaurant' is a main heading and the sub-headings

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