

Exploring the influence of local food environments on food behaviours: a systematic review of qualitative literature

AUTHOR(S)

E Pitt, D Gallegos, T Comans, C Cameron, Lukar Thornton

PUBLICATION DATE

01-10-2017

HANDLE

10536/DRO/DU:30101005

Downloaded from Deakin University's Figshare repository

Deakin University CRICOS Provider Code: 00113B

Public Health Nutrition: 20(13), 2393–2405 doi:10.1017/S1368980017001069

Review Article

Exploring the influence of local food environments on food behaviours: a systematic review of qualitative literature

Erin Pitt[1,*], Danielle Gallegos[2], Tracy Comans[1], Cate Cameron[3] and Lukar Thornton[4]
[1]School of Medicine and Menzies Health Institute Queensland, Griffith University, Nathan Campus, Nathan, QLD 4111, Australia: [2]School of Exercise and Nutrition Sciences, Queensland University of Technology, Brisbane, Australia: [3]Recover Injury Research Institute and Menzies Health Institute Queensland, Griffith University, Brisbane, Australia: [4]Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Science, Deakin University, Melbourne, Australia

Submitted 21 November 2016: Final revision received 23 March 2017: Accepted 21 April 2017: First published online 7 June 2017

Abstract

Objective: Systematic reviews investigating associations between objective measures of the food environment and dietary behaviours or health outcomes have not established a consistent evidence base. The present paper aims to synthesise qualitative evidence regarding the influence of local food environments on food and purchasing behaviours.
Design: A systematic review in the form of a qualitative thematic synthesis.
Setting: Urban localities.
Subjects: Adults.
Results: Four analytic themes were identified from the review including community and consumer nutrition environments, other environmental factors and individual coping strategies for shopping and purchasing decisions. Availability, accessibility and affordability were consistently identified as key determinants of store choice and purchasing behaviours that often result in less healthy food choices within community nutrition environments. Food availability, quality and food store characteristics within consumer nutrition environments also greatly influenced in-store purchases. Individuals used a range of coping strategies in both the community and consumer nutrition environments to make optimal purchasing decisions, often within the context of financial constraints.
Conclusions: Findings from the current review add depth and scope to quantitative literature and can guide ongoing theory, interventions and policy development in food environment research. There is a need to investigate contextual influences within food environments as well as individual and household socio-economic characteristics that contribute to the differing use of and views towards local food environments. Greater emphasis on how individual and environmental factors interact in the food environment field will be key to developing stronger understanding of how environments can support and promote healthier food choices.

Keywords
Food environment
Qualitative
Review
Thematic synthesis

The role of the built environment has received growing attention in relation to its contribution to diet and health outcomes such as obesity[1]. Food and nutrition environments have been transforming rapidly over the past few decades[2], with many changes in access and availability of foods in line with shifting patterns of dietary intake[3] and social demographics[4]. Decreased availability of and accessibility to supermarkets has been identified as a key barrier to consuming a healthy diet[5] and a number of studies have reported on healthier food options being more expensive than less healthy foods[6]. In environments that are seemingly less supportive of healthy eating, it is often difficult to make nutritious food choices when reduced availability, accessibility and affordability challenge the ability to acquire healthier alternatives[7].

The local food environment has usually been categorised and measured in terms of different types of food outlet including the supermarkets, corner stores, fast-food outlets and restaurants available to individuals where they live[8]. Based on this work, Glanz and colleagues[9] have developed a conceptual framework that identifies three types of environments including the community nutrition

*Corresponding author: Email e.pitt@griffith.edu.au
© The Authors 2017

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

environment (types of stores, accessibility), the consumer (within-store) nutrition environment (availability of healthy options, price, nutrition information) and the organisational nutrition environment (home, school or work). These environments are influenced by a combination of government and industry policies and the information environment (media and advertising), which work in combination with individual factors such as socio-demographic characteristics, psychosocial factors and the perceived nutrition environment and ultimately help determine eating patterns and behaviour[9].

Much of the existing quantitative literature has sought to establish a relationship between the food environment (particularly the community nutrition environment) and both dietary behaviours and/or weight status[7,10]. However, results have been inconsistent and the role of the food environment on eating patterns is far from understood[9]. While most evidence on the links between the food environment and dietary intake comes from quantitative studies, as demonstrated by a series of systematic reviews[7,9–13], far less research has been undertaken in terms of understanding the food environment from a qualitative perspective.

There is no currently published systematic review of qualitative literature that has specifically looked at the local food environment and dietary behaviours. Much of the qualitative research has explored socio-ecological determinants of food choices and/or dietary behaviours of different population groups (children[8,14], adolescents[15,16] and socio-economically disadvantaged populations[17,18]) in a range of environments (home[8,16], school[19,20] or local community[13,21]). Although one qualitative systematic review has explored obesogenic dietary intake in young children[22] and another has focused on determinants of fruit and vegetable consumption in children and adolescents[23], neither solely considered environmental determinants or food and purchasing behaviours.

Given the difficulty of studies and systematic reviews of quantitative literature in establishing associations between objective measures of the food environment and dietary behaviours or health outcomes such as obesity, the current review aims to investigate what the qualitative literature tells us about the influence of the local food environment on food and purchasing behaviours. Synthesising qualitative evidence will enable an in-depth exploration of food environments to provide greater understanding of possible explanations for contrary outcomes, assist to inform and generate new hypotheses in quantitative research and subsequently guide the design of public health policy, interventions and practice[24].

Methods

The current review adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement to ensure quality of methods and reporting[25].

Search methods

Six electronic databases were searched using keyword searches of entire articles. The databases included MEDLINE, Health Reference Centre, CINAHL Plus with full text, PsycINFO, PubMed and Australian and New Zealand Reference Centre. Terms were selected to define essential elements of the search including the environment and specifically the type of environment, food and dietary intake, qualitative research methods, as well as key food environment concepts. A list of search terms and lateral searching methods are provided in the online supplementary material, Supplemental Tables 1 and 2.

Eligibility criteria

Articles were included if they incorporated a qualitative research method with the inclusion of participant comments or quotes; were a primary study published in a peer-reviewed academic journal between 2000 and 2015; and were written in English language. The inclusion of the 15-year time period was selected given the increasing contribution to the food environment literature during this time[13,26].

The current review was particularly interested in explicit references made to people's food consumption and/or purchasing behaviours or related environmental determinants as a function of the local food environment, as supported by specific quotes from participants. Research focusing on dietary intakes of specific micro- or macronutrients or particular health or nutrition conditions/disorders, as well as studies on dietary acculturation or food security outside the context of food environments and purchasing behaviours, were excluded.

Some criteria were further refined such as excluding articles based on their setting, specifically schools, workplaces and within-home environments, due to the additional scope and diversity afforded by these other types of food environments. Additional eligibility criteria were defined during the study selection process including the decision to include articles sampling adults and/or children within urban/metropolitan areas, but only if reported from the perspective of an adult, as the primary purchaser of food. Rural localities, as defined by the paper in their original context, were excluded given the potential differences in food environments between rural and urban areas.

Study selection

Articles identified through database searches were imported into EndNote version X7. Duplicate records, non-English language articles and non-journal articles were removed. One author (E.P.) reviewed titles, abstracts and identified articles required for full-text evaluation. Inclusion or exclusion of full-text articles was undertaken independently by three authors (E.P., D.G. and L.T.) and then determined by majority consensus upon group discussion. Additional articles were retrieved from reference lists of included articles. The PRISMA flow diagram is recommended to document the systematic review search

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

and selection process[27] and its application to the current review can be seen in Fig. 1.

Quality assessment

Although there is currently a lack of consensus regarding the best tool for undertaking quality assessment of qualitative research[28], the Critical Appraisal Skills Programme (CASP) tool for appraising qualitative research is one recognised appraisal tool and was subsequently used to undertake quality assessment of studies included in the current review[29]. The purpose of the quality assessment was not to exclude articles based on their quality but simply to assess their rigour, credibility and relevance[30]. This assisted in gaining a depth of understanding of the articles included[31], particularly in terms of their strengths, weaknesses and overall contribution to the review[32].

Data extraction and analysis

Summary data of eligible studies were extracted including authors and year of publication; study location; study aim; sample characteristics; and data collection methods.

Data analysis utilised the thematic synthesis process as detailed by Thomas and Harden[33], which is a widely used approach to analysing and synthesising qualitative data within systematic reviews[31]. The three main stages of this method included inductive line-by-line coding of article findings; developing descriptive codes to translate concepts between studies; and finally developing analytic codes to transform findings beyond the context of the original studies to generate new meaning and understanding. All major sections of empirical findings focusing on the local food environment and food/purchasing behaviours or related environmental determinants were free coded (E.P.) for four articles and then cross-checked (D.G.) for quality assurance and consensus. The remaining articles were subsequently coded in the same manner.

Descriptive themes were developed by grouping individual codes by topic or similar ideas. Codes were then reorganised into a hierarchal structure under themes, allowing individual codes to sit under multiple descriptive themes or left in free code form. Descriptive themes and codes were iteratively reorganised and refined with similar or overlapping codes and themes being merged together. All authors participated in ongoing critical discussion regarding refinement of codes and themes.

Analytic themes emerged through an iterative inductive and deductive approach. First, the relationships between descriptive themes were examined and then applied to answer the review question. The latter evolved by conceptualising the relationship between the food environment and dietary intake, as presented through initial coding and generation of descriptive themes. Similarities emerged with Glanz and colleagues' model of nutrition environments[9] and thus their framework was used deductively to structure the findings in the context of existing literature and current understanding of food environments. Final descriptive themes and codes became mutually exclusive under analytic themes.

Results

Summary of included studies

A total of 2744 articles were identified through the search process, of which thirty met the inclusion criteria for the review (Fig. 1). Included studies were published between 2001 and 2015, with nineteen from the USA, seven from the UK and one each from Mexico, Canada, Australia and the Netherlands. Data collection methods included focus groups (*n* 14), interviews (*n* 12) and a combination of interviews and focus groups (*n* 4). Sixteen articles sampled participants specifically for characteristics of socio-economic position and seventeen articles sampled participants either solely or predominantly from ethnically diverse communities, thirteen of which consisted of African-American populations. A summary of the included studies can be seen in Table 1.

Quality assessment

The outcomes from the quality assessment are presented in the online supplementary material, Supplemental Table 3. Only four of the thirty articles met the criteria for all domains of quality. All articles provided a clear statement of aims, qualitative methodology and research design; however, two lacked key details regarding their recruitment strategy, five did not provide information on ethical clearance and twelve did not consider the relationship between researchers and participants during research design or data collection. There was no mention or detail provided regarding data saturation as part of data analysis in twenty-three of the articles, seven did not consider implications of bias either during analysis or reporting, and two articles failed to discuss the credibility of their research findings. Finally, three articles did not consider applicability or transferability of the research.

Key findings

Thematic synthesis results are presented under four key analytic themes: (i) the community nutrition environment; (ii) the consumer nutrition environment; (iii) other environmental factors; and (iv) individual coping strategies for shopping and purchasing decisions. A matrix of key themes identified across the included studies can be seen in Table 2. The analytic themes represent a blend of concepts that either directly or partially align with Glanz and colleagues' model of nutrition environments[9] and provide a means of understanding the findings in terms of current food environment literature.* However, the

* The concept of affordability in the current review has been discussed within the context of the broader food environment (price differences between rather than within food stores) and was therefore seen to align with the community nutrition environment instead of the consumer nutrition environment.

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

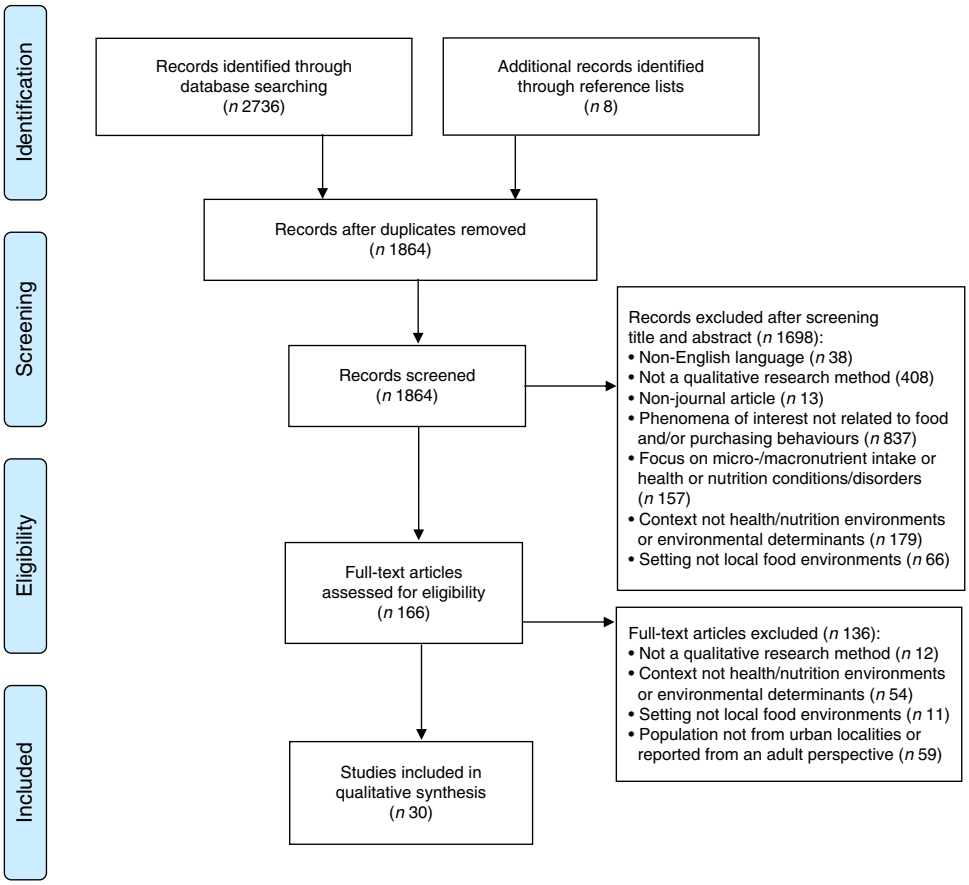


Fig. 1 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram of the search and screening process for the current systematic review

themes also highlight other novel and emergent ideas. For example, behaviours such as coping strategies are not represented within this particular framework.

Theme 1: Community nutrition environment

Availability

The comparative availability of healthy and unhealthy options in the food environment was identified as playing a key role in food purchasing decisions and was discussed by sixteen articles included in the present the review from predominantly lower-income or minority populations in the Netherlands, Australia, USA and UK. Articles mentioned the proliferation of takeaway foods within communities[17,34] and decreased or declining availability of produce, which was seen as one of the biggest influences on diet[35]. Concern was raised regarding the availability of convenience or junk foods within stores[34], the proximity to fast food, and thus the subsequent increased consumption of these foods[36–39] and decreased consumption of fresh produce[40]:

> 'every corner sells fast food … [so it's] hard not to buy it.' (Lucan *et al.*[35], p. 705)

Articles mentioned greengrocers[40] and other stores either closing down or moving out of the area due to lack of trade[41] or overwhelming competition[40]. Reference was also made to the lack of larger, high-quality supermarkets within neighbourhoods, forcing consumers to shop outside their local area[42].

Culturally and linguistically diverse populations located in both the USA and the UK referred to the difficulties in obtaining traditional foods due to limited availability[34]. Consumers would often choose to frequent particular stores because of cultural availability and variety of ethnic foods[43], yet rejected stores that sold unfamiliar items or those catering for other ethnic groups[44].

One US-based article identified the phenomenon of local food environments being both 'raced' and 'classed', with a clear segregation of food stores being a result of racism and oppression[45]. Minority communities such as African-American communities were often in areas with little or no availability of healthy foods[45]. Subsequently it was identified that 'white' areas often had better availability, as well as variety and quality of foods[46], with good food stores generally perceived to be in better areas of town[45,47]. Marked differences were seen in

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

Table 1 Summary characteristics of studies included in the current systematic review

Author(s), year, reference	Location	Sample	Population characteristics	Data collection method	Topics addressed
Baruth *et al.* (2014)[61]	USA	*n* 28 (females)	Low income; predominantly African-American ethnicity	Focus groups (*n* 4)	Perceptions and experiences of barriers to healthy eating
Bridle-Fitzpatrick (2015)[55]	Mexico	*n* 20 (females)	Latino ethnicity; varying SES	Interviews (*n* 20)	Availability, access and exposure to healthy and unhealthy foods; interactions with and perceptions of food environments
Cannuscio *et al.* (2014)[44]	USA	*n* 25 (16 females, 9 males)	More than half African-American ethnicity	Interviews (*n* 25)	Socio-ecological determinants of food shopping; interactions with and within the local food environment
Clifton (2004)[49]	USA	*n* 27 (24 females, 3 males)	Low SES; more than half Latino ethnicity	Interviews (*n* 27)	Accessibility as a barrier to food acquisition
Dammann and Smith (2009)[52]	USA	*n* 92 (females)	Low SES; more than half African-American ethnicity	Focus groups (*n* 14)	Socio-ecological determinants of food choices
Dwyer *et al.* (2008)[59]	Canada	*n* 39 (34 females, 5 males)	Predominantly Caucasian ethnicity	Focus groups (*n* 5)	Experiences and challenges of parents in supporting healthy eating among their pre-school children
Freedman (2009)[45]	USA	*n* 20 (14 females, 6 males)	Predominantly African-American ethnicity	Interviews (*n* 20)	Perceptions and experiences of food access
Hendrickson *et al.* (2006)[53]	USA	*n* 22 (15 females, 7 males)	Half Caucasian ethnicity	Focus groups	Consumer perceptions on food availability
Inglis *et al.* (2005)[17]	Australia	*n* 56 (females)	High and low SES	Interviews	Dietary behaviours among varying levels of SES
James (2004)[36]	USA	*n* 40 (19 females, 21 males)	African-American ethnicity; varying SES	Focus groups (*n* 6)	Socio-ecological determinants of food choices and dietary intake
Kamphuis *et al.* (2007)[40]	Netherlands	*n* 38 (17 females, 21 males)	Varying SES	Focus groups (*n* 4)	Socio-ecological determinants of fruit and vegetable consumption
Krukowski *et al.* (2012)[56]*	USA	*n* 48 (46 females, 2 males)	More than half African-American ethnicity	Focus groups (*n* 5)	Socio-ecological determinants of food store choice
Kumar *et al.* (2011)[47]	USA	*n* 14 (13 females, 1 male)	African-American ethnicity	Focus groups (*n* 2)	Perceptions of the neighbourhood nutrition environment
Lawrence *et al.* (2009)[50]	UK	*n* 56 (females)	High and low SES	Focus groups (*n* 11)	Socio-ecological determinants of food choices
Lindsay *et al.* (2009)[57]	USA	*n* 51 (females)	Latino ethnicity	Focus groups (*n* 6) and interviews (*n* 20)	Influence of social class, culture and environment on food behaviours
Lucan *et al.* (2012)[35]	USA	*n* 33 (18 females; 15 males)	Low income; African-American ethnicity	Interviews (*n* 33)	Perceived socio-ecological influences on the consumption of fruits, vegetables and fast foods
McGuffin *et al.* (2015)[37]	UK	*n* 186 (104 females, 82 males)	Caucasian ethnicity	Focus groups (*n* 24)	Factors influencing family out-of-home eating
Munoz-Plaza *et al.* (2008)[42]	USA	*n* 25 (13 females, 12 males)	African-American ethnicity	Focus groups (*n* 3)	Perceptions of the local food environment; barriers to healthy eating
Piacentini *et al.* (2001)[41]†	UK	*n* 21	Caucasian ethnicity	Interviews (*n* 21)	Grocery shopping behaviours and related influences
Rawlins *et al.* (2013)[34]	UK	*n* 43 (34 females, 9 males)	Ethnically diverse	Focus groups (*n* 8) and interviews (*n* 5)	Barriers and facilitators to healthy eating
Rose (2011)[48]	USA	*n* 47 (25 females, 22 males)	African-American ethnicity	Interviews (*n* 47)	Food acquisition behaviours and related factors
Tach and Amorim (2015)[54]	USA	*n* 66	Low income; predominantly African-American ethnicity	Interviews (*n* 66)	Food acquisition behaviours and related factors
Thompson *et al.* (2013)[62]	UK	*n* 26 (16 females, 10 males)	Predominantly Caucasian ethnicity	Interviews (*n* 26)	Influence of the supermarket environment on food shopping behaviours
Webber *et al.* (2010)[43]*	USA	*n* 28 (24 females, 3 males)	Predominantly Caucasian ethnicity; low SES	Interviews (*n* 28)	Within-store purchasing decisions and related factors

Table 1 *Continued*

Author(s), year, reference	Location	Sample	Population characteristics	Data collection method	Topics addressed
Whelan *et al.* (2002)[51]†	UK	*n* 35	Low SES; mothers with children	Focus groups (*n* 5)	Food shopping behaviours, consumption patterns and attitudes towards a healthy diet
Wiig and Smith (2008)[60]	USA	*n* 92 (females)	Low SES; more than half African-American ethnicity	Focus groups (*n* 14)	Grocery shopping behaviours and influencing factors
Withall *et al.* (2009)[38]	UK	*n* 27 (26 females, 1 male)	Low SES; predominantly overweight or obese	Interviews (*n* 8) and focus groups (*n* 5)	Barriers to consuming a healthy diet
Yen *et al.* (2007)[39]	USA	*n* 52 (females)	Predominantly Latino ethnicity; varying SES	Focus groups (*n* 8)	Neighbourhood perceptions and associations with poor diet
Zachary *et al.* (2013)[58]	USA	*n* 46 (40 females, 6 males)	Predominantly African-American ethnicity	Interviews (*n* 32) and focus groups (*n* 3)	In-store food purchasing decisions
Zenk *et al.* (2011)[46]	USA	*n* 30 (females)	Low SES; African-American ethnicity	Interviews (*n* 30)	Food acquisition behaviours and their environmental influences

SES, socio-economic status.
Information in the above table represents information/participants that met the inclusion criteria. For example, if a study used a mixed-methods research design, details are not provided on the number of survey participants in the study or if the study incorporated both rural and metropolitan areas, details on the rural participants (if made explicit) have not been provided.
*Number of rural participants cannot explicitly be identified and excluded from the sample.
†Number of females and males not identified.

both the availability and quality of foods sold in predominantly African-American areas[48] or low-income communities, including populations from the Netherlands and Australia[17,40], compared with those in white and more privileged areas[45] and thus food quality was also a function of store clientele[47]:

> 'Same price. Low quality … food is directed to the area.' (Kumar *et al.*[47], p. 374)

Equity issues were also identified solely in US populations through chain stores stocking different products depending on the neighbourhood[45], thus potentially highlighting inequitable access to food choices[46]. Local food environments tended to mirror the social class of the community and consumers endeavoured to shop at stores congruent with their social status, clearly highlighting class differences in where people shop[44].

Accessibility

Accessibility was identified as a key determinant of food purchasing behaviours in terms of where food stores were located as well as transport options that facilitate access and was discussed in eighteen articles from the USA, the UK and Australia, being particularly evident for lower socio-economic groups. A number of barriers to accessing local stores were identified[17,45], including having to rely on others for use of private vehicles[49–52] or being able to frequent only nearby convenience stores if access to private or public transport was not an option[41,45,46,53]:

> 'I mean, you're not fixing to find any foods or anything in the convenience store. It's a horrible thing, you know, for those who don't have it [transportation], because they are forced to go to one of those convenience stores … They [the stores] don't have real food over there.' (Freedman[45], p. 388)

References were also made to the sporadic availability of jitneys (informal taxi service)[48] at certain local stores, therefore limiting store choice for those reliant, primarily African-American communities, on this form of public transport[47].

Given the suboptimal availability of items in local stores, good food stores were often seen as being far away[45]. Afforded the opportunity, preference was given to leaving the local community and travelling further for food to obtain better-quality and variety of foods as well as to save money[42,49] and this was particularly due to dissatisfaction with neighbourhood stores within US-based localities[48].

Walkability was a key priority for low-income and minority population groups within the UK and US populations without access to cars[41,46,48,49,51,54]. Articles also made reference to the influence of transportation mode on shopping frequency[51,52]. Access to private motor vehicles usually meant less frequent shopping trips compared with more frequent trips made by those who walked or used

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

Table 2 Summary of analytic and key descriptive themes across studies included in the current systematic review

	Community nutrition environment			Consumer nutrition environment		Other environmental factors		Individual coping strategies for shopping and purchasing decisions	
Article	Availability	Accessibility	Affordability	In-store food availability	Food store characteristics or features	Influence of media and advertising	Other Environmental factors	Coping strategies within the community nutrition environment	Coping strategies within the consumer nutrition environment
Baruth *et al.*[61]	–	–	–	–	–	–	–	Y	–
Bridle-Fitzpatrick[55]	–	–	Y	–	–	–	–	Y	Y
Cannuscio *et al.*[44]†	Y	Y	Y	–	Y	–	Y	Y	Y
Clifton[49]	–	Y	–	–	–	–	–	–	Y
Dammann and Smith[52]	–	Y	Y	–	–	–	–	Y	Y
Dwyer *et al.*[59]*	–	–	–	–	–	Y	–	–	Y
Freedman[45]†	Y	Y	–	Y	Y	–	–	–	–
Hendrickson *et al.*[53]	Y	Y	Y	Y	–	–	–	–	–
Inglis *et al.*[17]	Y	Y	–	–	–	–	–	–	Y
James[36]	–	–	–	Y	–	–	–	–	Y
Kamphuis *et al.*[40]	Y	–	–	Y	–	–	Y	–	Y
Krukowski *et al.*[56]	–	–	–	Y	Y	–	–	Y	Y
Kumar *et al.*[47]†	Y	Y	Y	Y	–	–	–	–	–
Lawrence *et al.*[50]	–	Y	–	–	Y	–	–	–	Y
Lindsay *et al.*[57]	Y	Y	–	Y	–	Y	–	Y	–
Lucan *et al.*[35]†	Y	Y	Y	–	–	Y	–	–	Y
McGuffin *et al.*[37]*	–	Y	–	–	–	Y	–	–	Y
Munoz-Plaza *et al.*[42]	Y	Y	Y	Y	Y	–	–	Y	Y
Piacentini *et al.*[41]	Y	Y	Y	Y	–	–	–	Y	Y
Rawlins *et al.*[34]†	Y	–	–	–	–	–	–	Y	Y
Rose[48]†	–	Y	–	Y	–	–	Y	Y	Y
Tach and Amorim[54]†	Y	Y	Y	–	–	–	–	Y	Y
Thompson *et al.*[62]*	–	–	–	–	–	–	–	–	Y
Webber *et al.*[43]	Y	–	Y	Y	Y	–	–	Y	Y
Whelan *et al.*[51]	–	Y	–	Y	–	–	–	Y	Y
Wiig and Smith [60]	–	Y	Y	–	–	–	–	Y	Y
Withall *et al.*[38]	Y	–	–	Y	–	–	–	–	Y
Yen *et al.*[39]	Y	–	–	–	–	–	–	–	–
Zachary *et al.*[58]	–	–	–	Y	Y	–	–	Y	Y
Zenk *et al.*[46]†	Y	Y	Y	Y	Y	–	Y	Y	Y

Y, yes; –, not applicable.
*Socio-economic factors not considered or discussed within articles (*n* 3).
†Racial or culturally diverse factors discussed within articles and pertaining to key themes (*n* 8).

public transport[48], the latter of whom also needed to factor in the cost of each trip[41,42]. Public transport was also seen as impractical and difficult when required to transport heavy groceries home, especially fruit and vegetables, or to shop with young children[41,49,50,52]. Thus location of and access to stores was a key determinant to buying and consuming fresh produce[35,50].

Affordability

Twelve primarily US-based articles referred to distinct differences in price depending on the type of store. Corner stores[41,42,48,52,53,54] and meat markets[46,52] were usually said to be much more expensive than supermarkets, chain superstores[44] or public markets[55]:

> 'Milk is normally 79 pence for the big jugs. I just go down to the [store] and get it there because up here it's [1 pound]…' (Piacentini *et al.*[41], p. 150)

Consumers often referred to local food stores as over-priced[43,45,46,52,53] and taking advantage of local residents[46,53]. Specific reference was also made to the same items in different stores being more expensive[42].

Theme 2: Consumer nutrition environment

In-store food availability

In-store availability of fruit, vegetables and meat was reported as a key driver of food store choice[41,56] and was discussed in fifteen articles from the Netherlands, USA and UK. Contrary to this, however, the availability of fresh produce was often referred to as unreliable and sporadic[36,45], especially in lower socio-economic areas. Corner stores and mini-markets were described as having less variety[48,53] and fewer (if any) healthy items or alternatives[42,44–46,57] than supermarkets[44,45]. Local food stores tended to be stocked with unhealthy snack foods, cold drinks, cigarettes and beer[45]. Consequently this limited the variety of healthy food people had access to, particularly if they were reliant on corner stores for their food purchasing[57]:

> 'Far as fruit, there ain't no fruit there [at the local convenience store]. I don't remember seeing no kind of, you know, like oranges, bananas, apples, tangerines, peaches; I don't see none of that down there. They ain't got no fruits or nothing.' (Freedman[45], p. 390)

In-store food quality

Nine articles, predominantly based in the USA, reported on customer concern regarding poor quality and safety of foods they could select from[41,42,48,53]. Consumers mentioned displays of withering fruit and vegetables[43,45,46,53], canned goods and meats close to expiration[43,47], and spoiled or rotting meats[42,46,48]. Consumers discussed closely inspecting food prior to purchasing[43] but also refusing to purchase fresh produce because of quality[58], opting to buy canned produce instead, or purchasing fresh foods from outside the community[45,46]. Reference was also made to deceptive sales practices utilised by stores to disguise spoiled produce[42], resulting in distrust of local food stores:

> 'I just take for granted when I go to the store that it's going to be fresh, but not around here; here sometimes you have to blow the dust off and check the date.' (Webber *et al.*[43], p. 300)

Food store characteristics or features

Eight articles (seven from the USA and one from the UK) identified specific features or characteristics of food stores that play a role in influencing a person's decision to frequent a particular store and make food purchases, including in-store promotions and product placement, as well as cleanliness and customer service. Such factors were mostly referred to in minority or lower socio-economic communities.

In-store promotions and product placement. In-store marketing, promotions and sales were discussed in relation to their influence on promoting purchasing decisions. These promotions were helpful for some who searched for items on sale[54], while others perceived them to be exploitive and complicated[43]. Specific reference was made to the heavy promotion of junk foods in terms of price, as well as their placement within the store to encourage unhealthy purchases[58]. Consumers often made comment on displays put at store entrances to catch their attention, 'wall of values' and junk foods placed directly in front of healthy items such as fresh produce[57]. It was also noted that promotions and sales rarely applied to fresh produce[43]:

> 'It's all the buy-one-get-one-free on big bars of chocolate and big cakes ... but you never see buy-one-get-one-free by big bags of fruit.' (Lawrence *et al.*[50], p. 1008)

Further to marketing and sales often favouring unhealthy foods, a couple of articles discussed the fact that healthier food items were not easily identifiable within store. They mentioned that healthy items were available but difficult to identify[58] due to their placement and marketing[46]. Although some stores had separate sections for their healthy products, there was a general lack of shelf labelling to identify such items, with labels usually used only to highlight product prices and specials[58].

Cleanliness. Store cleanliness was reported as an important determinant of store choice[56]. Clean stores were associated with perceptions of fresh and wholesome food[43] with customers also associating poor upkeep with poor-quality food[46]. Consumers discussed refusing to shop in a particular store if the cleanliness did not meet expectations[45,46]:

> 'I walked in the store and it was just like nasty… we're not fixing to get nothing from up out of here

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

> because they've got roaches and the floor is filthy dirty. I'm gone.' (Zenk *et al.*[46], p. 285)

Customer service. Poor attitudes and a lack of courtesy were identified as barriers to food purchasing and patronising certain stores[42,46]. Several articles discussed what patrons look for in terms of good customer service such as staff that are adequately trained[43,44], are helpful to customers in finding particular items[44,56] and reasonable management who a receptive to feedback and handling complaints[43]. Customers looked for welcoming environments where they were greeted upon arrival[56], made to feel accepted, treated with respect and on a first-name basis with management or employees. Customers expected a degree of service that was in line with the demeanour of the particular store; however, customers reported differing attitudes depending on the store they shopped in[43].

Theme 3: Other environmental factors

Influence of media and advertising

Four articles (two from the USA and one each from Canada and the UK) discussed the role of television-based media or outdoor advertising of fast food as influences on people's food choices. One article attributed the choice of out-of-home eating establishment to advertising and marketing techniques[37]. Media was identified as an important influence on diet[35] and children's pester power and request for unhealthy foods while grocery shopping was attributed to particular products being seen on television[59].

Other environmental factors

Factors broader than the food environment were also identified as having an influence on people's choice of shopping location such as neighbourhood characteristics and safety concerns, which were identified in four US-based articles. People spoke of being hassled by loiterers in front of food stores[46], nearby drug sales or alcohol-related violence[44] as well as general safety in grocery store car parks[56]. Personal safety was identified as a determinant of shopping location[48] with people choosing to avoid stores where they had heard of violent incidents occurring[56]:

> 'I don't really like going certain places … cause I just don't feel safe …' (Zenk *et al.*[46], p. 286)

Theme 4: Individual coping strategies for shopping and purchasing decisions

Coping strategies within the community nutrition environment

Sixteen articles from the USA, the UK and Mexico identified the resourcefulness of people in their use of food stores within the food environment to suit their needs and requirements. Thus consumers were seen to actively adapt to their local food environment[43,44]. Such strategies included shopping at multiple stores or locations[43,46,57,60] and also frequenting certain stores for specific purchases[43,44,46] due to both cost and preference considerations. For example, purchases made at corner stores were limited to just essential items because of their inflated prices[41,44,52,54,60]. People also chose to shop at stores that were most convenient in undertaking their errands or fit with their routine[44]. Others prioritised shopping convenience over all other factors[43,58] in an endeavour to frequent stores that were conveniently located[56], including shopping at the one location[43,55].

Coping strategies within the consumer nutrition environment

A number of individual approaches to food shopping and purchasing within food stores was discussed in twenty-four of the included articles from all study localities, with cost frequently referred to as the primary factor that dominated purchasing priorities, particularly for people of lower socio-economic status[39,41,42]. People sought to minimise purchasing costs at the expense of all other purchasing considerations. Cost was deemed to be a more important consideration than the nutritional quality of foods[36] and also dictated unhealthy food purchases regardless of people's preferences for healthier items[58]:

> 'I know exactly what we should be eating and what would be healthy and all that and I'm really frustrated that we can't eat that way … because there just ain't enough money ...' (Dammann and Smith[52], p. 246)

Cost was deemed a barrier to purchasing healthy items such as fruit and vegetables[17,35,50,56,58,61] in the USA, the UK and Australia, with healthy foods perceived as being more expensive[42] and unhealthy items seen as more cost-effective alternatives[58,61]. However, others found it more cost effective to buy fresh and seasonal foods rather than pre-packaged and pre-made items[59] or thought it was possible to eat healthily[51] if junk food purchases were reduced[38,52].

Regardless of study locality, articles discussed an array of in-store purchasing behaviours that people, predominantly of lower socio-economic status, applied to minimise the cost of their shopping. Techniques included searching for items on sale[43,49,51,54,57,58]; buying items in bulk[49,54,60]; comparing prices[41,58]; buying store brands[51,54]; settling for cheaper cuts of meat[51,60]; trying to get the best value for money[41,58,61]; and refusing to buy certain items if they were considered too expensive[43].

Consumers discussed the importance of ensuring an adequate quantity of food for their family rather than quality food within their budget constraints[51,52,56,58]. One article from the UK also discussed various in-store shopping styles routinely applied within the store environment, including 'restricted and budgeted' shoppers, characterised

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

by very controlled and planned purchases, often within the confines of price considerations[62].

For those of higher socio-economic status from US, Australian and Mexican populations, cost rarely drove purchasing decisions[39], which were instead prioritised by taste and food quality preferences, the convenience of accessing foods as well as the health benefits of their food choices[17,55].

Discussion

The current review sought to synthesise qualitative evidence regarding the influence of the local food environment on food and purchasing behaviours. Availability, accessibility and affordability were consistently identified as key determinants of store choice and purchasing behaviours that often resulted in less healthy food choices within community nutrition environments. Food availability and quality within stores, and food store characteristics within consumer nutrition environments, also greatly influenced in-store purchases. Media and advertising as well as other environmental characteristics each influenced food purchasing behaviours. People used a range of individual coping strategies in both the community and consumer nutrition environments to make optimal purchasing decisions, often within the context of financial constraints.

Findings also identified distinct differences in themes that emerged from the articles depending on whether they were based within US populations or elsewhere. It appeared that the key themes of affordability (within the community nutrition environment) and in-store food quality and food store characteristics or features (within the consumer nutrition environment) were more often discussed in articles from the USA. In addition to this, race-based factors were discussed solely in US-based articles. This potentially highlights between-country variations and thus contextual differences between food and social environments[63,64]. For example, while evidence tends to suggest the presence of cost and access disparities for low-income and minority communities in the USA, this is not necessarily consistent in other countries such as the UK[64,65]. Differences in the actual food environments and people's use of these between countries can make research undertaken in different contexts difficult to compare[1,64].

All but three articles had a specific focus on or discussed socio-economic factors both at the community or individual level and their influence on food acquisition. It was not surprising therefore that cost of food was continually identified as the most important influence. This finding reinforces the importance of socio-economic status and its contribution to disparities in food access, availability and cost, and is generally supported within the available literature[66–68].

Quality assessment outcomes of included articles were concerning for aspects of research design and reporting but were not formally used to separate study results. Poorer-quality articles were included, given their novelty and potential to still provide a rich and insightful contribution to the findings generated from the review. Regardless, there is a need to ensure high-quality and rigorous processes and reporting while undertaking future qualitative research endeavours.

Although the current review was focused on the role of environmental determinants on food behaviours, the synthesis identified challenges in seeking to explore environmental factors in isolation from other social-ecological determinants of behaviour. Indeed, consideration of the inequalities and challenges experienced by lower socio-economic and minority populations in accessing and making purchasing decisions within the food environment was key to consolidating findings across studies. Food and purchasing decisions are influenced by more than just the environment and thus the importance of intra- and interpersonal, social and cultural factors that influence behaviour must not be underestimated[69]. Policy and behavioural change interventions should still embrace a socio-ecological approach beyond exploration of the environmental determinants presented in the current review[70].

Synthesis also highlighted distinct individual approaches to food shopping and purchasing within the community and consumer nutrition environments, primarily due to socio-economic (financial) constraints. These approaches demonstrate the dynamic interplay between structural barriers that exist within the environment and the capacity of human agency when faced with limited community, social and financial resources[48], which cannot be overlooked in terms of the influence of solely environment on food behaviours[71]. An individual's agency is also underpinned by his/her motivation, ability and opportunity in undertaking certain behaviours[72], as seen by the array of coping mechanisms applied and demonstrated through people's resourcefulness and adaptation to their food environments to meet their purchasing requirements. However agency is limited, particularly if structural constraints are too difficult to overcome[48].

The current review is not without its limitations. The systematic search process included empirical literature published in peer-reviewed journals and thus did not incorporate grey literature, government reports or forthcoming research, potentially missing other important contributions in the field. Furthermore, the scope of the review was limited to including only community and consumer food environments and therefore excluded research in organisational environments including schools, childcare centres, workplaces and the home environment due to the additional breadth and diversity of outcomes that would result from their inclusion. A vast majority of the included articles (n 19) were from research undertaken in the USA and given the variability within these food environments and also compared with other countries, this could impact the applicability of findings and result in an inability to make generalisations to different populations. Finally, the

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

review did not incorporate synthesised results regarding food security issues and the use of food assistance programmes; although mentioned in a number of articles (*n* 9), it was deemed this topic could not be adequately addressed within the chosen scope of the review, given its breath, scope and complexity.

To our knowledge, the current systematic review is the first to synthesise qualitative research on the local food environment and food consumption and purchasing behaviours. The findings from this synthesis will assist in providing a deeper and more comprehensive understanding of environmental determinants within community and consumer nutrition environments that are consistent with findings from quantitative research in the field[64,66]. Moreover, they may help to explain the inconsistent quantitative associations found between the food environment and dietary behaviours by emphasising the complexity and diversity of contextual factors that exist within these environments.

Future research should focus on integrating findings from qualitative and quantitative food environment syntheses in order to generate both new and refined hypotheses for ongoing research into the associations between aspects of the food environment and health/diet-related behaviours. Given the significant focus of included articles on socio-economic determinants, future research could explore how different people use the same food environment; that is, what characteristics result in individuals using food environments in different ways. This synthesis provides a summation of qualitative literature that could be used to guide policy formation and continue to develop tailored and multicomponent interventions within food environment research.

Conclusion

Environmental factors continue to be identified as pertinent determinants of food store selection and purchasing behaviour. Regardless of an individual's ability to cope with less than optimal environments through the power of human agency, the environment needs to be modified and improved in order to maximise health-related outcomes. There is a need to investigate contextual influences within food environments as well as individual and household socio-economic characteristics that contribute to the differing use of and views towards local food environments. Greater emphasis on how individual and environmental factors interact in the food environment field will be key to developing stronger understanding of how environments can support and promote healthier food choices.

Acknowledgements

Financial support: E.P. was supported by a Griffith University Postgraduate Research Scheme scholarship. C.C. was supported by a Public Health Fellowship (grant number ID428254) from the National Health and Medical Research Council (NHMRC) Australia. This research did not receive any specific non-financial support. *Conflict of interest:* None. *Authorship:* E.P. conducted all searches, data extraction, quality appraisal, synthesis of results and writing the manuscript. D.G. and L.T. contributed to the synthesis of results. All authors contributed to the conceptual design of the research, editing and approval of the final manuscript prior to submission. *Ethics of human subject participation:* Ethical approval was not required for this paper as articles included in this systematic review and the findings generated were from existing studies available in the public domain.

Supplementary material

To view supplementary material for this article, please visit http://dx.doi.org/10.1017/S1368980017001069

References

1. Lake A & Townshend T (2006) Obesogenic environments: exploring the built and food environments. *J R Soc Promot Health* **126**, 262–267.
2. Story M, Kaphingst KM, Robinson-O'Brien R *et al.* (2008) Creating healthy food and eating environments: policy and environmental approaches. *Annu Rev Public Health* **29**, 253–272.
3. Popkin BM, Duffey K & Gordon-Larsen P (2005) Environmental influences on food choice, physical activity and energy balance. *Physiol Behav* **86**, 603–613.
4. Hayes A, Australian Institute of Family Studies (2011) *Families in Australia 2011: Sticking Together in Good and Tough Times*. Melbourne: Australian Institute of Family Studies.
5. Bodor JN, Rose D, Farley TA *et al.* (2008) Neighbourhood fruit and vegetable availability and consumption: the role of small food stores in an urban environment. *Public Health Nutr* **11**, 413–420.
6. Jetter KM & Cassady DL (2006) The availability and cost of healthier food alternatives. *Am J Prev Med* **30**, 38–44.
7. Osei-Assibey G, Dick S, Macdiarmid J *et al.* (2012) The influence of the food environment on overweight and obesity in young children: a systematic review. *BMJ Open* **2**, e001538.
8. Holsten JE (2009) Obesity and the community food environment: a systematic review. *Public Health Nutr* **12**, 397–405.
9. Glanz K, Sallis JF, Saelens BE *et al.* (2005) Healthy nutrition environments: concepts and measures. *Am J Health Promot* **19**, 330–333.
10. Caspi CE, Sorensen G, Subramanian SV *et al.* (2012) The local food environment and diet: a systematic review. *Health Place* **18**, 1172–1187.
11. Black C, Moon G & Baird J (2014) Dietary inequalities: what is the evidence for the effect of the neighbourhood food environment? *Health Place* **27**, 229–242.
12. Cobb LK, Appel LJ, Franco M *et al.* (2015) The relationship of the local food environment with obesity: a systematic review of methods, study quality, and results. *Obesity (Silver Spring)* **23**, 1331–1344.
13. Engler-Stringer R, Le H, Gerrard A *et al.* (2014) The community and consumer food environment and children's diet: a systematic review. *BMC Public Health* **14**, 522.

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

14. Williams LK, Veitch J & Ball K (2011) What helps children eat well? A qualitative exploration of resilience among disadvantaged families. *Health Educ Res* **26**, 296–307.
15. Christiansen KM, Qureshi F, Schaible A *et al.* (2013) Environmental factors that impact the eating behaviors of low-income African American adolescents in Baltimore City. *J Nutr Educ Behav* **45**, 652–660.
16. Watts AW, Lovato CY, Barr SI *et al.* (2015) Experiences of overweight/obese adolescents in navigating their home food environment. *Public Health Nutr* **18**, 3278–3286.
17. Inglis V, Ball K & Crawford D (2005) Why do women of low socioeconomic status have poorer dietary behaviours than women of higher socioeconomic status? A qualitative exploration. *Appetite* **45**, 334–343.
18. Williams L, Ball K & Crawford D (2010) Why do some socioeconomically disadvantaged women eat better than others? An investigation of the personal, social and environmental correlates of fruit and vegetable consumption. *Appetite* **55**, 441–446.
19. Nollen NL, Befort CA, Snow P *et al.* (2007) The school food environment and adolescent obesity: qualitative insights from high school principals and food service personnel. *Int J Behav Nutr Phys Act* **4**, 18.
20. Watts AW, Lovato CY, Barr SI *et al.* (2015) A qualitative study exploring how school and community environments shape the food choices of adolescents with overweight/obesity. *Appetite* **95**, 360–367.
21. Inglis V, Ball K & Crawford D (2008) Socioeconomic variations in women's diets: what is the role of perceptions of the local food environment? *J Epidemiol Community Health* **62**, 191–197.
22. Mazarello Paes V, Ong KK & Lakshman R (2015) Factors influencing obesogenic dietary intake in young children (0–6 years): systematic review of qualitative evidence. *BMJ Open* **5**, e007396.
23. Krolner R, Rasmussen M, Brug J *et al.* (2011) Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part II: qualitative studies. *Int J Behav Nutr Phys Act* **8**, 112.
24. Dixon-Woods M, Bonas S, Booth A *et al.* (2006) How can systematic reviews incorporate qualitative research? A critical perspective. *Qual Res* **6**, 27–44.
25. Moher D, Liberati A, Tetzlaff J *et al.* (2009) Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA Statement. *PLoS Med* **6**, e1000097.
26. Lytle LA (2009) Measuring the food environment: state of the science. *Am J Prev Med* **36**, 4 Suppl., S134–S144.
27. Tong A, Flemming K, McInnes E *et al.* (2012) Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Med Res Methodol* **12**, 181–188.
28. Dixon-Woods M, Shaw RL, Agarwal S *et al.* (2004) The problem of appraising qualitative research. *Qual Saf Health Care* **13**, 223–225.
29. Critical Appraisal Skills Programme (2013) *10 Questions to Help You Make Sense of Qualitative Research*. Oxford: Critical Appraisal Skills Programme.
30. McInnes RJ & Chambers JA (2008) Supporting breastfeeding mothers: qualitative synthesis. *J Adv Nurs* **62**, 407–427.
31. Ring N, Ritchie K, Mandava L *et al.* (2010) *A Guide to Synthesising Qualitative Research for Researchers Undertaking Health Technology Assessments and Systematic Reviews*. Scotland: NHS Quality Improvement Scotland; available at http://www.nhshealthquality.org/nhsqis/8837.html
32. Centre for Reviews and Dissemination (2008) *Systematic Reviews: CRD's Guidance for Undertaking Reviews in Health Care*. York: University of York.
33. Thomas J & Harden A (2008) Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol* **8**, 45.
34. Rawlins E, Baker G, Maynard M *et al.* (2013) Perceptions of healthy eating and physical activity in an ethnically diverse sample of young children and their parents: the DEAL prevention of obesity study. *J Hum Nutr Diet* **26**, 132–144.
35. Lucan SC, Barg FK, Karasz A *et al.* (2012) Perceived influences on diet among urban, low-income African Americans. *Am J Health Behav* **36**, 700–710.
36. James DC (2004) Factors influencing food choices, dietary intake, and nutrition-related attitudes among African Americans: application of a culturally sensitive model. *Ethn Health* **9**, 349–367.
37. McGuffin LE, Price RK, McCaffrey TA *et al.* (2015) Parent and child perspectives on family out-of-home eating: a qualitative analysis. *Public Health Nutr* **18**, 100–111.
38. Withall J, Jago R & Cross J (2009) Families' and health professionals' perceptions of influences on diet, activity and obesity in a low-income community. *Health Place* **15**, 1078–1085.
39. Yen IH, Scherzer T, Cubbin C *et al.* (2007) Women's perceptions of neighborhood resources and hazards related to diet, physical activity, and smoking: focus group results from economically distinct neighborhoods in a mid-sized US city. *Am J Health Promot* **22**, 98–106.
40. Kamphuis CB, van Lenthe FJ, Giskes K *et al.* (2007) Perceived environmental determinants of physical activity and fruit and vegetable consumption among high and low socioeconomic groups in the Netherlands. *Health Place* **13**, 493–503.
41. Piacentini M, Hibbert S & Al-Dajani H (2001) Diversity in deprivation: exploring the grocery shopping behaviour of disadvantaged consumers. *Int Rev Retail Distrib Consum Res* **11**, 141–158.
42. Munoz-Plaza CE, Filomena S & Morland KB (2008) Disparities in food access: inner-city residents describe their local food environment. *J Hunger Environ Nutr* **2**, 51–64.
43. Webber CB, Sobal J & Dollahite JS (2010) Shopping for fruits and vegetables. Food and retail qualities of importance to low-income households at the grocery store. *Appetite* **54**, 297–303.
44. Cannuscio CC, Hillier A, Karpyn A *et al.* (2014) The social dynamics of healthy food shopping and store choice in an urban environment. *Soc Sci Med* **122**, 13–20.
45. Freedman DA (2009) Local food environments: they're all stocked differently. *Am J Community Psychol* **44**, 382–393.
46. Zenk SN, Odoms-Young AM, Dallas C *et al.* (2011) You have to hunt for the fruits, the vegetables: environmental barriers and adaptive strategies to acquire food in a low-income African American neighborhood. *Health Educ Behav* **38**, 282–292.
47. Kumar S, Quinn SC, Kriska AM *et al.* (2011) Food is directed to the area: African Americans' perceptions of the neighborhood nutrition environment in Pittsburgh. *Health Place* **17**, 370–378.
48. Rose DJ (2011) Captive audience? Strategies for acquiring food in two Detroit neighborhoods. *Qual Health Res* **21**, 642–651.
49. Clifton KJ (2004) Mobility strategies and food shopping for low-income families – a case study. *J Plann Educ Res* **23**, 402–413.
50. Lawrence W, Skinner C, Haslam C *et al.* (2009) Why women of lower educational attainment struggle to make healthier food choices: the importance of psychological and social factors. *Psychol Health* **24**, 1003–1020.
51. Whelan A, Wrigley N, Warm D *et al.* (2002) Life in a 'food desert'. *Urban Stud* **39**, 2083–2100.
52. Dammann KW & Smith C (2009) Factors affecting low-income women's food choices and the perceived impact of

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069

dietary intake and socioeconomic status on their health and weight. *J Nutr Educ Behav* **41**, 242–253.
53. Hendrickson D, Smith C & Eikenberry N (2006) Fruit and vegetable access in four low-income food deserts communities in Minnesota. *Agric Hum Values* **23**, 371–383.
54. Tach L & Amorim M (2015) Constrained, convenient, and symbolic consumption: neighborhood food environments and economic coping strategies among the urban poor. *J Urban Health* **92**, 815–834.
55. Bridle-Fitzpatrick S (2015) Food deserts or food swamps? A mixed-methods study of local food environments in a Mexican city. *Soc Sci Med* **142**, 202–213.
56. Krukowski RA, McSweeney J, Sparks C *et al.* (2012) Qualitative study of influences on food store choice. *Appetite* **59**, 510–516.
57. Lindsay AC, Sussner KM, Greaney ML *et al.* (2009) Influence of social context on eating, physical activity, and sedentary behaviors of Latina mothers and their preschool-age children. *Health Educ Behav* **36**, 81–96.
58. Zachary DA, Palmer AM, Beckham SW *et al.* (2013) A framework for understanding grocery purchasing in a low-income urban environment. *Qual Health Res* **23**, 665–678.
59. Dwyer J, Needham L, Simpson JR *et al.* (2008) Parents report intrapersonal, interpersonal, and environmental barriers to supporting healthy eating and physical activity among their preschoolers. *Appl Physiol Nutr Metab* **33**, 338–346.
60. Wiig K & Smith C (2009) The art of grocery shopping on a food stamp budget: factors influencing the food choices of low-income women as they try to make ends meet. *Public Health Nutr* **12**, 1726–1734.
61. Baruth M, Sharpe PA, Parra-Medina D *et al.* (2014) Perceived barriers to exercise and healthy eating among women from disadvantaged neighborhoods: results from a focus groups assessment. *Women Health* **54**, 336–353.
62. Thompson C, Cummins S, Brown T *et al.* (2013) Understanding interactions with the food environment: an exploration of supermarket food shopping routines in deprived neighbourhoods. *Health Place* **19**, 116–123.
63. Macintyre S (2007) Deprivation amplification revisited; or, is it always true that poorer places have poorer access to resources for healthy diets and physical activity? *Int J Behav Nutr Phys Act* **4**, 32.
64. Cummins S & Macintyre S (2006) Food environments and obesity – neighbourhood or nation? *Int J Epidemiol* **35**, 100–104.
65. Cummins SC (2003) The local food environment and health: some reflections from the United Kingdom. *Am J Public Health* **93**, 521, author reply 521–522.
66. Walker RE, Keane CR & Burke JG (2010) Disparities and access to healthy food in the United States: a review of food deserts literature. *Health Place* **16**, 876–884.
67. Dubowitz T, Heron M, Bird CE *et al.* (2008) Neighborhood socioeconomic status and fruit and vegetable intake among whites, blacks, and Mexican Americans in the United States. *Am J Clin Nutr* **87**, 1883–1891.
68. Morland K, Wing S & Diez Roux A (2002) The contextual effect of the local food environment on residents' diets: the atherosclerosis risk in communities study. *Am J Public Health* **92**, 1761–1767.
69. Richard L, Gauvin L & Raine K (2011) Ecological models revisited: their uses and evolution in health promotion over two decades. *Annu Rev Public Health* **32**, 307–326.
70. Sallis JF & Glanz K (2009) Physical activity and food environments: solutions to the obesity epidemic. *Milbank Q* **87**, 123–154.
71. Kremers SP, de Bruijn GJ, Visscher TL *et al.* (2006) Environmental influences on energy balance-related behaviors: a dual-process view. *Int J Behav Nutr Phys Act* **3**, 9.
72. Brug J (2008) Determinants of healthy eating: motivation, abilities and environmental opportunities. *Fam Pract* **25**, Suppl. 1, i50–i55.

Downloaded from https://www.cambridge.org/core. Deakin University, Australia (Journals), on 05 Sep 2017 at 04:52:31, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1368980017001069