



The impacts of kitchen and dining spatial design on cooking and eating experience in residential buildings: a scoping review

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Abstract

The built environment is a factor widely known to have significant impacts on dietary behaviours and the promotion of healthy food practices. Yet, there is limited understanding of the influential design features of domestic cooking and eating spaces on food practices. This systematic scoping review aimed to provide an overview of the body of knowledge (by identifying and classifying different design features of domestic kitchen and dining area and their impact on the cooking/eating experiences generally and in different age cohorts), as well as explore knowledge gaps to aid the planning of future research. In total, 27 articles met the selection criteria for the analysis, most of which were qualitative, from the USA, the UK, and Australia, and published from 2014 onwards. Influential design features associated with cooking/eating experiences included size and layout, connection to other spaces, fixture and fittings (including spatial ergonomics, materiality, and texture), and indoor environmental qualities (lighting, ventilation, visual access, and window views). Many of these features such as the provision of sufficient dining space were common requirements for a diversity of residents. However, kitchen layout and the significance of certain safety features to food practices differed according to age group. To conclude, it was noted that despite the range of studies reviewed, currently there is insufficient practical knowledge and evidence to inform design decisions. Further research using a multidisciplinary approach is required to explore the detail of kitchen design features and individuals' food practices to provide recommendations for future design policy.

Keywords Cooking and eating space · Kitchen design · Dining area design · Cooking and eating experience · Dietary behaviour · Healthy food practice

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1 Introduction

In the last four decades, significant changes in food practices and dietary behaviours have occurred in many high-income countries, including Australia and the USA (Popkin et al., 2012; Ronto et al., 2018; Venn et al., 2017), while rates of obesity and overweight are rising (AIHW, 2022b; CDC, 2022). Time spent in food preparation and cooking at home as well as expenditure on unprocessed foods (including fresh fruit, vegetables, and meat) has both decreased, whereas the consumption of commercially prepared foods has risen considerably (Hogan, 2018; Nielsen et al., 2002; Venn et al., 2017). This trend in food practices has led to interest in identifying and understanding the contextual factors that have impacted dietary intakes, from behavioural, motivational, educational, environmental, social, political, economic, and cultural approaches (Cohen & Babey, 2012; French et al., 2001; Lam et al., 2021; Oostenbach et al., 2021; Sobal et al., 2014).

The built environment is one such factor that can substantially impact food decisions and eating behaviours (Booth et al., 2005; Marshall & Bell, 2003; Rollings & Wells, 2017; Rosenkranz & Dzewaltowski, 2008). The built environment operates as a system of influences on human activities and well-being, the design of which involves various scales, ranging from city to neighbourhood, to building, to furniture, to atmospherics (Evans & McCoy, 1998; Gifford et al., 2011; Wang et al., 2021). For example, at the neighbourhood scale, evidence suggests that through zoning and land-use regulation, the built environment can be manipulated to support or inhibit healthy eating options such as children's access to healthy/unhealthy food options around schools (Kestens & Daniel, 2010), while at the building scale, supermarket design can be manipulated to promote easy access to unhealthy food through product placement that encourages impulse (Cameron, 2018; Thornton et al., 2012). There is thus a wide range of built environment factors affecting the acquisition of attitudes and behaviours towards food, of which individuals might not be aware (Edwards et al., 2021; Swinburn et al., 1999). Given that most food preparation and consumption occur within the home (AIHW, Kombanda et al., 2022; Smith et al., 2013), an understanding of the design of cooking and eating spaces in residential buildings and its influences on dietary behaviours is particularly pertinent in trying to address growing rates of obesity in developed economies.

The literature widely acknowledges the health-promoting properties of home food preparation and the practice of family/shared meals in terms of dietary patterns, health status, and family/social relationships (Fulkerson et al., 2014; Leech et al., 2014; Tani et al., 2019; Wolfson et al., 2020). However, research to date has mostly focused on household resources, food preferences, and broader norms in relation to food practices (Thompson et al., 2016, p. 322), rather than the influence of home built environment. The literature examining the impacts of the design of kitchen and dining spaces on the practices of cooking and eating, despite spanning disciplines including nutrition, public health, urban planning, epidemiology, social and behavioural sciences, environmental psychology and behavioural geography, remains relatively sparse (Glanz et al., 2016). Indeed, in the case of cooking/eating spaces, emphasis is mostly on public facilities, including canteens (Clinton-McHarg et al., 2018; Lake & Townshend, 2006; Mandraccia et al., 2021; Skov et al., 2013); dining halls in schools; dining areas in long-term care facilities and nursing homes (Brush et al., 2002; Chaudhury et al., 2013, 2017; Liu et al., 2017); and dining areas and table settings in restaurants (García-Segovia et al., 2015). There is thus a gap in our understanding of home kitchen design and food practices.

Via a cross-disciplinary approach, this paper aims to provide an overview of the body of knowledge on kitchen design and food practices that is heterogeneous in concepts, methods and disciplines, as well as identify knowledge gaps to aid the planning of future research. A systematic process is used to review existing literature to address the research question: What is known about the design features of cooking/eating spaces in residential buildings and their impacts on food practices? In total, the review found 1424 records, of which 27 met the selection criteria for the analysis. This paper begins with a short explanation of how kitchens and dining rooms are designed and experienced today. Next, the key role of these spaces in promoting healthy dietary behaviours is explained, and special design features characterising them are defined. The systematic methodological steps are outlined in Sect. 3 before analysing the selected articles in Sect. 4 and discussing the implications of findings in part Sect. 5.

2 Background

The evolution of domestic kitchen design in developed economies over the past 100 years has been widely studied from different perspectives (Le Bel & Kenneally, 2009). For instance, the twentieth-century kitchen has been investigated as a backdrop for understanding cultural preferences of individuals (Freeman & Freeman, 2004); as a unique site of gender, power and culture (Giudici, 2018; Johnson, 2006; Llewellyn, 2004); as a scientific space central in the integration of new technology in the home (Bullock, 1988; Hardyment, 1988; McGaw, 1984; Parr, 2002); as a prime place in protecting families from infectious diseases (Moody & Vineyard, 2008); as a market-consumption junction, where the scarcity of resources in food markets and the lack of time to prepare food for consumption occurred (Stigzelius et al., 2018); and as an important function of the home responding to new sustainability and circularity design challenges (Ollár, 2021). Evidently, many contextual factors have impacted the evolution of domestic kitchen design, including industrialisation, the changing role of women, architectural science, and food safety.

In the past two decades, due to the success of technological inventions, the kitchen has become increasingly *nomadic* (Giudici, 2018). Today's kitchen has many meanings: it is a functional space containing multiple artefacts and technologies, *food environment*, *place of storage*, *activity space*, and *central hub* (Le Bel & Kenneally, 2009; Peace et al., 2018, p. 257; Stigzelius et al., 2018). Here, a series of detachable, movable, and manageable objects shape the kitchen and ensure that it is safe, convenient, and accessible for all members of the household—even children (Ledin & Machin, 2019). Notably, these technological advances have been globally accompanied by a significant shift to higher density living for families. Since apartments are generally smaller than residential-detached houses (Rosewall & Shoory, 2017), this trend may lead to considerable changes in occupants' lifestyles, and thereby food behaviours (Shove et al., 2012). However, the impacts on cooking and eating experiences of specific environmental and design qualities in different residential typologies in developed economies remain to be examined.

2.1 Importance of kitchen/dining spaces for healthy food practice

Home food preparation, cooking with household members, and shared meals have widely been associated with healthy dietary behaviour and food practice. For example, the frequency of eating meals as a family has direct, significant influences on dietary intake

and psychosocial outcomes for children and adolescents (Gillman et al., 2000; Harrison et al., 2015). Experiencing more frequent family meals results in greater fruit and vegetable consumption (Christian et al., 2013); lower risk of overweight or obesity in children and adolescents (Martin-Biggers et al., 2014); lower levels of depressive symptoms and stress (Fulkerson et al., 2006; Utter et al., 2018); higher levels of family functioning and greater self-esteem (Lawrence & Plisco, 2017; Utter et al., 2018); and higher well-being scores (Utter et al., 2013). Moreover, home food preparation is associated with a lower risk of developing type 2 diabetes (T2D) (Zong et al., 2016). The literature also shows that children's engagement in food preparation at home has a protective effect on their dietary intake and weight, increases higher fruit and vegetable preference (Chu et al., 2013; Laska et al., 2012), and positively affects children's mental health as well as eating behaviours (Tani et al., 2021). The authors highlighted the importance of designing a space that encourages caregivers to cook, involve children in this practice, and establish connections with them. This context positions the kitchen and dining area of the residential buildings as privileged spaces for the promotion and protection of adequate and healthy food (Dunn et al., 2021; Edwards et al., 2021; Martins et al., 2021).

To understand the key role of kitchen/dining room design for healthy food practices, we adopted a multidisciplinary theory, known as *Affordances*. Affordance is a well-understood concept in many fields, including health and architecture (Maier et al., 2009; Robathan, 2020), and has been seen as promising in understanding desirable housing design features and how they become meaningful in everyday experiences (Coolen, 2015; Kuoppa et al., 2020). According to Gibson (1979, p. 127): "the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill". Here, the design affordances are understood as the properties of an environment as well as the human–environment relationships that allow activities and actions (Chemero, 2003). Thus, affordance is not equivalent to "function" as it is relational to the specific resident's intentions, needs, and perceptions (Clapham, 2011, p. 366), stemming from the reciprocal relationship between the resident and the dwelling in everyday activities. In housing studies, affordance has brought attention to the possibilities offered by a space for and with its occupants (Marco et al., 2022), allowing designers to scrutinise the living environment, experiences and practices (Coolen, 2006, 2015; Kuoppa et al., 2020). Unexpected behaviours occur when the affordances of designed structures were not correctly understood, or when structures create an environment in which novel behaviours can occur (Maier et al., 2009). Consequently, users interact with the designed building in ways the designers either did not or could not anticipate. This theoretical perspective applied to kitchen design allows us to explore the design of the kitchen, the human interaction with that design in terms of food practices and the changes/consequences when that design does not serve the residents' needs.

2.2 Spatial characteristics of cooking/dining area

Before commencing our analysis, we first identify what characterises the spatial design of kitchens and dining rooms in developed economies. While different studies highlighted some of the spatial characteristics of cooking/dining area (Edwards et al., 2021; Kang & Lee, 2016; Ollár et al., 2022), we focus on the classification provided by Ollár et al. (2022) and Kang and Lee (2016)—as they both suggest a comprehensive list of influential design features. In a recent study on the adaptive capacity of domestic kitchen space, Ollár et al. (2022) developed a framework representing nine prominent spatial characteristics of the

kitchen. Via a literature review, the authors identified aspects of kitchen that influence how it can be used, furnished, and experienced, and classified them as “*room organisation* (room typology, open floorplan, and doors), *built-in furniture* (kitchen typologies and kitchen island), *floor area of the kitchen and apartment, infrastructure, daylight and windows*, and *dining area*” (Ollár et al., 2022). Further, Kang and Lee (2016) analysed several universal design guidelines and suggested five criteria for the universal design of a kitchen, including clear floor space, workflow, universal reach range, area for later use, and safety. Here, *clear floor space* refers to the minimum floor space needed for users to access and use kitchen appliances and fixtures; *workflow* refers to efficient fixture layout for preparing food and carrying out household activities in relation to work process, relationships between each work centre, and length of countertops; *universal reach range* refers to the height and depth of the storage cabinets and countertops usable by people with various capabilities; *area for later use* refers to spaces provided for later installation of additional appliances in the same kitchen system in order to meet the needs of potential residents; and *safety* refers to design characteristics that prevent accidents.

Table 1 represents a list of design features characterising the spatial characteristics of domestic kitchens and dining rooms. The current paper uses this list as a basis for the thematic analysis.

3 Methods

Given the broad nature of our research question, what is known about the design features of cooking/eating spaces in residential buildings and their impacts on food practices? as well as the need to understand the cross-disciplinary body of literature in this area to inform practice (Munn et al., 2018; Tricco et al., 2018); a systematic scoping review methodology was selected. Scoping reviews require rigorous methods but are less rigid than standard systematic reviews, allowing the researcher to refine the research question and search terms iteratively as more is learnt about the topic and to include many different types of study designs (Arksey & O’Malley, 2005). This scoping review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist extension (Tricco et al., 2018). The prime objectives were to: (1) identify and classify different design features of the kitchen and dining area and their impact on cooking and eating habits in developed economies; (2) explore the cooking and eating experience in accordance with different age cohorts (children, adolescents, adults, and older adults. Sub-objectives were to classify how research was conducted and identify knowledge gaps in this field.

3.1 Search strategy

The review was completed in December 2021 and updated in February 2022. An initial search was conducted using a set of keywords developed from the key resources and authors’ knowledge (from the perspective of Architecture and Health). The keywords were refined based on the quantity and relevance of returned items. Here, Boolean operators were employed to narrow or broaden the search by using synonyms, acronyms, and other alternative terms. Search strategy and search terms were identified in collaboration with a specialist research librarian. The final search string consisted of two sets of search terms

Table 1 The spatial characteristics of domestic cooking/eating spaces (compiled from Kang & Lee, 2016; Ollár, 2021; Ollár et al., 2022)

Nom	Spatial design features	Description
1	Floor layout and room organisation	The relationship of kitchen/dining room with other functional spaces within home influences its use and experience of households. For instance, the open-plan floor suggests the integration of kitchen, dining, and living rooms that creates a feeling of spaciousness and enables social activities
2	Size and shape of the kitchen/dining room	This feature has a direct impact on design compliance with universal design criteria, including clear floor space, workflow, area for later use, and safety. Here, sufficient free floor areas at work units, around the dining area and in front of doors are necessary. Further, size and shape significantly influence the existence/dearth of essential furniture allowing certain activities in the space
3	Kitchen/dining room layout	Kitchen/dining room layout influences the arrangement of built-in furniture (including cabinets, storage, kitchen island, and some appliances), known as kitchen typology. Here, four prime typologies, I-kitchen, L-kitchen, parallel-kitchen and U-kitchen, are commonly used for furniture placement
4	Fixture layout and infrastructure (electrical and mechanical systems)	Three types of infrastructure impact the usability of the cooking area, including the electrical outlets, plumbing and ventilation system. An efficient fixture layout for main kitchen appliances (sink, stove and fridge), an adequate number of and well-positioned power outlets, and efficient exhaust fans are crucial in meeting universal design criteria and creating a comfortable environment for cooking/eating experiences. It is also suggested that fixture layout should provide a degree of spatial flexibility and adjustability
5	Built-in furniture and fitting	Furniture and fitting must comply with the universal reach range, addressing the diverse needs of households
6	Windows (view, daylight and natural ventilation)	Providing sufficient daylight and window surfaces is important for the everyday activities carried out in the kitchen. This must be complemented with electric lighting, especially above work surfaces
7	Material (texture and colour)	Materials used for walls, floor, and built-in furniture influence individuals' perceptions, cleaning processes, and safety rates (related to falls and errors)

describing cooking and eating space and experience, and the third set of terms to limit the search (see Table 2).

Peer-reviewed articles (excluding PhD theses and conference papers) written in English were exported from nine major online databases relevant to health and design disciplines [Scopus, Web of Science, Avery Index Architecture, Art and Architecture Complete, APA PsycInfo, SocIndex, CINAHL Complete (EBSCO), Global Health (EBSCO), and Medline Complete (EBSCO)]. The results from each database are provided in Fig. 1. Here, the Covidence online tool was used to manage and organise the results (Covidence systematic review software, 2020). Furthermore, backward and forward “snowball” searches were also conducted on the articles returned from full-text assessment, resulting in the addition of 279 articles (see Greenhalgh & Peacock, 2005; Wohlin, 2014).

3.2 Data extraction and synthesis

Two researchers (ASM and FJA) independently identified, reviewed, and selected relevant literature for eligibility assessment following PRISMA’s four-step guidelines for systematic reviews. After removing duplications, the returned items were filtered in Covidence by comparing the titles and abstracts to the eligibility criteria. Once all records were compiled, the full text of potentially eligible articles was reviewed for the final selection of articles, and the reason for exclusion was identified. Here, records were excluded principally on relevance to the research question and without any limitation on the research context (e.g. research not conducted in developed economies) or publication date. Disagreements between the two reviewers were minimal (on four articles) and resolved by a discussion between all the authors.

Table 2 List of search terms

Search concept	Search terms*
Cooking/eating space	"kitchen design" OR "kitchen layout" OR "kitchen plan" OR "kitchen area" OR "kitchen spa*" OR "kitchen environment" OR "kitchen architecture" OR "kitchen size" OR "kitchen light*" OR "open plan kitchen" OR "cooking area" OR "cooking space" OR "cooking and eating area" OR "cooking and eating space" OR "dining area" OR "dining spa*" OR "dining layout" OR "dining room design" OR "dining environment" OR "dining light*" OR "eating area" OR "eating space" or "dining room size" OR "dining table" OR "design of kitchen" OR "design of dining" OR "design of cooking" OR "design of eating" OR "prep* space" OR "prep* area" OR "bench top" OR "benchtop" OR "storage space" OR "storage design" OR "storage area" OR "dirty kitchen" OR "cater* kitchen" OR "scullery kitchen" OR "secondary kitchen"
Cooking/eating experience	dining OR cooking OR eating OR "family meal*" OR "shared meal" OR "mealtime experience" OR "dietary behaviour" OR "dietary habit*" OR "eating disorder" OR "food practice" OR "feeding practice" OR "food behaviour" OR "food choice" OR "family interaction" OR "family relationship" OR "family bond" OR "children's engag*" OR "children's involve*" OR "children engag*" OR "children involve*"
Excluded	hospital OR restaurant OR office "long-term care" OR "nursing home" OR "aged-care" OR tobacco OR "childcare"

*To include all variations of search terms, we refined the search string using advanced search features of each database

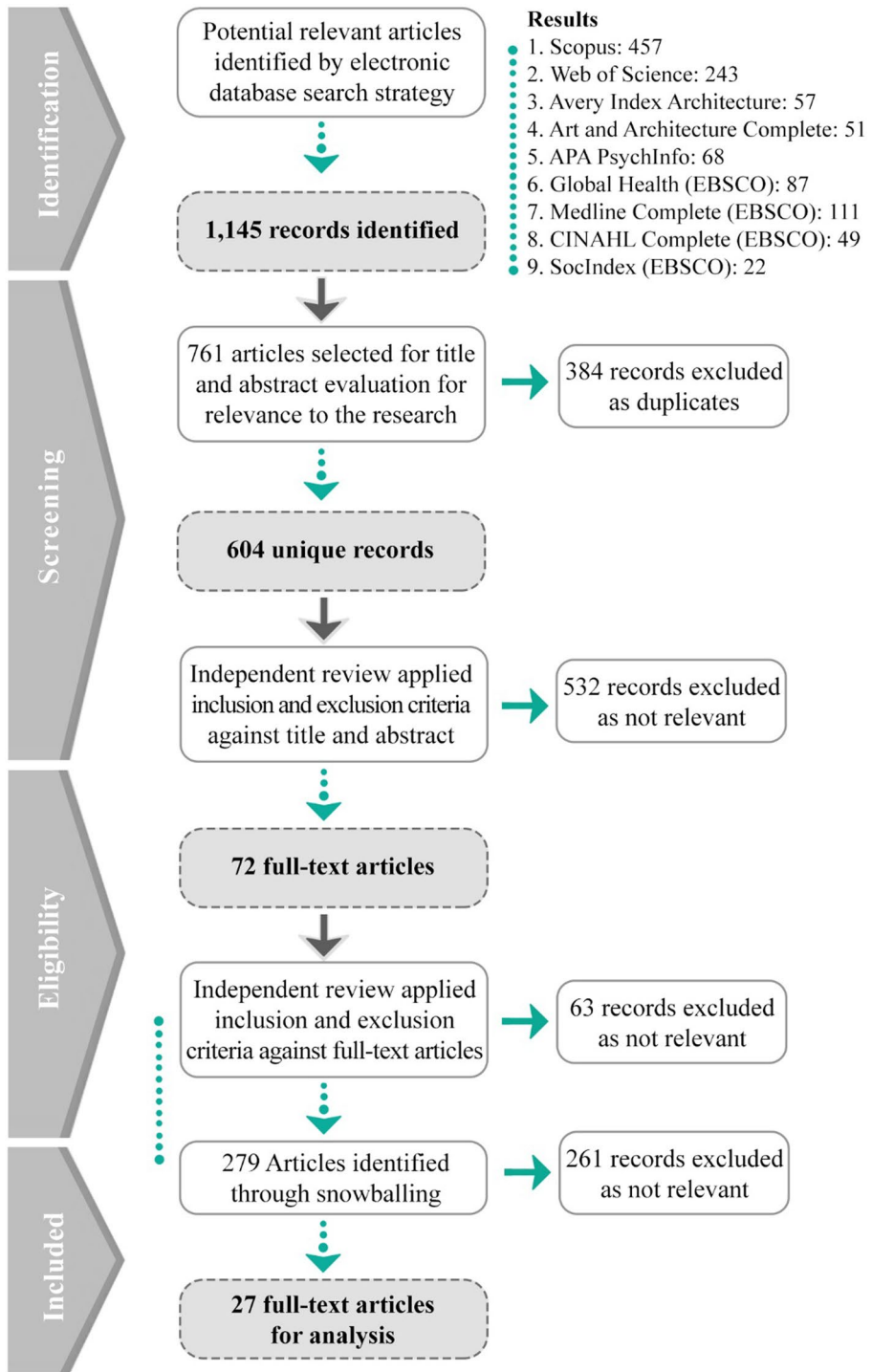


Fig. 1 Literature flow

In total, we included 27 articles for analysis (see Fig. 1). The data from the total sample were tabulated according to seven fields: study (title, authors, year), type of study, country of study, aim, methodology, spatial design, and cooking and eating experience (see supplementary file). Extracted data were synthesised and compared across publications to identify recurring patterns. Via thematic analysis, design features investigated in the records were classified according to the special characteristics identified in Table 1 and then collapsed into four prime themes: *Kitchen Size and Layout*, *Fixture and Furniture*, *Environmental Quality*, and *Dining Area Layout and Furniture*. Then, the associated impacts of these features were sorted in terms of residential type and specific groups of dwellers (families with children and the elderly).

4 Findings

4.1 Study methodologies and disciplines

Two-thirds of the articles were qualitative, with four studies using a quantitative approach and four mixed methods (Table 3). Of the 19 qualitative studies, three were literature reviews with no systematic approaches in data collection. Sixteen qualitative studies involved primary data collection, mostly using interviews, surveys, and questionnaire instruments with coding and thematic analytical techniques. The quantitative studies employed a wide range of research strategies as well as data collection and analysis, ranging from randomised controlled trials to single experimental studies. Similarly, the mixed method studies used various qualitatively and quantitatively driven research strategies to collect and analyse data. In total, there was only one meta-analysis study, classified in the third group that addressed the research question indirectly. This points to a paucity of systematic empirical research and standard method of research into the design of cooking/eating areas. Notably, multidisciplinary and multi-perspective approaches were common among the studies, with architecture as well as nutritional, social, and health sciences as the dominant fields.

In the following subsections, we discuss the impacts of four specific design features on cooking/eating practices highlighted by the 27 articles reviewed: (1) Kitchen size and layout; (2) Fixture and fittings; (3) Environmental quality; and (4) Dining area layout and furniture. Here, design features were sorted in relation to activities/experiences for food preparation, family interaction, and effective family/shared meal practice.

4.2 Kitchen size and layout

Kitchen size and layout was investigated in relation to the key role of the kitchen in food preparation, social interactions between household members, and enhancing shared meal practices. The literature highlighted the importance of the centrality of the kitchen floor layout as a prime domestic foodscape—whether as a room by itself or in a more open-plan configuration—which can enable interactions to occur (Le Bel & Kenneally, 2009; Miller & Maxwell, 2003; Ramsamy-Iranah et al., 2021). An open-plan kitchen was especially important for families with children, encouraging children to observe and participate in home cooking (Dunn et al., 2021). Further, a visible kitchen supported parents' home cooking by allowing them to multitask and observe children playing and doing homework in the same space (Miller & Maxwell, 2003). In terms of specific layout, Cho and Lee

Table 3 Methodological choices of the sample

Type of method	Field of study	Design features	Studies
<i>Qualitative</i>			
Literature review	Nutritional science; Social science: human and community development	Components of the eating environment; Properties of a formal dining area	3 19
Case study	Architecture	Kitchen design—user expectations	1
Observation and interview	Computer Science	Kitchen layout and links between kitchen, dining and living rooms; Arrangement and position of kitchen components	2
Interview; semi-structured interview	Interior design; Social and health science; Environmental science; Architecture; Population health science; Nutritional science	Area and links between kitchen, dining and living rooms; Kitchen size and layout; Arrangement and position of kitchen components; Dining table for family meal	8
Survey—statistical analysis; modelling	Architecture; Social and public health sciences	Storage and window design—user expectations; Dining area and TV	3
Photo elicited interviews—thematic analysis	Nutritional science; Health Science; Humanities and social sciences	Apartment size and kitchen/dining room layout	2
<i>Quantitative</i>			
Randomised controlled trials	Nutritional science	Dining table for family meal	1 4
Demographic data—statistical analysis	Nutritional science; Health science	Dwelling type	1
Questionnaire	Economics and management	Dining table for family meal	1
Survey (telephone survey)	Public health science	Dining table for family meal	1
<i>Mixed methods</i>			
Meta-analysis	Social science; human development	Dining table for family meal	1 4
Survey and drawings—statistical analysis and content analysis	Business; Architecture	Centrality of kitchen, importance of dining table	1
Observation (videotaped mealtimes)—thematic coding and statistical analysis	Nutritional science	Dining table for family meal	1
Observation (24-h dietary recalls, anthropometry, video-recorded meals, and survey)—thematic coding and statistical analysis	Community health science	Dining area and TV	1

(2021) investigated different types of kitchen designs suitable for low-income families with children, including a semi-closed layout with a sink attached to the wall and a narrow face-to-face kitchen with living room. The authors indicated that while the first design was more spacious and easier to use, the latter option facilitated supervision of children when playing in the living room.

Kitchens also need to be of adequate size to enable families to prepare food and dine together. One study examined an intervention that provided families with meal plans, recipes, and ingredients to cook meals at home (Utter & Denny, 2016). The authors found that lack of space for food preparation in the kitchen and the absence of a large enough table for the entire family to sit around were two significant issues hampering the participation of family members in cooking and eating family meals. Similarly, Miller and Maxwell (2003) argued that a kitchen needs to be large enough to allow more than one person to be involved in food preparation. These authors and those who researched kitchen design for elderly residents (Maguire et al., 2014; Peace, 2016) all emphasised the importance of a kitchen large enough to accommodate a table to support home cooking and dining.

The size of kitchens in apartments has received particular attention because of the generally reduced dimensions of this housing form. Three recent studies highlighted the adverse impacts of small-sized kitchen and dining areas in apartment on individuals' cooking/eating experience. Dunn et al. (2021), Thornton et al. (2020) and Carroll et al. (2011) discussed how the lack of space for food storage, food preparation, and a dining table could make families compromise their desired food practices, while Thornton et al. (2020) noted how households often had to adjust food practices in apartments but also created ingenious solutions to overcome design barriers. In one study, apartment living was also associated with less home food cooking, with Oostenbach et al., (2021, p. 2141) arguing that barriers created by the size and poor "internal design of apartments" should be studied in future research.

4.3 Fixture and fittings

Several studies discussed how the design of kitchen fixtures and fittings such as storage areas and food preparation areas could influence food practices. In their literature review, Sobal and Wansink (2007) described how the design of kitchen built-in furniture and fittings (such as shelves and kitchen benches) influenced what and how much people ate through both accessibility and visibility. Accessibility to foods and beverages within a room shaped how much individuals consume, with experiments reporting that more accessible foods were consumed more often and in greater quantities. The visibility of food within a room was also seen to increase the salience of food to potential food consumers in the room and increase consumption by failing to provide cues that serve as stopping points in the food consumption process. Another study focused specifically on storage design; Hagejård et al. (2020) found that insufficient or unsuitable storage spaces for vegetables lead to faster decay, impeding the frequent use of vegetables. The authors also stressed the need for an adequate workspace to support various cooking techniques, especially when preparing vegetables.

Kitchen fixtures and fittings were also explored in relation to food practices for specific groups of residents. Dunn et al. (2021) noted that kitchen bench space should be located away from stove tops, to allow children to be involved in food preparation. In another study, it was argued that kitchen design can enhance the quality of life for the elderly if focused on the *use of* and *daily routine activities* within these spaces for different needs as

people age (Maguire et al., 2014, p. 74). Where this did not occur food practices were compromised. For example, Ramsamy-Iranah et al. (2021) showed that in homes with poorly designed kitchen/dining areas, elderly preferred to eat in front of the TV. Another study found that design issues made preparing and eating food for elderly residents “unsafe, tedious, and no longer enjoyable” (Forlizzi et al., 2004, p. 47).

The literature on the specifics of age-inclusive design of cooking/eating areas highlighted four serious design shortcomings leading to cooking difficulties and significant safety issues for the elderly. First, kitchen environments often fail ergonomically in relation to the height and positioning of cabinets/shelves, resulting in accessibility problems to shelves and the storage of unnecessary appliances and food on kitchen countertops (Forlizzi et al., 2004; Peace, 2016). Second, poorly designed built-in furniture, along with the arrangement and position of work centres and kitchen appliances, might create challenges related to mobility, reaching and bending that affect individuals’ cooking performance (Maguire et al., 2014). Third, insufficient lighting made food preparation more difficult (Maguire et al., 2014; Peace, 2016; Ramsamy-Iranah et al., 2021). Fourth, poor use of colour and texture for floor coverings could lead to falls in the kitchen (Peace, 2016). One study outlined design that supported home cooking for the elderly, which included: larder units with open sides, deeper drawers that can support the weight of plates, pans and bowls, small kitchen table instead of breakfast bars and stools, carousel storage options and extra shelves, adjustable and glass-fronted wall cupboards, heat-proof pull out worktop next to the oven, and providing appliances at mid-level (Maguire et al., 2014).

4.4 Environmental quality (daylight and ventilation)

Two studies, Lau et al., (2006, 2010), examined daylight and ventilation issues in apartment designs in relation to food practices. The authors found that inconsiderate architectural design of windows and kitchen layouts resulted in inefficient and poorly lit and ventilated kitchens, which made cooking difficult for families. Residents often prioritised storage over the need for daylight penetration, with window areas blocked by kitchen objects due to a lack of storage and poor layout. However, appropriate daylight quality had a significant role on dwellers’ physical and psychological health when cooking and discouraged home eating. Thus, it was argued that the kitchen size should be enlarged with sufficient storage space and natural ventilation in order to encourage more cooking and eating at home.

4.5 Dining area layout and furniture

The design features of dining area were commonly discussed in relation to their role in promoting mindful eating and enhancing family meal practices. A wide range of studies highlighted the crucial role of a dining table and the physical setting of this item of furniture in encouraging and enhancing family meal practices. A dining table was identified as playing a critical role in congregation and socialisation among households, as well as providing structured and routine family meals that contribute to positive mindful eating experiences (Le Bel & Kenneally, 2009). Thus, insufficient space in residential apartment buildings to accommodate a family-sized table might take its toll on family eating practices (Dunn et al., 2021; Utter & Denny, 2016).

Moreover, sitting and eating a family meal together at *a table in an organised way* was directly associated with: quality family interactions linked to sociocultural values and norms (Scagliusi et al., 2016), the body mass index of children and parents and lower

chance of obesity (Parkes et al., 2020; Wansink & Van Kleef, 2014), higher fruit and vegetable consumption (Christian et al., 2013; Wyse et al., 2011), and better general nutritional health in younger and older children—across countries and socioeconomic groups (Dallacker et al., 2018; Fiese & Schwartz, 2008; Kasper et al., 2019). Physical features associated with the dining table (e.g. size, surface material, and the number of seats), as well as some behavioural features (e.g. social norms and setting expectations) also influenced food intake (Sobal & Wansink, 2007).

Turning to potential distractions during mealtime, simply having the TV on as background noise (in the dining room or in an adjacent room) was associated with higher odds of consuming high fat beverages and snacks (Kegler et al., 2021), and in general, negative health outcomes (Le Bel & Kenneally, 2009; Trofholz et al., 2017), specifically for children (Fiese & Schwartz, 2008). Parkes et al. (2020) showed that not eating in a dining area, not sitting at a table, and using screens during mealtime were associated with the high/increasing obesity and overweight trajectories. Further, eating while TV viewing was considered a risk factor for being overweight or obese in childhood and adolescence (Ghobadi et al., 2018; Liang et al., 2009; Martines et al., 2019). Thus, minimising distractions in the dining area from a TV was recommended (Jones, 2018).

5 Discussion

The eating environment is a complex phenomenon involving a number of factors that have individual and combined effects on the meal experience—sometimes in a subtle and unconscious way (Edwards et al., 2021; Swinburn et al., 1999). Despite the significance of the domestic kitchen to everyday food practices, the micro-geographies of the built environment—such as the domestic kitchen/dining area design—have been neglected compared with the macro-environments (Glanz et al., 2016; Oostenbach et al., 2021). Thus, our review provides a step in filling this knowledge gap by identifying the range of design features influencing food practices in the home. Here, we use concepts of affordance to discuss the findings of our review, and we then discuss the limitations of the review and the further research required to inform the future design of kitchens to support home cooking.

First, we discuss the design features associated with perceived environmental affordances (Coolen, 2015; Kuoppa et al., 2020), in this case for food preparation and consumption as well as household interactions involved in these processes. Table 4 represents a summary of those design features.

Many of these design features afforded home cooking and eating for a diversity of residents. For example, the crucial role of an appropriately sized table, where a meal can be shared between household, and absence of environmental distractions such as TV have been discussed in relation to the desires and needs of various age groups (Fiese & Schwartz, 2008; Maguire et al., 2014; Miller & Maxwell, 2003; Peace, 2016; Utter & Denny, 2016). However, other design issues appeared to be more relevant to specific age cohorts. While safety considerations were important in a general sense, spatial requirements of families with children were slightly different to those of the elderly. The literature suggested that benches near stove tops must be avoided for children to be safely involved in food preparation (Dunn et al., 2021); yet, for elderly, safety considerations were more related to ergonomic design of cabinets and use of certain floor materials to avoid falls (Maguire et al., 2014). Further, families with children preferred more

open-plan style kitchens to enable multitasking of food preparation and childcare (Dunn et al., 2021; Miller & Maxwell, 2003).

Our review also identified unexpected behavioural aspects of kitchen design, where users interacted with the kitchen/dining area “in ways designers either did not or could not anticipate” (Maier et al., 2009, p. 407). Examples of these designs included limited or poorly designed storage (Hagejård et al., 2020), unsafe designs (Forlizzi et al., 2004), poorly lit food preparation areas (Peace, 2016; Ramsamy-Iranah et al., 2021), and insufficient space for dining (Dunn et al., 2021). In these instances, the kitchen design did not support the intention of home cooking or dining. This has health implications, given the evidence for the health-promoting properties of home food preparation and the practice of family/shared meals (Fulkerson et al., 2014; Leech et al., 2014; Tani et al., 2019; Wolfson et al., 2020). Such design failures may contribute to the observations that time spent home cooking as well as expenditure on unprocessed foods has both decreased, whereas consumption of commercially prepared foods has increased (Hogan, 2018; Nielsen et al., 2002; Venn et al., 2017). Given the fact that the incidence of overweight and obesity is rising in developed economies, kitchen designs that better support home cooking are warranted.

While home cooking/eating is widely known as a fundamental factor for health, this review has revealed that the literature far fails to address the *detail* of how this can be facilitated in the design of spaces within residential buildings. This aligns with observations by Foster et al. (2020) and Thornton et al. (2020) who argue that there is currently no empirical evidence to inform *sufficient/adequate space* for cooking/eating practices within current design guidelines. Based on the findings of this review, we recommend that further detailed research is required on size, scales, and layouts of kitchens, along with the affordances in these spaces, to “avoiding common design failures” (Maier et al., 2009, p. 393) and facilitate home cooking and eating.

It is also clear that future research needs to employ multiple research approaches and strategies (Thornton et al., 2020). More importantly, multidisciplinary teams, involving built environment researchers, architectural designers, as well as nutritional and health researchers, who can explore the interrelationships between design and the user should be created to generate knowledge that better informs new policies and kitchen design practices. According to Sal Moslehian et al., (2021, p. 13), issues in the transition of, and translation from, research to building design innovations might be addressed by reformulating research questions for innovation and greater impact “through transdisciplinary approaches”. Indeed, researchers must work with designers to ensure evidence provides the practical, tangible, and meaningful knowledge needed for making design decisions (Freihoefer & Zborowsky, 2017).

As for the limitations of this review, the literature on the design of cooking/eating spaces in certain types of residential buildings such as nursing homes, senior, and extra-caring housing as well as other building typologies like schools, hospitals, and office buildings was excluded. Research on the impacts of design features of kitchens, buffets, and dining halls on individuals’ dietary behaviour is significant, but design evidence examined in those studies cannot be generalised and applied to the design of residential buildings. Thus, despite the variety of research in those contexts, we limited the sample to typical domestic buildings. Also, the focus of this review was specifically on cooking/eating experiences, and therefore, studies investigating only health and well-being of dwellers were excluded. Finally, this was a scoping review, so the quality of the research reviewed was not assessed.

Table 4 A summary of design features associated with perceived environmental affordances

1	Kitchen size and layout	Size and Scale (space for food preparation and social interactions—benchtop away from stove tops and a kitchen table); Layout (openness for supervision, conversation, and accessibility); Storage (visibility of and accessibility to food); Ergonomic design in relation to the height and position of cabinets/shelves (for food preparation); Layouts of built-in furniture along with the arrangement and position of work centres and kitchen appliances (for food preparation and presence of household) Sufficient lighting (for food preparation); Careful use of colour and texture for floor coverings (for food preparation); Space for a kitchen table (to do kitchen tasks, eating meals and family activities)
2	Fixture and fittings	Ambience (environmental comfortability in terms of ventilation and lighting)
3	Environmental quality	Size (space for a family-sized table to create a formal setting)
4	Dining area layout and furniture	Physical features of the table (appropriate size with enough seats, surface material, and configuration of objects on the table) Absence of distractions during mealtime (screen-free dining room, and TV-off in an adjacent room)

6 Conclusion

Home cooking and eating is known to have health benefits, yet the design of cooking and eating spaces in residential buildings is an under researched field. Given the dearth and diversity of the literature in this context, we scoped a wide range of studies via a cross-disciplinary and systematic approach. Spatial design features associated with cooking/eating experiences included size and layout, connection to other spaces, fixture and fittings (including spatial ergonomics, materiality, and texture), and indoor environmental qualities (lighting, ventilation, visual access, and window views). The reciprocal relationships explored in this study between affordances of different design features and food practices highlight the complexity of the design of cooking/eating spaces, requiring a multidisciplinary perspective.

Understanding the literature on domestic kitchen design and food practices is an important first step for putting this topic on both the research and policy agenda. However, at present the body of studies reviewed does not provide robust evidence for the design of domestic cooking/eating spaces to support home cooking and dining. Future research should measure and evaluate the subjective and objective impacts of design aspects on individuals' experiences and food practices, to inform design practice and policy.

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Declarations

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Human and animal rights This is a scoping review paper and does not involve human participants and/or animals. All articles analysed during this study are included in the reference list.

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References

- AIHW, A. I. o. H. a. W. (2012). Australia's food and nutrition 2012. <https://www.aihw.gov.au/reports/food-nutrition/australias-food-nutrition-2012/summary>
- AIHW, A. I. o. H. a. W. (2022a). Diet. <https://www.aihw.gov.au/reports/australias-health/diet>
- AIHW, A. I. o. H. a. W. (2022b). Overweight and obesity. Retrieved May 12, 2022b, from <https://www.aihw.gov.au/reports/australias-health/overweight-and-obesity>
- Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19–32.
- Booth, K. M., Pinkston, M. M., & Poston, W. S. C. (2005). Obesity and the built environment. *Journal of the American Dietetic Association*, 105(5), 110–117.
- Brush, J. A., Meehan, R. A., & Calkins, M. P. (2002). Using the environment to improve intake for people with dementia. *Alzheimer's Care Today*, 3(4), 330–338.
- Bullock, N. (1988). First the kitchen: Then the facade. *Journal of Design History*, 1, 177–192.
- Cameron, A. J. (2018). The shelf space and strategic placement of healthy and discretionary foods in urban, urban-fringe and rural/non-metropolitan Australian supermarkets. *Public Health Nutrition*, 21(3), 593–600.
- Carroll, P., Witten, K., & Kearns, R. (2011). Housing intensification in Auckland, New Zealand: Implications for children and families. *Housing Studies*, 26(03), 353–367.
- CDC, C. o. D. C. a. P. (2022). Adult obesity facts. <https://www.cdc.gov/obesity/data/adult.html>
- Chaudhury, H., Hung, L., & Badger, M. (2013). The role of physical environment in supporting person-centered dining in long-term care: A review of the literature. *American Journal of Alzheimer's Disease & Other Dementias*, 28(5), 491–500.
- Chaudhury, H., Hung, L., Rust, T., & Wu, S. (2017). Do physical environmental changes make a difference? Supporting person-centered care at mealtimes in nursing homes. *Dementia*, 16(7), 878–896.
- Chemero, A. (2003). An outline of a theory of affordances. *Ecological Psychology*, 15(2), 181–195.
- Cho, H., & Lee, S. (2021). A study on the plan for child-rearing-friendly housing: A case study on the remodeled public housing in Kyoto, Japan. *Journal of Asian Architecture and Building Engineering*, 21, 1–15.
- Christian, M. S., Evans, C. E., Hancock, N., Nykjaer, C., & Cade, J. E. (2013). Family meals can help children reach their 5 A day: A cross-sectional survey of children's dietary intake from London primary schools. *Journal of Epidemiology and Community Health*, 67(4), 332–338.
- Chu, Y. L., Farmer, A., Fung, C., Kuhle, S., Storey, K. E., & Veugelers, P. J. (2013). Involvement in home meal preparation is associated with food preference and self-efficacy among Canadian children. *Public Health Nutrition*, 16(1), 108–112.
- Clapham, D. (2011). The embodied use of the material home: An affordance approach. *Housing, Theory and Society*, 28(4), 360–376.
- Clinton-McHarg, T., Janssen, L., Delaney, T., Reilly, K., Regan, T., Nathan, N., Wiggers, J., Yoong, S. L., Wyse, R., & Grady, A. (2018). Availability of food and beverage items on school canteen menus and association with items purchased by children of primary-school age. *Public Health Nutrition*, 21(15), 2907–2914.
- Cohen, D. A., & Babey, S. H. (2012). Contextual influences on eating behaviours: Heuristic processing and dietary choices. *Obesity Reviews*, 13(9), 766–779.
- Coolen, H. (2006). The meaning of dwellings: An ecological perspective. *Housing, Theory and Society*, 23(4), 185–201.
- Coolen, H. (2015). Affordance based housing preferences. *Open House International*, 40, 74–80.
- Covidence systematic review software. (2020).
- Dallacker, M., Hertwig, R., & Mata, J. (2018). The frequency of family meals and nutritional health in children: A meta-analysis. *Obesity Reviews*, 19(5), 638–653.
- Dunn, K., Andrews, F., & Warner, E. (2021). The cooking and eating experiences of Australian families with children, living in private, inner-city, high-rise apartments. *Housing and Society*, 50, 1–20.
- Edwards, J. S., Hartwell, H. J., & Giboreau, A. (2021). Emotions studied in context: The role of the eating environment. In *Emotion measurement* (pp. 613–643). Elsevier.
- Evans, G. W., & McCoy, J. M. (1998). When buildings don't work: The role of architecture in human health. *Journal of Environmental Psychology*, 18(1), 85–94.
- Fiese, B. H., & Schwartz, M. (2008). Reclaiming the family table: Mealtimes and child health and well-being. Social Policy Report. Volume 22, Number 4. *Society for Research in child development*.
- Forlizzi, J., DiSalvo, C., & Gemperle, F. (2004). Assistive robotics and an ecology of elders living independently in their homes. *Human-Computer Interaction*, 19(1–2), 25–59.

- Foster, S., Hooper, P., Kleeman, A., Martino, E., & Giles-Corti, B. (2020). The high life: A policy audit of apartment design guidelines and their potential to promote residents' health and wellbeing. *Cities*, *96*, 102420.
- Freeman, J., & Freeman, J. (2004). *The making of the modern kitchen: A cultural history*. Berg Publishers.
- Freihoefer, K., & Zborowsky, T. (2017). Making the case for practice-based research and the imperative role of design practitioners. *HERD*, *10*(3), 66–82. <https://doi.org/10.1177/1937586716674470>
- French, S. A., Story, M., & Jeffery, R. W. (2001). Environmental influences on eating and physical activity. *Annual Review of Public Health*, *22*(1), 309–335.
- Fulkerson, J. A., Larson, N., Horning, M., & Neumark-Sztainer, D. (2014). A review of associations between family or shared meal frequency and dietary and weight status outcomes across the lifespan. *Journal of Nutrition Education and Behavior*, *46*(1), 2–19.
- Fulkerson, J. A., Story, M., Mellin, A., Leffert, N., Neumark-Sztainer, D., & French, S. A. (2006). Family dinner meal frequency and adolescent development: Relationships with developmental assets and high-risk behaviors. *Journal of Adolescent Health*, *39*(3), 337–345.
- García-Segovia, P., Harrington, R. J., & Seo, H.-S. (2015). Influences of table setting and eating location on food acceptance and intake. *Food Quality and Preference*, *39*, 1–7.
- Ghobadi, S., Hassanzadeh-Rostami, Z., Salehi-Marzizjariani, M., Bellissimo, N., Brett, N. R., Totoso de Zepetnek, J., & Faghil, S. (2018). Association of eating while television viewing and overweight/obesity among children and adolescents: A systematic review and meta-analysis of observational studies. *Obesity Reviews*, *19*(3), 313–320.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.
- Gifford, R., Steg, L., & Reser, J. (2011). *Environmental psychology*. Wiley.
- Gillman, M. W., Rifas-Shiman, S. L., Frazier, A. L., Rockett, H. R., Camargo, C. A., Jr., Field, A. E., Berkey, C. S., & Colditz, G. A. (2000). Family dinner and diet quality among older children and adolescents. *Archives of Family Medicine*, *9*(3), 235.
- Giudici, M. S. (2018). Counter-planning from the kitchen: For a feminist critique of type. *The Journal of Architecture*, *23*(7–8), 1203–1229.
- Glanz, K., Handy, S. L., Henderson, K. E., Slater, S. J., Davis, E. L., & Powell, L. M. (2016). Built environment assessment: Multidisciplinary perspectives. *SSM-Population Health*, *2*, 24–31.
- Greenhalgh, T., & Peacock, R. (2005). Effectiveness and efficiency of search methods in systematic reviews of complex evidence: Audit of primary sources. *BMJ*, *331*(7524), 1064–1065.
- Hagejård, S., Ollár, A., Femenías, P., & Rahe, U. (2020). Designing for circularity—Addressing product design, consumption practices and resource flows in domestic kitchens. *Sustainability*, *12*(3), 1006.
- Hardyment, C. (1988). *From mangle to microwave: The mechanization of household work*.
- Harrison, M. E., Norris, M. L., Obeid, N., Fu, M., Weinstangel, H., & Sampson, M. (2015). Systematic review of the effects of family meal frequency on psychosocial outcomes in youth. *Canadian Family Physician*, *61*(2), e96–e106.
- Hogan, L. (2018). Food demand in Australia: Trends and issues 2018.
- Johnson, L. C. (2006). Browsing the modern kitchen—A feast of gender, place and culture (part 1). *Gender, Place & Culture*, *13*(2), 123–132.
- Jones, B. L. (2018). Making time for family meals: Parental influences, home eating environments, barriers and protective factors. *Physiology & Behavior*, *193*, 248–251.
- Kang, K.-Y., & Lee, K.-H. (2016). Application of universal design in the design of apartment kitchens. *Journal of Asian Architecture and Building Engineering*, *15*(3), 403–410.
- Kasper, N., Ball, S. C., Halverson, K., Miller, A. L., Appugliese, D., Lumeng, J. C., & Peterson, K. E. (2019). Deconstructing the family meal: Are characteristics of the mealtime environment associated with the healthfulness of meals served? *Journal of the Academy of Nutrition and Dietetics*, *119*(8), 1296–1304.
- Kegler, M. C., Hermstad, A., & Haardörfer, R. (2021). Home food environment and associations with weight and diet among U.S. adults: A cross-sectional study. *BMC Public Health*, *21*(1), 1032. <https://doi.org/10.1186/s12889-021-11102-2>
- Kestens, Y., & Daniel, M. (2010). Social inequalities in food exposure around schools in an urban area. *American Journal of Preventive Medicine*, *39*(1), 33–40.
- Kombanda, K. T., Margerison, C., Booth, A., & Worsley, A. (2022). The Impact of the COVID-19 Pandemic on Young Australian Adults' Food Practices. *Current Developments in Nutrition*, *6*(3), nzac009.
- Kuoppa, J., Nieminen, N., Ruoppila, S., & Laine, M. (2020). Elements of desirability: Exploring meaningful dwelling features from resident's perspective. *Housing Studies*, *35*(10), 1661–1683.
- Lake, A., & Townshend, T. (2006). Obesogenic environments: Exploring the built and food environments. *The Journal of the Royal Society for the Promotion of Health*, *126*(6), 262–267.

- Lam, T. M., Vaartjes, I., Grobbee, D. E., Karssenber, D., & Lakerveld, J. (2021). Associations between the built environment and obesity: An umbrella review. *International Journal of Health Geographics*, 20(1), 1–24.
- Laska, M. N., Larson, N. I., Neumark-Sztainer, D., & Story, M. (2012). Does involvement in food preparation track from adolescence to young adulthood and is it associated with better dietary quality? Findings from a 10-year longitudinal study. *Public Health Nutrition*, 15(7), 1150–1158.
- Lau, S.S.-Y., Gou, Z., & Li, F.-M. (2010). Users' perceptions of domestic windows in Hong Kong: Challenging daylighting-based design regulations. *Journal of Building Appraisal*, 6(1), 81–93.
- Lau, S.S.-Y., Li, F. M., Leung, D., Tang, G. W., Ye, A., Chau, K., & Wong, S. (2006). Compromising building regulations and user expectations in the design of high-rise domestic kitchens. *Structural Survey*, 24, 212–229.
- Lawrence, S. D., & Plisco, M. K. (2017). Family mealtimes and family functioning. *The American Journal of Family Therapy*, 45(4), 195–205.
- Le Bel, J. L., & Kenneally, R. R. (2009). Designing meal environments for 'mindful eating'. In *Meals in science and practice* (pp. 575–593). Elsevier.
- Ledin, P., & Machin, D. (2019). Forty years of IKEA kitchens and the rise of a neoliberal control of domestic space. *Visual Communication*, 18(2), 165–187.
- Leech, R. M., McNaughton, S. A., Crawford, D. A., Campbell, K. J., Pearson, N., & Timperio, A. (2014). Family food involvement and frequency of family dinner meals among Australian children aged 10–12 years. Cross-sectional and longitudinal associations with dietary patterns. *Appetite*, 75, 64–70.
- Liang, T., Kuhle, S., & Veugelaers, P. J. (2009). Nutrition and body weights of Canadian children watching television and eating while watching television. *Public Health Nutrition*, 12(12), 2457–2463.
- Liu, W., Jao, Y.-L., & Williams, K. (2017). The association of eating performance and environmental stimulation among older adults with dementia in nursing homes: A secondary analysis. *International Journal of Nursing Studies*, 71, 70–79.
- Llewellyn, M. (2004). Designed by women and designing women: Gender, planning and the geographies of the kitchen in Britain 1917–1946. *Cultural Geographies*, 11(1), 42–60.
- Maguire, M., Peace, S., Nicolle, C., Marshall, R., Sims, R., Percival, J., & Lawton, C. (2014). Kitchen living in later life: Exploring ergonomic problems, coping strategies and design solutions. *International Journal of Design*, 8(1), 73–91.
- Maier, J. R., Fadel, G. M., & Battisto, D. G. (2009). An affordance-based approach to architectural theory, design, and practice. *Design Studies*, 30(4), 393–414.
- Mandracchia, F., Tarro, L., Llauredó, E., Valls, R. M., & Solà, R. (2021). Interventions to promote healthy meals in full-service restaurants and canteens: A systematic review and meta-analysis. *Nutrients*, 13(4), 1350.
- Marco, E., Tahsiri, M., Sinnett, D., & Oliveira, S. (2022). Architects' 'enforced togetherness': New design affordances of the home. *Buildings and Cities*, 3(1), 168–185.
- Marshall, D., & Bell, R. (2003). Meal construction: Exploring the relationship between eating occasion and location. *Food Quality and Preference*, 14(1), 53–64.
- Martin-Biggers, J., Spaccarotella, K., Berhaupt-Glickstein, A., Hongu, N., Worobey, J., & Byrd-Bredbenner, C. (2014). Come and get it! A discussion of family mealtime literature and factors affecting obesity risk-. *Advances in Nutrition*, 5(3), 235–247.
- Martines, R. M., Machado, P. P., Neri, D. A., Levy, R. B., & Rauber, F. (2019). Association between watching TV whilst eating and children's consumption of ultraprocessed foods in United Kingdom. *Maternal & Child Nutrition*, 15(4), e12819.
- Martins, C. A., Andrade, G. C., de Oliveira, M. F. B., Rauber, F., de Castro, I. R. R., Couto, M. T., & Levy, R. B. (2021). "Healthy", "usual" and "convenience" cooking practices patterns: How do they influence children's food consumption? *Appetite*, 158, 105018.
- McGaw, J. A. (1984). More work for mother: The ironies of household technology from the open hearth to the microwave. In *JSTOR*.
- Miller, A. S., & Maxwell, L. E. (2003). Exploring the role of home design in fostering family interaction: The use of programming methods in research. *Journal of Interior Design*, 29(1–2), 50–65.
- Moody, D., & Vineyard, M. L. (2008). Evolution of domestic kitchen design: Influence of disease theory and the changing role of women. *Housing and Society*, 35(2), 13–23.
- Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18(1), 1–7.
- Nielsen, S. J., Siega-Riz, A. M., & Popkin, B. M. (2002). Trends in energy intake in US between 1977 and 1996: Similar shifts seen across age groups. *Obesity Research*, 10(5), 370–378.

- Ollár, A. (2021). *Spatial design for circularity-exploring spatial aspects in housing design with focus on the kitchen*. Chalmers Tekniska Hogskola (Sweden).
- Ollár, A., Granath, K., Femenías, P., & Rahe, U. (2022). Is there a need for new kitchen design? Assessing the adaptative capacity of space to enable circularity in multi-residential buildings. *Frontiers of Architectural Research*, *11*, 891–916.
- Oostenbach, L. H., Lamb, K. E., Dangerfield, F., Poelman, M. P., Kremers, S., & Thornton, L. (2021). The role of dwelling type on food expenditure: A cross-sectional analysis of the 2015–2016 Australian Household Expenditure Survey. *Public Health Nutrition*, *24*(8), 2132–2143.
- Parkes, A., Green, M., & Pearce, A. (2020). Do bedroom screens and the mealtime environment shape different trajectories of child overweight and obesity? Research using the Growing Up in Scotland study. *International Journal of Obesity*, *44*(4), 790–802.
- Parr, J. (2002). Introduction: Modern kitchen, good home, strong nation. *Technology and Culture*, *43*(4), 657–667.
- Peace, S. (2016). Chapter two age-inclusive design: A challenge for kitchen living? *Care and Design: Bodies, Buildings, Cities*, 18.
- Peace, S., Maguire, M., Nicolle, C., Marshall, R., Percival, J., Scicluna, R., Sims, R., Kellaher, L., & Lawton, C. (2018). Transitions in kitchen living: Past experiences and present use. *The New Dynamics of Ageing*, *1*(1), 257.
- Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, *70*(1), 3–21.
- Ramsamy-Iranah, S., Maguire, M., Peace, S., & Pooneeth, V. (2021). Older adults' perspectives on transitions in the kitchen. *Journal of Aging and Environment*, *35*(2), 207–224.
- Robathan, P. (2020). *Towards social housing that affords positive healthy outcomes for an ageing population: A transdisciplinary approach*. University of the West of England].
- Rollings, K. A., & Wells, N. M. (2017). Effects of floor plan openness on eating behaviors. *Environment and Behavior*, *49*(6), 663–684.
- Ronto, R., Wu, J. H., & Singh, G. M. (2018). The global nutrition transition: Trends, disease burdens and policy interventions. *Public Health Nutrition*, *21*(12), 2267–2270.
- Rosenkranz, R. R., & Dziewaltowski, D. A. (2008). Model of the home food environment pertaining to childhood obesity. *Nutrition Reviews*, *66*(3), 123–140.
- Rosewall, T., & Shoory, M. (2017). Houses and Apartments in Australia Bulletin–June Quarter 2017. *Bulletin*(June).
- Sal Moslehian, A., Kocaturk, T., & Tucker, R. (2021). An integral view of innovation in hospital building design: Understanding the context of the research/practice gap. *Building Research & Information*, *49*, 1–16.
- Scagliusi, F. B., da Rocha Pereira, P., Unsain, R. F., & de Moraes Sato, P. (2016). Eating at the table, on the couch and in bed: An exploration of different locus of commensality in the discourses of Brazilian working mothers. *Appetite*, *103*, 80–86.
- Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Sage.
- Skov, L. R., Lourenco, S., Hansen, G. L., Mikkelsen, B. E., & Schofield, C. (2013). Choice architecture as a means to change eating behaviour in self-service settings: A systematic review. *Obesity Reviews*, *14*(3), 187–196.
- Smith, L. P., Ng, S. W., & Popkin, B. M. (2013). Trends in US home food preparation and consumption: Analysis of national nutrition surveys and time use studies from 1965–1966 to 2007–2008. *Nutrition Journal*, *12*(1), 1–10.
- Sobal, J., Bisogni, C. A., & Jastran, M. (2014). Food choice is multifaceted, contextual, dynamic, multilevel, integrated, and diverse. *Mind, Brain, and Education*, *8*(1), 6–12.
- Sobal, J., & Wansink, B. (2007). Kitchenscapes, tablescares, platescapes, and foodscapes: Influences of microscale built environments on food intake. *Environment and Behavior*, *39*(1), 124–142.
- Stigzelius, I., Araujo, L., Mason, K., Murto, R., & Palo, T. (2018). Kitchen concerns at the boundary between markets and consumption: Agencing practice change in times of scarcity (Husmodern, Sweden 1938–1958). *Consumption Markets & Culture*, *21*(4), 347–372.
- Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine*, *29*(6), 563–570.
- Tani, Y., Doi, S., Isumi, A., & Fujiwara, T. (2021). Association of home cooking with caregiver–child interaction and child mental health: Results from the Adachi Child Health Impact of Living Difficulty (A-CHILD) study. *Public Health Nutrition*, *24*(13), 4257–4267.

- Tani, Y., Fujiwara, T., & Isumi, A. (2019). Home cooking and child obesity in Japan: Results from the A-CHILD study. *Nutrients*, *11*(12), 2859.
- Thompson, C., Cummins, S., Brown, T., & Kyle, R. (2016). Contrasting approaches to 'doing' family meals: A qualitative study of how parents frame children's food preferences. *Critical Public Health*, *26*(3), 322–332.
- Thornton, L., Rich, S., Johnson, L., Horne, R., & Andrews, F. (2020). Pie in the sky: Exploring food practices among those living in apartments within Melbourne, Australia. *Cities & Health*, *6*, 1–4.
- Thornton, L. E., Cameron, A. J., McNaughton, S. A., Worsley, A., & Crawford, D. A. (2012). The availability of snack food displays that may trigger impulse purchases in Melbourne supermarkets. *BMC Public Health*, *12*(1), 1–8.
- Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D., Horsley, T., & Weeks, L. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467–473.
- Trofholz, A. C., Tate, A. D., Miner, M. H., & Berge, J. M. (2017). Associations between TV viewing at family meals and the emotional atmosphere of the meal, meal healthfulness, child dietary intake, and child weight status. *Appetite*, *108*, 361–366.
- Utter, J., & Denny, S. (2016). Supporting families to cook at home and eat together: Findings from a feasibility study. *Journal of Nutrition Education and Behavior*, *48*(10), 716–722.
- Utter, J., Denny, S., Robinson, E., Fleming, T., Ameratunga, S., & Grant, S. (2013). Family meals and the well-being of adolescents. *Journal of Paediatrics and Child Health*, *49*(11), 906–911.
- Utter, J., Larson, N., Berge, J. M., Eisenberg, M. E., Fulkerson, J. A., & Neumark-Sztainer, D. (2018). Family meals among parents: Associations with nutritional, social and emotional wellbeing. *Preventive Medicine*, *113*, 7–12.
- Venn, D., Banwell, C., & Dixon, J. (2017). Australia's evolving food practices: A risky mix of continuity and change. *Public Health Nutrition*, *20*(14), 2549–2558.
- Wang, L., Zhou, Y., Wang, F., Ding, L., Love, P. E., & Li, S. (2021). The influence of the built environment on people's mental health: An empirical classification of causal factors. *Sustainable Cities and Society*, *74*, 103185.
- Wansink, B., & Van Kleef, E. (2014). Dinner rituals that correlate with child and adult BMI. *Obesity*, *22*(5), E91–E95.
- Wohlin, C. (2014). Guidelines for snowballing in systematic literature studies and a replication in software engineering. In *Proceedings of the 18th international conference on evaluation and assessment in software engineering*
- Wolfson, J. A., Leung, C. W., & Richardson, C. R. (2020). More frequent cooking at home is associated with higher Healthy Eating Index-2015 score. *Public Health Nutrition*, *23*(13), 2384–2394.
- Wyse, R., Campbell, E., Nathan, N., & Wolfenden, L. (2011). Associations between characteristics of the home food environment and fruit and vegetable intake in preschool children: A cross-sectional study. *BMC Public Health*, *11*(1), 1–10.
- Zong, G., Eisenberg, D. M., Hu, F. B., & Sun, Q. (2016). Consumption of meals prepared at home and risk of type 2 diabetes: An analysis of two prospective cohort studies. *PLoS Medicine*, *13*(7), e1002052.

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