Rapid Review of ‘Moments of Change’ & Food-Related Behaviours

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Executive Summary

Introduction

Food behaviours are multiple and complex, ranging from which foods are purchased and how they are stored and prepared, to which foods are consumed and when, in what quantity, how frequently and with whom. As there are a range of factors influencing food behaviours, they may be susceptible to disruption from 'moments of change' (significant or sudden changes in circumstances or context), which result in the regular behaviour no longer being possible or desirable. Whether, and how, food behaviours develop across an individual's life course and change in response to changing circumstances is important to understand because there may be points at which shifts to healthier behaviours can be promoted or shifts towards less healthy behaviours can be prevented. The focus of this rapid evidence review is on how safe, healthy and sustainable food behaviours are influenced by moments of change.

Moments of change can be endogenous 'biographical' or life-course events (e.g., having a child, retiring, serious illness) experienced by the individual (and including both planned and unplanned events), or exogenous to the individual (e.g., sudden cultural or political change, environmental hazards). They may also occur in combination (e.g. starting a new job may also be combined with moving to a new house). They are particularly significant for disrupting habitual behaviours and can also lead to changes in values.

Scopus and Google searches revealed 112 articles – employing qualitative and quantitative methods – to examine the impact on food behaviours (including food purchasing, preparation, consumption, waste, and sustainability) of moments of change, specifically: Leaving parental home, Cohabitation, Relationship transitions, Parenthood, Cultural transitions, Health related changes, Retirement, Exogenous changes, and Other transitions.

- Leaving parental home

Leaving the parental home is related to a change in food behaviours – generally in terms of reduced consumption (at least amongst females) – due to a desire to achieve autonomy from parents, a change in peer-group norms, budget constraints, and lack of habits for regular food purchasing and cooking. Limited evidence suggests parents whose children have left home may also adjust their food routines.

- Cohabitation

Cohabitation changes a range of food behaviours as partners explore new ways of shopping for, preparing and consuming food, as a cultural signifier of relationship status. These changes are associated with both positive and negative health implications; men's diets, in particular, appear to become less healthy. Cohabitation appears to be a transition where female partners assume more responsibility and control over food; with the assent of the male partner.

- Relationship transitions

The creation and ending of personal relationships catalyse food-related behaviour change. Life transitions such as marriage appear to have mixed effects on dietary change but generally consumption increases somewhat amongst certain food categories. As with cohabitation, there is also increased attention to shared food practices. Satisfaction with ongoing personal relationships can also affect food consumption and weight loss/gain. Conversely, as relationships end, (e.g., through divorce or bereavement), food, and the

routines around it, appear to become less important, which may be both liberating and potentially a risk to nutritional health.

- Parenthood

Some changes in diet and food purchases do occur during the transition to – and experience of – parenthood, but what specific aspect of the diet is changed is inconsistent across studies, perhaps due to interacting influences (e.g., income, social context). Changes seem to be limited to one or two aspects of parents' diet, suggesting diets largely remain stable during this transition. Some changes are negative for health: males appear to reduce vegetable consumption, females to eat more high fat and high sugar foods, and all parents eating less salad and more saturated fats. Some changes are positive: females increase their fruit and vegetable consumption, males eat more healthily, and (when affordable) parents purchase more organic foods. This is perhaps due to acting as a good role model for their child; although, needing to satisfy all family members (including children) may be barriers to positive changes to diet. The intervention study suggests that interventions designed to change consumption behaviour may be more effective when individuals are *not* undergoing the transition to parenthood.

- Cultural transitions

Transitioning to an unfamiliar culture can significantly alter food behaviours, often involving negative dietary impacts. A lack of familiarity with food products, pricing and preparation, as well as the potential for being socially isolated, could mean that individuals lack the knowledge and awareness to address their nutritional needs adequately in a different culture, leading to a reliance on unhealthy foods that are easy to prepare or ready to eat. However, over time, as individuals adapt to their surroundings, they shift their diets accordingly.

- Health related changes

Experiencing either a change in health, or a partner’s change in health, can change people’s diets and food-related behaviours, particularly among older adults. This can include both more and less healthy food choices, as well as impacts on capacity to buy and prepare food. However, the evidence is patchy and predominantly based on recollections (i.e., more prone to bias).

- Retirement

Retirement is a time of significant change in food-related behaviour, specifically in terms of food expenditure and preparation. Less money tends to be spent on food, which is explained by a substitution effect in which the home becomes the focus for food preparation and consumption, while eating outside the home declines. The evidence for health-related change following retirement is less clear; limited studies show both positive and negative change and gender differences.

- Exogenous changes

Most studies on exogenous change and shifts in food behaviours have focused on national economic crises. Changes to diet during these times are profound, particularly for lower-income groups, and include reduced food consumption, choosing cheaper brands, eating fewer animal products and fruit or vegetables, in favour of more basic foods (e.g., grains). Much less is known about how natural disasters, technological advances, or other exogenous shocks, impact food behaviours.

- Other transitions

Other life transitions include loss of employment and residential relocation. Unemployment has substantial effects on dietary composition (towards less healthy choices) but are usually only short-lived. Residential relocation has been found to impact on adoption of plant-based diets.

Considerations and conclusions

Our assessment of the evidence quality, based on sample size and breadth, application of method, and analytic approach, overall was not exceptionally high. More were cross-sectional quantitative or qualitative studies than longitudinal or experimental. There were very few intervention studies. Comparability of studies was compromised by different timing, contexts and research methods. There was significant variation in the way that food-related behaviours were operationalised and measured, with many studies relying on self-reported food consumption and/or measuring behaviour over short time periods or for a limited range of foods. These issues limit the generalisability of findings. Most of the evidence focused on food consumption, expenditure and preparation, and there was very little evidence in relation to life changes and food safety, waste and sustainability.

Overall, the review shows that disruptions to established behavioural routines and habits at various transitions across the life-course and more widely across societies appear to influence changes in relation to a range of food behaviours. The range of transitions studied, methods used, and behaviours measured underline the heterogeneity of the evidence base. While the review found that behaviours appeared to change during these life transitions, methodological gaps and limitations in many studies constrain the extent to which it is possible to draw firm conclusions about the nature of such shifts. Moreover, the evidence highlights that transitions carry different implications based on factors such as culture, gender, income and age. Interventions targeting specific moments of change should be tailored to specific groups. In addition, while some transitions appear to involve the increasing routinisation of food-related practices (e.g. cohabitation, marriage, parenthood), others are more disruptive (e.g. divorce, children leaving home).

Despite the size of the literature base, there is relatively little coherence in terms of defining how and when to measure food-related behaviour change. This also reprises questions of what counts as a moment of change, as well as when do such transitions begin and end? Furthermore, the multiplicity of changes that make up a life transition and overlap with others, make specific causal agents difficult to determine. Therefore, more research is necessary to give clarity to the field and to advance the theoretical understanding of moments of change. This, along with methodological advances will help to address the large gaps that exist in the literature and to facilitate the implementation of policy and interventions in relation to other relevant life transitions.

1 Introduction

In January 2020, the Food Standards Agency (FSA) commissioned the Centre for Climate Change and Social Transformation (CAST) at Cardiff University to conduct a literature review to identify which 'moments of change' (significant or sudden changes in circumstances or context) were likely to trigger changes in eating habits and food practices, and in what way. The focus of the review was to be on how safe, healthy and sustainable food behaviours are influenced by a change in circumstances.

Food behaviours are multiple and complex, ranging from which foods are purchased and how they are stored and prepared, to which foods are consumed and when, in what quantity, how frequently and with whom. They can be motivated by a mix of psychological factors, including values and beliefs (**McBey, Watts & Johnstone, 2019; Clonan, Wilson, Swift et al., 2015**), identities (**Rosenfeld & Burrow, 2017**), emotions (**Gutjar, de Graaf, Kooijman et al., 2015**), and social norms (**Robinson, Thomas, Aveyard et al., 2014**). Knowledge of nutrition may also play a role (**Worsely, 2002**), as well as contextual and socioeconomic factors affecting what is accessible, affordable and available (**Fleischhacker, Evenson, Rodriguez et al., 2010; Mackenbach, Nelissen, Dijkstra et al., 2019**). As there are a range of factors influencing food behaviours, they may be susceptible to disruption from moments of change, which result in the regular behaviour no longer being possible or desirable. Whether, and how, food behaviours develop across an individual's life course and change in response to changing circumstances is important to understand because there may be points at which shifts to healthier behaviours can be promoted or shifts towards less healthy behaviours can be prevented.

Disruption from moments of change is particularly important to understand in the case of changing habitual behaviours (either preventing healthy ones from being lost, promoting healthy ones, or changing unhealthy ones). Habitual behaviours develop through behaviours being repeated, with successful outcomes, in a stable context (**Verplanken, Aarts, Knippenberg et al., 1998**). Such habitual behaviours are typically resistant to change as they are unconsciously triggered by the context, as opposed to being consciously chosen (**Wood, Tam & Witt, 2005**). However, if a moment of change results in a change to the regular context, the behaviour will no longer be triggered. At this point, a conscious reflection on – and re-evaluation of – the behaviour can take place. Individuals may then choose to adopt new behaviours to adapt to the new circumstances (**Verplanken, Walker, Davis et al. 2008)**. For instance, moments of change may mean that existing food-related values, beliefs, and knowledge can be acted on, whereas previous circumstances prevented them being acted on (**e.g. Clark, Chatterjee & Melia, 2016**). In contrast, moments of change may also challenge values, beliefs and knowledge, which may lead to a change in values, beliefs, or knowledge and in turn, change behaviour (**e.g. Thomas et al., 2018**). It has also been found that such periods of disruption may provide an opportunity to intervene to actively promote the uptake of new behaviour(s) (**Capstick, Lorenzoni, Corner et al., 2014**). Indeed, interventions targeted to moments of change (when habits are disrupted) may be more effective than when targeted to more stable contexts (when habits may be stronger; Bamberg, 2006). If the new behaviours become habitual (or generally preferable), then even if the circumstances revert to what they were, the new behaviour may still be maintained. Otherwise, the old habits are likely to return (**Wood et al., 2005**).

‘Moments of change’, also known as ‘critical moments’ (**Giddens, 1991**), transformative moments (**Hards, 2012**) or ‘epiphanies’ (**Denzin, 2001**) punctuate the life course and are acknowledged as points of transition that can be defined as having a ‘before and ‘after’ as part of broader life trajectories in ways that reconfigure lifestyles (**Henwood et al., 2015**). Some moments of change are endogenous ‘biographical’ or life-course events (e.g., having a child, retiring, serious illness) experienced by the individual (and including both planned and unplanned events), while others may be exogenous to the individual (e.g., sudden cultural or political change, environmental hazards). While the range and impacts of moments of change are now beginning to be explored in more depth, no overall typology of endogenous or exogenous moments currently exists, leaving a lack of conceptual clarity across the field. Indeed, reflecting the broader literature on moments of change (**see Thompson, Michaelson, Abdallah et al., 2011**), within the evidence of this rapid review, it was observed that moments of change were treated either as discrete transitions from one status to another **(e.g. Cliff, Townsend & Wolfson, 2019)** or as continuous transitions in which no one “moment” is identifiable (**e.g. Burningham, 2020**). This debate on the nature of moments of change is acknowledged, but beyond the scope of this review to address directly. It is also important to consider that moments of change are not mutually exclusive and often occur in combination (e.g. starting a new job may also be combined with moving to a new house). Moments of change identified in this rapid review on food behaviours include: Leaving education/home, Cohabitation, Relationship transitions, Pregnancy and parenthood, Cultural transitions, Health related changes, Retirement, Exogenous changes, and Other transitions.

2 Aims and Objectives

The overall aim of the rapid review was to synthesise all available peer-reviewed evidence for the impacts of moments of change on food-related behaviours (including food purchasing, preparation, consumption, waste, and sustainability). This is considered the *primary* aim. In addition, we evaluated the evidence base using three criteria: the type of evidence (i.e. qualitative or quantitative, cross-sectional or longitudinal), and the subjective relevance of the evidence to food behaviours (i.e. was food-related behaviour change a central focus of the study or more peripheral?). This evidence evaluation is considered the *secondary aim* of the rapid review.

3 Methodology

The methodological approach of the literature review was based upon a standardised protocol for producing quick scoping reviews and rapid evidence assessments (**Collins, Coughlin, Miller et al., 2015**). The main stages in this process are detailed in the following sections.

3.1. Research protocol

3.1.1 Clarifying the research question

In line with **Collins et al (2015)**, we utilised four elements to clarify the optimal approach to be taken in order to address the primary review question: i. the review *population*; ii. the *intervention*; iii. the *comparator*; and iv. the *outcome(s)* of the intervention. These four

elements were used to address the primary and secondary aims of the rapid review as follows:

Table 1. Review focus and criteria

Review question(s)	**Which moments of change (i.e. significant or sudden change in circumstances or context) are likely to trigger changes in food-related habits (with a focus on safe, healthy and sustainable food behaviours) and in what way?**
Population	Populations subjected to moments of change, defined as a range of identifiable and significant life event changes/transitions, including endogenous/exogenous change; planned/unplanned change; personal/wider change.
Intervention/Exposure	Contexts where moments of change occur linked to changes in food-related behaviours (either through deliberate interventions or natural behavioural changes).
Comparator	Populations for whom no such moments of change have occurred.
Outcome	Changes in food-related behaviours, particularly behaviours linked to food safety, health and sustainability. Changes in food-related behavioural values, attitudes and intentions.

3.1.2 Searching for relevant evidence

The evidence searches began with the identification of a set of keywords to be entered into electronic database searches, relevant to the aims of the rapid review. The keywords were generated through an iterative process once the basic search protocol had been established. An initial list of keywords was drawn up by the review team, then trialled and refined based on the search returns from pilot searches. This enabled the review team to create a comprehensive list of keywords and synonyms that were optimal in identifying the most relevant kinds of articles for the review, as well as generating an estimate of the scope of relevant evidence that existed.

Search terms included synonyms of the exposure keyword and its variants, in generic terms (e.g. ‘moment of change’, ‘life event’ and ‘life transition’) and more specific terms (e.g. residential relocation, parenthood, retirement). These were combined with a range of terms covering dietary and food-related changes, both generic (e.g. ‘food’, ‘diet’, nutrition’) and related behaviours (e.g. ’food waste’, ‘food composting’ ‘food safety’ and ‘food saving’).

Searches were conducted using electronic databases of the scientific literature. We also included a limited search of unpublished and non-academic (‘grey literature’) searches in order to minimise publication bias in relation to a topic where relevant evidence may have been published from a range of non-academic or unpublished sources. For the peer-reviewed academic articles, we primarily searched the academic database, *SCOPUS.* For the non-peer review articles, we used Google searches*.* While the former comprised peer-review academic articles, the latter also comprised working reports, conference proceedings and other unpublished academic work. For the grey literature searches, we compiled a list of websites of professional organisations in the food, health and safety sectors and performed systematic online searches. Further to these tailored electronic database searches, we also searched through the extensive corpus of articles on moments of change forming part of the

'*Understanding and leveraging moments of change for pro-environmental behavioural lifestyle shifts*' (MOCHA) project for additional evidence on moments of change and food-related behaviour change.

Academic databases were searched for studies that were published on any date up to February 14th, 2020. While one of the first reviews into moments of change was published in the grey literature in 2011 (**Thompson et al., 2011**), it did not take a specific focus on food-related behaviour, therefore it was decided by the review team that the rapid review should extend its search before this review date in order to address the specific focus on food-related behaviours. The earliest study in the review was published in 1988. There were no geographical constraints on the search.

Records of the systematic keyword searches were collated and then combined to create a complete list of all the evidence found.

3.1.3. Screening the evidence

Once the Scopus and Google searches were completed, the results underwent two processes of screening to ensure the relevance of the articles generated in line with the review question. The Scopus and Google searches generated 18,004 articles, though a significant proportion of these articles was duplicated across searches. Once duplicates had been removed, we commenced screening the articles.

An initial round of screening involved reading the title of each article and including or excluding a given article in terms of its relevance to the aims of the review. If the title of the article was unclear or ambiguous, the reviewer then scanned the article abstract/introduction to judge its relevance. Non-English language articles were also excluded. Relevant articles were retained for secondary screening. Articles that were judged not to be relevant were sifted out at this stage, though a record of the article was retained.

Following the removal of duplicates and initial sifting to determine the relevance of articles, 17,688 articles were excluded, leaving 316 articles. These remaining articles were screened again. This time, the abstract and introduction of each source were read to check that each article met the criteria for inclusion (Table 1).

At the end of this process, 204 articles were excluded due to a lack of relevance to the review aims, leaving a literature corpus of 112 articles for evidence extraction and synthesis. These articles were read in full.

3.1.4 Extraction of evidence

All the twice-screened articles were collated in an Excel file in preparation for evidence extraction. This was done in two stages. A set of criteria was generated in advance in accordance with the aims of the review. These criteria comprised i. T*ype of evidence*; ii. *Research des*ign; iii. *Population/sample details*, iv. *Details of intervention; v. Outcomes measured; vi. Evidence relating to the primary question; vii. Relevant secondary evidence; viii. Summary of the conclusion; ix. Subjective rating of the relevance of the study.*

The resulting database of summarised articles was used to create a systematic mapping of the evidence, which forms the basis of the report.

3.1.5 Synthesis of evidence

Once we had screened and built a database of relevant evidence, we read through each source to generate findings to address the questions outlined above. A narrative synthesis approach was used to address the review question. A more quantitative synthesis of the evidence was beyond the scope of the project due to schedule for the review and the diversity of sources considered. Furthermore, a narrative synthesis is judged to be the most useful approach for organising and communicating review findings for policy and practice (**Popay, Roberts, Sowden et al., 2006**).

4 Results

4.1 Influence of life events on food-related behaviours

In this rapid review, we identified and categorised eight discrete categories of life events that were associated with food-related behaviour change, along with a few miscellaneous studies of relevance. These are displayed in Table 2.

Table 2. Types of life events associated with food-related behaviour change identified in the evidence base

Life event
Educational transitions & leaving the parental home
Cohabitation
Relationship transitions
Pregnancy & parenthood
Cultural transitions
Health-related change
Retirement
Exogenous change
Other life transitions

Before proceeding further, it is necessary to explain that whilst we have presented moments of change as discrete life transitions in line with the evidence, such categorisation also acknowledges the reality that there may be significant overlap between multiple life events in ways that map onto broader transitions (e.g. cohabitation and parenthood). We have structured the review in line with a subjective interpretation of the literature presented but acknowledge that in some sections the ensuing discussion relates to associated transitions. For example, we have merged studies on transitions from school education and leaving home but include transitions to university as a separate section. In addition, while being aware of the significant overlap, we discuss the evidence for transitions to cohabitation, marriage and parenthood separately. This has also been done for practical reasons based on the relative dearth or surfeit of studies providing evidence for one kind of transition or another. In doing

so, we acknowledge that this is but one way of interpreting and categorising the evidence base.

4.1.1 Educational transitions and leaving the parental home

Leaving the parental home is an important transition for adolescents in which autonomy increases and identity develops (**Young, Dagnan & Jahoda, 2016**). Similarly, leaving the parental home is marked by substantial change as young people establish new households, reduce dependence on parents, and wellbeing increasingly becomes a function of participation in the labour market (**Mulder & Clark, 2000**). We identified 14 studies in which leaving the parental home is linked to changes in food behaviours. Eight studies used quantitative methods and the other 6 were qualitative. In addition, 7 conducted cross-sectional analyses and 7 analysed longitudinal datasets. These studies are summarised in Table 4.

Research has tended to focus on the transition from the parental home to university, partly due to the ease of recruiting student samples. **Blichfeldt and Gram (2013)** found that students did not struggle with the cooking and shopping behaviours themselves, but rather found it difficult to develop the habit of cooking on an everyday basis and keeping enough food in the fridge. Those who experienced the least difficulty with this were those who had more experience of cooking before moving to university.

The qualitative evidence also identified a desire to achieve autonomy and independence from parents when leaving the parental home, which can be expressed through having control over their diet and mealtimes (**Koehn, Gillison, Standage et al., 2016; Kwok, Capra & Leveritt, 2016**). Peers were also found to have an important role in the re-negotiation of food and eating practices, with people forming specific eating habits with specific peers (**Wills, 2005**) and having a desire to not deviate from the perceived norms of their peer groups (**Koehn et al., 2016**). Despite or perhaps, because of this, **McBey et al., (2019)** found in focus groups with first year undergraduates that there is little evidence for the change in life-course creating an openness to reducing meat consumption.

The longitudinal evidence for dietary changes following a transition to university is mixed, with both declines and stability in diets found. **Edwards and Meiselman (2003)** tracked changes in the dietary habits of UK students at three time-points (from leaving home in September, then in January and May) during the first year of university (n=377). They found that dietary energy intake declined significantly between starting university in September and the following January but stabilised between January and May. There were also some small changes in macronutrient intakes, though these were not statistically significant. Similarly, **Deforche Van Dyck, Deliens et al., (2015)** found that people from their final year of high school to their second year of university decreased their intake of healthy and unhealthy food, but there was an observed weight gain. However, **Pullman. Masters, Zalot et al., (2009)** found that energy and nutrient intake did not change for males from before starting university to approximately six months later (although they experienced a significant weight gain, of 3.0 kg, with significant increases in BMI, body fat, waist circumference, hip circumference, and waist:hip ratio).

Table 4. Summary of results from fourteen studies providing evidence for associations between educational transitions, leaving home and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance [1]
Beasley et al.	2004	Quantitative/Cross-sectional	UK	University students (n=219)	Students who leave home to start university report their diet to be less healthy; but found to be healthier than students who continue to live at home	High
Blichfeldt & Gram	2013	Qualitative/ Longitudinal	Denmark	University students (n=55)	Students with less prior experience had more difficulty in food provisioning	High
Deforche et al.	2015	Quantitative/ Longitudinal	Belgium	University students (n=291)	Transition to university linked with reduced food intake and weight gain	High
Edwards & Meiselman	2014	Quantitative/ Longitudinal	UK	University students (n=377)	Energy intake declined following the start of university but then	High

[1] Relevance was subjectively rated on a score of 1-3. A score of 1 was given when food behaviour was studied peripherally. A score of 2 was given when food behaviour was prominent but not the central focus. A score of 3 was given when food behaviour was the central focus of the study.

					stabilised after the first few months	
Harker et al.	2010	Quantitative/Cross-sectional	Germany	University students (n=305)	Students who continue to live in the family home consume more fruit and vegetables and more food generally, in contrast to Beasley et al. (2004)	Low
Koehn et al.	2016	Qualitative/ Cross-sectional	UK	School leavers (n=16)	Leaving the parental home associated with increased autonomy and control over food practices	Medium
Kwok et al.	2016	Qualitative/ Cross-sectional	China	University students (n=31)	Leaving the parental home associated with increased autonomy and control over food practices	High
McBey et al.	2019	Qualitative/ Cross-sectional	UK	Adults (n=16)	Leaving school unrelated to openness to reducing meat consumption	Medium

Plessz et al.	2016	Qualitative/Cross-sectional	France	Consumers (n=30)	Adolescents leaving home linked to liberation from family meal routines for parents	High
Pullman et al.	2009	Quantitative/ Longitudinal	Canada	University students (n=128)	Transition to university linked to subsequent weight gain for males	Medium
Reitmeier & Roosen	2015	Quantitative/ Longitudinal	Germany	Household heads (n=9,321)	Children leaving the home identified as sensitive period for dairy brand switching	High
Ribar	2015	Quantitative/ Longitudinal	Australia	Young adults (n=13,969)	Leaving home associated with negative dietary impacts	Medium
Winpenny et al.	2018	Quantitative/ Longitudinal	Norway	Adolescents / Young adults (n=1,100)	Leaving home associated with decreased fruit and vegetable consumption	High
Wills	2005	Qualitative/ Cross-sectional	UK	College students (n=40)	Peers influence food habits after leaving school	High

Harker, Sharma, Harker et al., (2010) conducted a cross-sectional survey of German students aged 18-24 (n=305) and compared dietary patterns between those who continued to live with their parents in the family home and those who were living away from home. The

students living at home consumed greater quantities of fruit and vegetables. However, students living at home were also found to consume greater amounts across all the food groups studied, suggesting that leaving home is not related to negative dietary impacts in a straightforward way. **Beasley. Hackett and Maxwell, (2004)** investigated the dietary health of UK students living within or away from the family home (n=219) in a cross-sectional survey. They reported that students who were not living at home felt that their diets had become less healthy since leaving. However, students who did not live in the family home were found to consume a narrower range of foods, but fewer unhealthy foods (e.g. foods high in sugar and saturated fats) than students who were living with their families. The authors concluded that while students who live at home may enjoy more varied diets, these diets were less healthy because they were less restricted by budget and unhealthy family dietary choices.

Other longitudinal work has focused on leaving home considering destinations other than university. **Winpenny, Van Slujis, White et al., (2018)** tracked young people in Norway (n=1,100) over nine timepoints as they progressed through four age-related transitions (leaving education, leaving home, cohabitation and entering the job market). They report that leaving home was the life transition in young adulthood most related to dietary change, with evidence linking this life change with slight reduction in consumption of fruit and vegetables and increased consumption of confectionery. They also found a slight reduction in sugar-sweetened beverages, but only for young men. In another longitudinal panel study, **Ribar (2015)** analysed dietary change amongst young Australians leaving home (n=13,969). Leaving the family home was associated with an increase in skipping meals amongst men, compared to those who continued to live at home. In addition, men who left home for reasons other than for study or cohabitation, reported lower nutritional intake than those who continued to live in the family home. The pattern was similar for young women, though difference in nutritional intake did not reach statistical significance.

There is also some evidence that the transition to leaving home influences not only the food-related behaviours of those leaving, but also the individuals who are left behind. In the cross-sectional analysis of a subset of French households (n=30) from a larger panel of consumption change over time (**Plessz, Dubuisson-Quellier, Gojard et al., (2016)**, interview participants discussed how children leaving the parental home not only created shifts in children's food-related practices, but also those of the parents. In such transitions, parents felt liberated from the constraints of family food preparation and meal routines. Without children living at home, couples renegotiated and simplified their food practices in ways that bore similarity to the disruption of food practices following loss of a spouse. **Reitmeier and Roosen (2015)** analysed data from a panel of 30,000 German households (where the head was aged 45+) over a four-year period. (n=9,321). Using supermarket scanner data, changes in household size (e.g. children leaving home or cohabitation) were the transitions most strongly associated with brand switching in the purchase of dairy produce.

Overall, the identified evidence suggests that leaving the parental home is related to a change in food behaviours, with most studies focussing on behaviour change amongst the children (rather than the parents). This change was found to be due to children's desire to achieve autonomy from parents and a change in peer-groups and social norms. The observed changes were towards reducing consumption compared to those still living in the parental home or to when they themselves were still living in the parental home. However, there was some evidence of diet being stable amongst males. In one study, the decline in consumption was related to greater budget constraints as a student living away from the parental home,

compared to a student living in the parental home. Other evidence suggests that it is the lack of habits for regular food purchasing and cooking that reduces food consumption in those who have left the parental home. In terms of change to the types of food consumed, one study found students living away from the parental home consumed less unhealthy foods (foods high in sugar and saturated fats) than those living in the parental home. In contrast, those who left the parental home for reasons other than university, showed a reduced consumption of healthier foods (fruit and vegetables) and an increased consumption of less healthy foods (confectionery). As such, initial evidence suggests that leaving the parental home is disruptive to individuals' diets; however, further longitudinal evidence that tracks the types of food consumed before and throughout the transition away from the parental home (both amongst children and their parents) will be important, as well as further work to understand why changes do or do not occur.

4.1.2 Cohabitation

Cohabitation has become an increasingly normative life transition for young adults in many societies and has a bearing on marital stability, non-marital childbearing, and lifestyles more generally (**Manning & Smock, 2005**). We identified 13 studies in which changes in food-related behaviours in the transition to cohabitation have been found. Six studies were quantitative and 7 were qualitative, with 8 cross-sectional analyses and 5 longitudinal. These studies are summarised in Table 5.

Table 5. Summary of results from thirteen studies providing evidence for associations between cohabitation and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Anderson et al.	2004	Qualitative/ Longitudinal	UK	Young couples (n=22)	Cohabitation associated with positive and negative dietary changes	High
Burke et al.	2004	Quantitative/ Longitudinal	Australia	Young adults (n=600)	Cohabitation associated with weight gain and positive dietary change	High
Harcourt et al.	2020	Qualitative/Cross-sectional	UK	Adult men (n=19)	Cohabitation affects responsibility for food provision	Low
Hartmann et al.	2014	Quantitative/ Longitudinal	Switzerland	Adults (3,359)	Cohabitation associated with negative dietary changes (for men)	High
Kemmer	1999	Qualitative/ Cross-sectional	UK	Couples (n=22)	Female partners linked to adoption of responsibility for nutrition following cohabitation	Low

Kobayashi et al.	2015	Quantitative/ Cross-sectional	Japan	Female students (1,136)	Cohabitation/commensality between students, mothers and grandmothers associated with healthier diets	Low
MacLellan et al.	2004	Qualitative/Cross-sectional	Canada	Women (n=40)	Females eat more healthily than their male partners	High
Mata et al	2018	Quantitative/ Longitudinal	Germany	Adults (20,950)	Cohabitation associated with weight increase (for men)	Low
Newcombe et al.	2012	Qualitative/Cross-sectional	Ireland	Men (n=33)	Marriage/Cohabitation linked to meals as signifier of committed relationship, while control over food was handed to the female partner	Medium
Plessz et al.	2016	Qualitative/Cross-sectional	France	Consumers (n=30)	Cohabitation linked to greater focus on eating together and adaptation to commensal food norms	High
Pollard et al.	2001	Quantitative/Cross-sectional	UK	Women (n=33,367)	Cohabitation linked to slight increase in fruit and vegetable consumption	Medium
Rogan et al.	2018	Qualitative/Cross-sectional	Ireland	Polish-Irish couples (n=15)	Tensions over food practices in intercultural relationships	High
Winpenny et al.	2018	Quantitative/ Longitudinal	Norway	Adolescents/ young adults (n=1,100)	Cohabitation associated with increased fruit consumption	High

The beginning of cohabitation is a period of significant food-related behaviour change in terms of gendered food provisioning and routines. **Newcombe. McCarthy, Cronin et al., (2012)** interviewed a subset of Irish males (n=33) from a larger national study to discuss their lifestyles and relationships with food. Cohabitation emerged as a turning point whereby dietary choices and eating habits were adapted as a signifier of a committed marital relationship. Cohabitation was also associated with eating heavier meals, leading to modest gains in weight. Men spoke of a matriarchal form of governance in which women were viewed as being responsible for meal decisions and nutritional health, while men stayed out of the kitchen. **Plessz et al., (2016)** conducted focus groups with 30 French adults from a larger

consumer panel of 7,000 households, in which early cohabitation was demarcated by couples eating together and negotiating food-related practices and norms in which commensality became a major focus. **Harcourt, Appleton, Clegg et al., (2020)** also took a qualitative approach in investigating the influence of social relationship change on men's weight and dietary behaviours in 19 interviews with men aged 18-60 with a BMI ≥24 kg/m^2. While those cohabiting with female partners shared and were mutually supported in some diet-related goals, female partners were generally viewed as overseeing the kitchen and household nutrition. Because of this, some men spoke of having little autonomy and low behavioural control over food choices. A belief that women knew more about nutrition also reduced intentions to modify unhealthy diets. Furthermore, *not* having a partner to cook healthy meals was viewed by some men as a barrier to a healthier lifestyle. **Rogan, Piacentini and Hopkinson (2018)** also conducted interviews with 15 Polish-Irish couples living in Ireland, reporting intercultural tensions between partners over food practices in relation to what defined 'good food'. This extended to further tensions in the blending of different cultural food practices in child-rearing and on special occasions such as Christmas and Easter.

In a qualitative longitudinal study, **Anderson, Marshall and Lee (2004)** studied changes in food choices and eating practices during the transition to cohabitation by interviewing 22 male/female couples in the UK. Participants were interviewed around three months before and around three months after beginning cohabitation. Between each timepoint, participants reported that shopping became a more regular and organised activity. Emphasis was placed on the evening meal as a 'proper meal', to be shared by partners and mostly eaten at home (to save money), which was not the case prior to cohabitation. Couples also reported the added temptation to indulge in unhealthy consumption introduced by partners after moving in together. Meanwhile, **Kemmer (1999)** conducted interviews with UK couples without children a few months before and after moving in together. In most couples, the female partner became responsible for food choices and meal preparation, with evidence for a trade-off between the burden of responsibility for food practices and control over food choices. In only a few couples was responsibility for food consumption choices shared or assumed by the male partner.

Further to changes in food consumption following cohabitation, **MacLellan et al., (2004)** sought to identify barriers and facilitators associated with fruit and vegetable consumption by interviewing 40 adult Canadian women (aged 20-49). Within the interviews, women reported that their male partners generally had less healthy diets and would not consume vegetables, which created tensions for participants who sought to maintain a healthy diet.

With reference to more quantitative evidence, **Pollard, Greenwood, Kirk et al., (2001)** conducted a cross-sectional analysis of data from the UK Women's Cohort Study (n=35,367). Amongst a range of lifestyle factors contributing to fruit and vegetable consumption, women who were married/cohabiting consumed a slightly higher, but statistically significant quantity of fruit and vegetables than women who were divorced, widowed, single or separated. However, the overall differences in fruit and vegetable consumption were small. **Kobayashi, Asakura, Suga et al., (2015)** investigated food choices of Japanese female students (n=1,136) cohabiting with their mothers and maternal/paternal grandmothers. Those students who cohabited with their grandmothers (regardless of whether they were maternal or paternal) had healthier diets, consuming more fruit, vegetables, dietary fibre, beta-carotene, vitamin C and potassium and less meat than those who did not. Mothers living with a parent

in the home also had healthier diets, consuming more fish, shellfish and vitamin C, and less meat.

Other studies provide more longitudinal evidence for dietary change following cohabitation. **Anderson et al., (2004)** also found in their interviews that cohabitation was associated with negative dietary health change. For example, sharing indulgent, unhealthy foods with a partner served to reduce the guilt of excessive consumption. Over the course of the study period, body weight increased similarly for both male and female partners (on average by 1.54kg and 1.63kg respectively). There was also evidence that cohabitation had at least the potential for positive dietary changes. Participants reported that mutually supportive relationships and a greater focus on food preparation enabled greater forward planning and consideration of healthy food choices.

In a more quantitative longitudinal study, **Hartmann, Dohle and Siegrist (2014)** examined food choices during transitions to cohabitation and parenthood in a three-wave longitudinal survey of Swiss adults (n=3,559). For men who transitioned to cohabitation, there was no indication that their dietary health increased in the year following cohabitation. Conversely, the evidence suggested that men's diets became less healthy (indicated by increased consumption of red meats, processed meats and savouries). However, there was also evidence that vegetable consumption was higher for men cohabiting than for men living alone. **Mata, Richter, Schneider et al., (2018)** tracked consumption and life changes over a 16-year period in a nationally representative sample of German adults (n=20,950). Cohabitation was associated with significant weight gain for men and women four years later. For those who separated, BMI was found to return approximately to pre-cohabitation levels. In a similar study, **Burke, Beilin, Dunbar et al., (2004)** studied changes in cardiovascular risk factors over a 9-year period for individuals aged 9 (n=569) or 25 (n=600) at baseline. Following cohabitation, BMI, waist circumference, cholesterol and body weight significantly increased in men and women (BMI and bodyweight gain were significantly higher for men) compared to those not cohabiting. However, consumption of total fats and saturated fat decreased (particularly in men). In **Winpenny et al.'s (2018)** longitudinal study of life-course transitions in adolescence and early adulthood in Norway (n=1,100), cohabitation was not found to be strongly linked to dietary changes, though there was some evidence that fruit consumption increased following cohabitation.

Cohabitation brings with it a renewed attention to food practices and a reconstruction of prior food habits as cohabiting partners explore new ways of shopping for, preparing and consuming food, as a cultural signifier of relationship status. This presents a potential entry point for behavioural intervention. The evidence for consumption change, like marriage, is associated with both positive and negative health implications; however, the latter appear to be more applicable to changes in male consumption following cohabitation. Further to gender differences in eating habits, cohabitation appears to be a transition where female partners tend to assume responsibility and control over food; with the assent of the male partner. This carries implications in terms of the targeting of interventions and highlights the importance of relationship dynamics for food-related behaviour, as well as the potential that partners interpret and respond differently to those interventions.

4.1.4 Relationship transitions

Personal relationships are integral to the human experience, and paradoxically, involve periods of stability and change in ways that impact profoundly on individuals (**Weigel & Murray, 2000)**. In this review we identified 21 studies in which relationship change over time has influenced food-related behaviours. Twelve studies used quantitative methods and 9 were qualitative, while 14 were cross-sectional and 7 were longitudinal. These studies are summarised in Table 6.

Marriage is a life transition linked to dietary changes in some studies. **Neighbors and Sobal (2008)** tracked wedding-specific dietary changes amongst 272 women who had signed up to a bridal show company in the USA. Most of the sample (70%) were trying to lose weight and a further 21% were actively preventing weight gain. Eating less food, low-calorie food and increasing fruit and vegetable intake were common strategies, while a minority of participants reported skipping meals and taking unprescribed diet pills/supplements.

Following marriage, consumption patterns typically became more routinised. **Harrison, Veeck and Gentry (2011)** interviewed 15 adults aged 80+ to examine the influence of life events on family food consumption. Life transitions such as marriage and starting a family introduced structured mealtimes for men and was associated with increased labour for women. However, in interviews with 60 Australian couples, **Craig and Truswell (1988)** found that around two-and-a-half years into marriage, the number of shared meals declined, apart from the evening meal. **Weisberg-Shapiro and Devine (2008)** studied interview accounts of Dominican women's diets in the context of life transitions and immigration. Women were influenced by their husbands to shift from less healthy non-traditional diets (characterised as less routinised with higher consumption of convenience and takeaway foods) to more routinised diets. Subsequently, following divorce, there was a shift to back to higher consumption of processed and takeaway foods due to eating alone.

Table 6. Summary of results from twenty-one studies providing evidence for associations between relationship transitions and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relev
Billson et al.	1999	Quantitative/Cross-sectional	UK	Adults (n=2,197)	Marriage associated with increased fruit and vegetable intake (for men)	Low
Carter et al.	2010	Quantitative/Cross-sectional	New Zealand	Adults (n=18,950)	Being unmarried associated with food insecurity	Low
Conklin et al.	2014	Quantitative/ Longitudinal	UK	Older adults (n=20,274)	Being widowed or living alone associated with negative dietary impacts	High
Craig & Truswell	1988	Qualitative/Cross-sectional	Australia	Couples (n=60)	Proportion of shared meals declines around 2.5 years following	High

					marriage, with exception of the evening meal	
de Morais et al.	2012	Qualitative/Cross-sectional	Portugal	Older adults (n=80)	Social isolation influences eating habits in old age	Mediu
Delaney & McCarthy	2011	Qualitative/Cross-sectional	Ireland	Adults (n=60)	Widowhood linked to simpler meals and greater control of food choices	Mediu
Edfors & Westergren	2012	Qualitative/Cross-sectional	Sweden	Older adults (n=12)	Widowhood associated with alleviation of responsibility for preparing meals for others	High
Eng et al.	2005	Quantitative/ Longitudinal	USA	Adult male health professionals (n=38,865)	Divorce associated with negative health-related dietary changes	High
Harrison et al.	2011	Qualitative/Cross-sectional	USA	Older adults (n=15)	Widowhood associated with liberation from meal routines	Low
Jabs et al.	1998	Qualitative/Cross-sectional	USA	Vegetarians/ Vegans (n=19)	Divorce as a catalyst for vegetarianism	Low
Kroshus	2008	Quantitative/Cross-sectional	USA	Adults (n=5,744)	Being unmarried associated with increased expenditure on commercially prepared food	Low
Lee et al.	2005	Quantitative/ Longitudinal	USA	Older females (n=80,944)	Marriage associated with increased BMI	Low
Men	2017	Quantitative/ Longitudinal	USA	Married and divorced mothers (n=34,735)	Divorce associated with increased food insecurity	Mediu
Neighbors & Sobal	2008	Quantitative/Cross-sectional	USA	Women preparing for their weddings (n=272)	Transition to marriage associated with unhealthy food-related behaviours	Mediu
Ogden et al.	2009	Qualitative/Cross-sectional	UK	Slimming club	Relationship satisfaction linked	Mediu

				members (n=538)	to weight gain and weight loss	
Shahar et al.	2001	Quantitative/ Longitudinal	USA	Widowed men and women (n=116)	Widowhood associated with weight loss and shift to less routinised food habits	Mediu
Smith et al.	2017	Quantitative/ Longitudinal	Australia	Adults (n=1,402)	Marriage associated with dietary improvement	High
Vesnaver et al.	2015	Qualitative/Cross-sectional	Canada	Widows living alone (n=15)	Widowhood associated with loss of routine in food practices	High
Vinther et al.	2016	Quantitative/ Longitudinal	UK	Middle-aged/older adults (n=11,577)	Widowhood associated with declines in healthy eating	High
Weisberg-Shapiro & Devine	2008	Qualitative/Cross-sectional	USA/Dominican Republic	Female migrants born in the Dominican Republic (n=29)	Marriage and divorce associated with shifts between traditional and non-traditional diet patterns	High
Yannakoulia et al.	2008	Quantitative/Cross-sectional	Greece	Adults (n=3,042)	Unmarried/divorced participants consume more fast food than those married/widowed	Mediu

Dietary changes following marriage can be positive and negative. **Lee, Cho, Grodstein et al., (2005)** conducted a cross-sectional analysis of a dataset of 80,944 older women in the US. Compared with women who remained married, women who were divorced or widowed had a lower BMI (0.65kg/m^2 versus 0.44kg/m^2 respectively). Compared to women who remained unmarried, women who remarried showed a statistically significant increase in BMI of 0.41kg/m^2. **Billson, Pryor and Nichols (1999)** investigated factors relating to fruit and vegetable consumption in a cross-sectional nationally representative analysis of British adults (1,087 men, 1,110 women). For men, being married was associated with an increased consumption of fruit and vegetables compared to single men. **Yannakoulia, Panagiotakos, Pitsavos et al., (2008)** investigated associations between diet, marital status and health in a cross-sectional study of Greek adults (n=3,042). Being unmarried was associated with higher consumption of potatoes, red meat, fast food and coffee, while those who were married ate more nuts, legumes and fish. However, **Smith, MacNaughton, Gall et al., (2017)** examined dietary data from an Australian panel study of 1,402 younger adults (aged 26-36) and found that marriage had little effect on diet. At follow-up after five years, diet quality had improved

for all groups whether they were married/living as married or not, and there were no differences between them in terms of consumption of takeaway food. However, men who were married/living as married were less likely to skip meals than single men. **Carter, Lanamuta, Kruse et al., (2010)** investigated the determinants of food insecurity in New Zealand based on a cross-sectional analysis of a single wave of nationally representative data from a longitudinal panel survey of 18,950 New Zealand households, reporting greater likelihood of food insecurity among those who were unmarried.

In an online survey of dieters from a slimming club (n=538), **Ogden, Stavrinaki and Stubbs et al., (2009)** asked participants to consider life events (other than pregnancy) that had contributed to weight gain. Relationship satisfaction was a significant factor, which was associated with both gaining and losing weight. More generally, life events that were more positive and controllable were associated with weight loss, while more negative and less controllable life events contributed to weight gain. Essentially, interpretation of the meaning of the life event was crucial.

Divorce is another life change event associated with negative dietary changes. **Kroshus (2008)** analysed a randomly selected nationally representative dataset in a prospective cohort study of gender, marital status and commercially prepared food expenditure amongst 5,744 US citizens. Households in which the household's head was divorced/separated or never married spent a significantly greater proportion of their food budget on commercially prepared food compared to those who were married (60% versus 38%, respectively). Of the former, households headed by men who had never married spent 63% more on commercially prepared foods than those headed by women who had never married. Households headed by divorced/separated men spent 37% more on commercially prepared food than households headed by divorced/separated women. **Men (2017)** investigated relationships between marital transitions, economic changes, and food security tracking married and divorced women with children over time. While lower formal educational attainment, disability and having more children were related to higher risk of food insecurity for both married and divorced women, the risk of food security was higher for divorced women than their married counterparts. In a longitudinal study of health-related behaviours from 38,865 male health professionals aged 40-75 at baseline living in the US, **Eng, Kawachi, Fitzmaurice et al., (2005)** reported marital relationship break-up was associated with detrimental changes to men's diets, including reduced consumption of fruit, vegetables and poultry; though red meat consumption also declined. Unmarried men also consumed slightly more snacks. Remarriage positively correlated with positive (increased vegetable consumption) and negative (increased consumption of refined grains) dietary changes. Meanwhile, **Yannakoulia et al., (2008)** found that adults who were never married or had been divorced consumed more fast foods compared to those who were married or widowed.

Very little evidence was found for potential dietary improvements following divorce. **However, Jabs, Devine & Sobal (1998)** interviewed adults who had transitioned to vegetarian/vegan diets in New York (n=19), reporting that divorce liberated participants from existing consumption routines in ways that catalysed a shift away from meat/dairy consumption.

Like divorce, losing a spouse in later life was a life transition associated with mainly negative dietary implications. **de Morais, Alfonso, Lumbers et al., (2012)** interviewed older Portuguese citizens (n=80) about their experiences of food and meals across the life course.

For example, some participants spoke of how discontinuities in relationships (e.g. bereavement) disrupted and challenged domestic food practices in later life. Eating alone following the loss of a partner was linked with increased unhappiness and less satisfaction from eating. In **Delaney and McCarthy's (2011)** interview study with older Irish adults, widowhood was linked to a simplification of food consumption, along with a greater sense of control over food choices, and the belief that they were eating adequately. In a Swedish study, **Edfors and Westergren (2012)** interviewed 12 older adults who were living independently in their own homes about their food habits, purchasing, cooking and eating over time. Participants reported that sudden life changes such as losing a spouse reduced responsibility for food and meal preparation. **Harrison et al., (2011)** interviewed 15 adults aged 80+ to examine the influence of life events on family food consumption patterns. Loss of spouse in later life removed existing routines and constraints to mealtimes for women, which was associated with increased freedom in food-related practices. Conversely, for men, the change was seen more in terms of a reduction in the quality of, and satisfaction with, meals.

Vesnaver, Keller, Sutherland et al., (2015) interviewed 15 Canadian widows living alone about food-related behaviours in later adult life. Participants discussed how loss of commensality occurred after a spouse became ill, leading to food-related changes including a loss of established routines and less routinised eating behaviours that fitted around caregiving responsibilities. Several participants discussed how, following widowhood, new meal patterns were adopted (e.g. no longer fitting around spouse), with food being deprioritised. This was typically associated with a lack of appetite, a lack of care for one's own nutrition, and disinterest in meal preparation. Meal preparation could become sporadic, with increased consumption of convenience foods. This was resolved through a generation of awareness (either self-realised or being told by others in their social circle), self-evaluation and a conscious decision to re-establish their food system and readjust behaviours. In a study comparing the effect of widowhood on weight change, dietary intake, and food practices involving interviews with 58 older widows matched with a married comparison sample, **Shahar, Schultz, Shahar et al., (2001)** found that mean weight loss over time was significantly higher among the widows. In addition, widows ate more meals alone, consumed more convenience foods, along with fewer snacks and prepared fewer meals at home and reported less enjoyment from eating than their married counterparts.

Longitudinally, **Conklin, Forouhi, Surtees et al., (2014)** examined food behaviour change within a large cohort study of 20,274 UK citizens aged 50+ in the UK. They reported that participants who were widowed, living alone or socially isolated consumed fewer vegetable products, which was linked to increased risk of diabetes. The impact of increasing social isolation was found to be enhanced for men, who were less self-reliant, less skilled and less motivated to prepare meals when alone. **Vinther, Conklin, Wareham et al., (2016)** studied marital transitions and changes in fruit and vegetable consumption in a four-year cohort panel study of older adults (n=11,577) in the UK. Men who became widowed were linked with significant reductions in fruit and vegetable variety, and less pronounced reductions in fruit and vegetable quantity. The authors concluded that widowhood could lead to negative dietary health changes, particularly for men. Furthermore, in the study by **Eng et al., (2005)**, compared to other men, those who had been widowed consumed more fried foods, more meals away from the home and fewer at home, as well as increasing consumption of some meat and fish products.

In summary, the literature illustrates how, during the creation and ending of personal relationships, these relationship dynamics function as a catalyst for food-related behaviour change. In terms of the former, life transitions such as marriage appear to have mixed effects on dietary change but suggest that considerable changes take place and consumption increases as people settle into married life, though the evidence is limited to small increases in a narrow range of food categories. This is also reflected in the importance of meal-sharing early in marriage, in ways synonymous with cohabitation; an increased attention to shared food practices may be linked to this. The importance of relationship satisfaction is also underlined by the evidence that satisfaction with ongoing personal relationships can affect food consumption and weight loss/gain. Conversely, as relationships end, for example, through divorce or bereavement, food, and the routines around it, appear to become less important as a result of the loss of commensality, which is both liberating and potentially a time of risk in terms of nutritional health and social isolation.

4.1.5 Pregnancy and parenthood

Becoming a parent typically causes disruption to established habits and routines for the new parents, with some anticipated and planned for, while others are unexpected. Becoming a parent can also represent a change in identity **(Hjelmar, 2011)** and shift in priorities and responsibilities **(Delaney & McCarthy, 2011)**. As such, established diets and food-related behaviours may be disrupted and changed in response. A summary of the identified evidence exploring parenthood and food behaviours is given in Table 7. We extracted 26 articles, of which 13 used quantitative methods, 12 were qualitative and 1 mixed method study. In addition, 13 articles conducted cross-sectional analyses and 13 were longitudinal. As with the other life-events, evidence for parenthood is predominantly observational, however, one study conducted an intervention for sustainable consumption during recent parenthood.

The interview data shows that new mothers and fathers intend to eat more healthily to adhere to their perceived ideals and responsibilities of parenthood and to be a good role model for the child (**Burningham & Venn, 2020; Delaney & McCarthy, 2011; Hjelmar, 2011; MacLellan et al., 2004; Mills, White, Wrieden et al., 2017; Reczek, Thomeer, Lodge et al., 2014**). Indeed, men reported that parenthood had made them more aware of the need for a healthy diet, which prompted them to reduce their previously heavy and voracious food consumption patterns. These changes were framed as a necessary sacrifice to be a good role model for their children (**Newcombe et al., 2012**). In line with this, there is some evidence that becoming a parent is associated with positive changes in diet. For instance, **Garfield and Bartlo (2010)** found that over a third of fathers they interviewed (n=31) reported that they had made positive changes to their eating habits since becoming a father (including increasing health food and beverages while decreasing junk food, red meat and soda). Furthermore, **Tung, Tsay & Lin (2019)** found that individuals who lived with young children had more positive attitudes towards organic food than individuals who did not live with young children, while **Plessz, Dubuisson-Quellier, Gojard et al. (2016)** found, through life-course interviews, that parenthood was associated with an increased consumption of organic products **(c.f. Hjelmar, 2011)**. At the same time, there were negative effects of parenthood identified, with mothers reporting a neglect of their own diet in the role of being a responsible mother or gaining weight through eating children's leftover food (**Delaney & McCarthy, 2011).**

The self-reported and retrospective changes are only partially supported by the evidence from longitudinal survey evidence, which tends to show only limited changes in diet. For instance, **Hartman and Siegrist (2013)** found that females' intake of vegetables did increase significantly, while males' intake decreased significantly when entering parenthood. However, in all other areas of their diet (fruit, salad, pork, beef, poultry, processed meats, sweets, savouries and wine), neither males nor females showed any significant changes. They also did not significantly differ in their diet from participants who did not have their first child in the same period, except for that they ate less salad and more savouries. Similarly, **Laroche, Wallace, Snetselaar et al., (2012)** found that those who had children or stepchildren enter the home during the survey's seven-year time span showed no statistically significant change in total energy, fruit and vegetable, sugar-sweetened beverage, or fast-food intakes. However, those who became parents did reduce their saturated fat less (1.6%) than those who did not become parents (2.1%) in the same time period. **Olson (2005)** tracked women's food choices across the transition to parenthood from pre-pregnancy to 2-years post-partum (n=360). The proportion of women eating 3+ portions of fruit and vegetables per day increased over this period, as did the proportion of women eating breakfast daily. In contrast, **George, Hanns-Nuss, Milani et al., (2005)** also tracked mothers' food consumption over the same period, but found that consumption of fruit, vegetables and grains declined after childbirth. **Smith et al., (2017)** found that becoming a parent was not associated with better diet quality and it was also not associated with changes in takeaway food consumption, although participants who became parents were more likely to eat breakfast at follow-up than those who had no children. **Nasuti, Blanchard, Naylor et al., (2014)** also found changes to only some aspects of diet - first-time mothers significantly decreased their fruit intake and second-time mothers significantly increased their meat intake. First-time fathers significantly increased their fibre intake. There were no significant changes for any parents in the total energy, fat, sugar bread, vegetables or milk they consumed. Finally, a general stability in diet quality, energy, and macronutrient intakes from the third trimester of pregnancy to six months postpartum was found in new mothers. However, several micronutrient intakes decreased over time, mostly due to changes in supplement use **(Lebrun, Plante, Savard et al., 2019)**.

Elstgeest and Dobson (2012) found evidence of more changes in a two-time point survey, with women who had started a family increasing their consumption of high-fat and sugar foods, fruit, and cooked vegetables. Likewise, across eight years of self-reported food purchase information it was found that those in higher-income households increased their fruit and vegetable purchases by 19%. However, among low-income households, there was no detectable change in fruit and vegetable purchases found and so this effect may be income dependent. Other changes observed were an increase in fresh produce by 19%, but there was no change in canned, frozen, or other stored products. Higher income and education were positively associated with fresh produce purchase **(Cliff, Townsend & Wolfson 2019).** In contrast to the lack of change in low-income households noted by **Cliff et al (2019), George et al., (2005)** found that for low-income women, the transition from pregnancy to postpartum was associated with a negative impact on dietary behaviour with a decrease in mean daily servings of grains, vegetables, and fruit and an increase in percentage of energy from fat and consumption of added sugar.

Reasons identified in the evidence base for why new parents may not positively change their diet following becoming a parent included the concern from mothers that healthier foods would be rejected by the family, the view it was important that children had something that they were willing to eat (**McBey et al., 2019**), and that buying local or organic food was too

expensive to be options with reduced finances **(Burningham & Venn, 2020; Kehily, Martens, Burningham et al., 2014**). In contrast, a reduction in perceived behavioural control may also be a barrier to change, with new parents experiencing a decrease in perceived behaviour control in the first six months following childbirth (linked to decrease in feelings of confidence and control over dietary behaviour; **Bassett-Gunter, Levy-Milne, Naylor et al., 2013; Bassett-Gunter, Levy-Milne, Naylor et al., 2015**).

Pregnancy itself has been found to be associated with changes in diet, typically in response to medical guidelines (**Forbes, Graham, Berglund et al., 2018**), with new behaviours, such as checking food content (e.g. reading ingredients), following bodily signals or using common sense (listening to the body), and making exceptions (e.g. having the occasional glass of wine or raw salmon at Christmas; **Hogberg, Sandstrom & Hamberg, 2013).** Further, pregnant women reported increasing their intake of milk products, fruit, and sweet items and commonly decreased or eliminated intake of caffeine, alcohol, and meats (**Forbes et al., 2018**).

One study tested the effect of interventions for sustainable consumption during recent parenthood. The interventions were either just information (leaflets) or a consultation (phone call with an agent who took the participants through the manuals and then offered them either a free two-day ticket for the public transport, vouchers for regional or organic food, discount vouchers for vegetarian cooking courses, or an incentive to change to a provider of "green electricity"). It was found that the recent parents who were in the consultation intervention (but not the information only condition) engaged in significantly less unsustainable behaviour than the recent parents in the control condition (no intervention). However, the effect of the consultation intervention, compared to control, was strongest for those who had neither moved nor had a child in the previous six months. This suggests that, although the period following certain life-events may offer a good opportunity intervene for more sustainable consumption, those in stable parental contexts may be more responsive to sustainable consumption campaigns than those who have very recently become parents (**Schäfer, Jaeger-Erben & Bamberg, 2012**).

Table 7. Summary of results from twenty-six studies providing evidence for associations between pregnancy/parenthood transitions and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Bassett-Gunter et al.	2013	Quantitative/ Longitudinal	Canada	New parents, established parents and non-parents (n=298)	First-time parents feel less control over dietary behaviours	High
Bassett-Gunter et al.	2015	Quantitative/ longitudinal	Canada	First-time parents and non-parents (n=172)	First-time parents feel less control over dietary behaviours	High
Burningham & Venn	2020	Qualitative/Cross-sectional	UK	Mothers (n=40)	First-time parenthood places limitations on	Medium

					dietary aspirations	
Cliff et al.	2019	Quantitative/ Longitudinal	USA	Household heads (n=21,939)	Grocery budget increase during parenthood linked to income	High
Delaney & McCarthy	2011	Qualitative/Cross-sectional	Ireland	Adults (n=60)	Increased sense of responsibility for family nutrition at expense of own diet	Medium
Elstgeest & Dobosn	2012	Quantitative/ Longitudinal	Australia	Women (n=6,534)	Motherhood linked with positive and negative dietary changes	High
Forbes et al.	2018	Quantitative/Cross-sectional	Canada	Pregnant women (n=379)	Parenthood associated with changes in dietary management	High
Garfield & Bartlo	2010	Qualitative/ Cross-sectional	USA	Married/ Unmarried couples (n=5,000)	Fatherhood linked to positive dietary changes	High
George et al.	2005	Quantitative/Cross-sectional	USA	Mothers (n=149)	Consumption of fruit, vegetables and grains declined following childbirth	High
Hartman & Siegrist	2013	Quantitative/ Longitudinal	Switzerland	Adults (n=3,559)	Parenthood linked with increased vegetable intake for female parents and decreased intake for males	High
Hjelmar	2011	Qualitative/Cross-sectional	Denmark	Consumers (n=16)	Increased sense of responsibility for healthy eating	Medium

Hogberg et al.	2013	Qualitative/Cross-sectional	Sweden	Pregnant women (n=23)	Pregnancy linked to changes in diet management	Excellent
Kehily et al.	2014	Qualitative/ Longitudinal	UK	Mothers (n=8)	Parenthood places limitations on dietary aspirations	Medium
Laroche et al.	2012	Quantitative/ Longitudinal	USA	Adults (n=2,881)	Parenthood associated with change in fat intake but no difference in other food consumption	High
Lebrun et al.	2019	Quantitative/ Longitudinal	Canada	Mothers (n=28)	Late pregnancy/post-partum linked with dietary stability but decrease in micronutrient intake	High
MacLellan et al.	2004	Qualitative/Cross-sectional	Canada	Women (n=40)	Increased sense of responsibility for healthy eating	High
McBey et al.	2019	Qualitative/ Cross-sectional	UK	Adults (n=16)	Leaving school unrelated to openness to reducing meat consumption	Medium
Mills, White, Wriden et al.	2017	Qualitative/Cross-sectional	UK	Adults (n=10)	Increased sense of responsibility for healthy eating	Medium
Nasuti et al.	2014	Quantitative/ Longitudinal	Canada	Couples (n=153)	Differences in diet change between first-time and second- time parents	High
Newcombe et al.	2012	Qualitative/Cross-sectional	Ireland	Men (n=33)	Parent linked to motivations to	Medium

					eat healthily for fathers	
Olson	2005	Quantitative/ Longitudinal	USA	Mothers (n=360)	Fruit and vegetable intake increased between pre-pregnancy and 2-years postpartum	High
Plessz et al.	2016	Mixed methods/ Longitudinal	France	Households (n=7,000/30)	Parenthood linked to increased consumption of organic products	High
Reczek et al.	2014	Qualitative/Cross-sectional	USA	Parents (n=40)	Increased sense of responsibility for healthy eating	Medium
Schäfer et al.	2012	Quantitative/ Longitudinal	Germany	Adults (n=1,031)	Stable parental contexts predispose parents to sustainable choices	High
Smith et al.	2017	Quantitative/ Longitudinal	Australia	Adults (n=1,402)	Parenthood not found to lead to diet change but reduced likelihood of skipping breakfast	High
Tung et al.	2019	Qualitative/Cross-sectional	Taiwan	Consumers (n=322)	Parenthood linked with positive attitudes to organic food	Medium

Overall, the evidence shows that some changes in diet and food purchases do occur during the transition to – and experience of – parenthood, but what specific aspect of the diet is changed is inconsistent (and not always comparable) between studies and it is possible that there are other interacting influences, such as income or social context, on food purchases following parenthood. Across the studies, the changes seem to be limited to one or two aspects of the parents' diet, rather than a shift across all measured areas, suggesting that a large part of parents' diets may remain consistent and stable during the transition to

parenthood. Not all shifts are positive, with some evidence that males reduce their vegetable consumption, females eat more high fat and high sugar foods, and both male and female parents eat less salad and more saturated fats. However, there are some positive shifts evidenced, with females increasing their fruit and vegetable consumption, males eating more healthily, and (when affordable) parents purchasing more organic foods. This is perhaps as a way of behaving in line with their new parental identity and perceptions of what is a good role model for their child. A lack of perceived control and a need to satisfy all family members (including children) may be barriers to positive changes to diet. The intervention study suggests that interventions designed to change consumption behaviour may be more effective when individuals are *not* undergoing the transition to parenthood.

4.1.6 Cultural transitions

Cultural transition is an increasingly common phenomenon in a highly interconnected, globalising and transnational world (**Suárez-Orozco, Suárez-Orozco, & Qin-Hilliard, 2001**). Food and eating rituals comprise a type of cultural artefact representative of national and cultural identity and can be highly significant as part of the transcultural experience (**Almerico, 2014**). We identified 10 studies in which movement between different cultures affected people's food-related behaviours. Three studies used quantitative methods and 6 were qualitative, while one used mixed methods. Of these, all 10 were cross-sectional. These studies are summarised in Table 8.

Shifts in food-related practices and consumption come about as a result of moving (either temporarily or permanently) to another culture, such as travelling to another country to study or work. With reference to qualitative evidence, **Wanjun, Steenstra, Wever et al., (2018)** studied changes in South Asian exchange students' food behaviours during a period of study in Sweden (n=6). Students initially lacked the cooking experience and skills required to adapt to the new context and were unfamiliar with product types and pricing. Gradually, students formed new behavioural routines in which they compensated for lack of experience by sharing recipes and learning cooking skills online, as well as using new shopping and food preparation routines such as buying raw or frozen ingredients and using a microwave oven.

Tseng and Fang (2011) found that exposure to stress within a new culture influences dietary changes in a survey of Chinese immigrants to the US (n=426). Subjective migration-related stress was associated with a higher intake of energy-dense and fatty foods. **Pavlova, Uher and Papezova(2008)** used interviews to explore dietary changes among Czech women living and working in the USA (n=15). Within the unfamiliar culture, participants found difficulties in negotiating different foods, unfamiliar eating habits, and increased quantities and perceived healthiness of available food. These affected women's dietary changes leading to weight gain and eating disorders. **Maury-Sintjago, Rodríguez-Fernández, García et al., (2019)** surveyed Haitian immigrants in Chile (n=234), in which it was revealed that immigrants were significantly more likely to experience food insecurity (78% reporting having experienced severe food insecurity). Factors such as having children, limited Spanish proficiency, lack of access to basic services, and lack of legal permanent residency increased the likelihood of food insecurity.

Ando (2019) examined the dietary changes of Japanese households living in the US (n=81). While mothers, who were primarily in charge of meal preparation, cooked familiar Japanese meals and tried to familiarise their children with culturally significant foods, their children

conformed to their cultural surroundings and tended to resist traditional Japanese foods outside the house. In addition, mothers were also concerned about the lack of variety of nutritionally balanced foods in the US and the cost and non-perishable (rather than fresh) quality of traditional Japanese foods. **Chapman and Beagan (2013)** analysed case studies on food decision-making within Punjabi families living in Canada (n=6). The case studies revealed that within the transcultural experience, food choices reconstituted tradition and national identities through eating practices. **Pablos and Olvera (2019)** documented in interviews the nostalgic experiences of Mexican immigrants living in New York (n=35), for whom food was a central part of the nostalgic experience of recovering their sense of national identity, familiarity and belonging in the new culture.

Table 8. Summary of results from ten studies providing evidence for associations between cultural transitions and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Ando	2019	Quantitative/Cross-sectional	USA	Japanese households (n=81)	Cultural transition leads to reconstruction of cultural food practices	High
Chapman & Beagan	2013	Qualitative/Cross-sectional	Canada	Punjabi-Canadian households	Cultural tradition reconstituted through food practices	Medium
Maury-Sintjago et al.	2019	Quantitative/Cross-sectional	Chile	Haitian immigrants (n=234)	Immigration linked to higher risk of food insecurity	Low
Menzies & Sheeksha	2012	Qualitative/Cross-sectional		Ex-vegetarians/ continuing vegetarians (n=34)	Overseas travel linked to return to meat consumption	Medium
Pablos & Olvera	2019	Qualitative/Cross-sectional	USA	Mexican immigrants (n=35)	Food practices as nostalgia for immigrants	Medium
Parra et al.	2014	Mixed/Cross-sectional	USA	Mexican immigrants (n=546)	Greater food safety risks	High

					in food practices	
Pavlova et al.	2008	Qualitative/Cross-sectional	USA	Young Czech women (n=13)	Cultural transition linked to weight gain and food disorder	High
Tseng & Fang	2011	Quantitative/Cross-sectional	USA	Chinese immigrants (n=426)	Migration stress associated with dietary change	High
Wanjun et al	2018	Qualitative/Cross-sectional	Sweden	Asian exchange students (n=6)	Cultural transition associated with adjustments in food practices to adapt to new setting	Medium
Weisberg-Shapiro & Devine	2019	Qualitative/Cross-sectional	USA/Dominican Republic	Female Dominican migrants (n=29)	Marriage, motherhood and divorce linked to shifts between traditional and non-traditional diets for female immigrants	High

Weisberg-Shapiro and Devine (2019) reported on a study of life-course events and dietary change in interviews with Dominican-born immigrants to the US living in low-income neighbourhoods. Participants related how dietary changes occurred at multiple transition points in their lives. For example, following migration to the US, adjustment to living alone in an unfamiliar culture and lacking cooking experience was linked to dietary change towards consumption of takeaway and convenience foods and weight gain. Following marriage and motherhood, food routines changed again to become focused on the family, with a shift to traditional home-prepared foods. Subsequently, those who became divorced returned to non-traditional diets with higher consumption of takeaways or convenience foods. **Menzies and Sheeksha (2012)** examined factors related to giving up vegetarianism in interviews with 19 ex-vegetarians and 15 continuing vegetarians. Travelling in different cultures was one transition associated with the decision to resume meat consumption for reasons of convenience and to avoid causing offence in cultures where vegetarianism by choice was

rare. Finally, **Parra, Kim, Shapiro et al., (2014)** examined home food safety knowledge and practices amongst Mexican-Americans living in the US in a national survey (n=468) and focus groups (n=78). Mexican-born participants were found to perform unsafe food practices more frequently compared to those born in the US, including unsafe thawing practices and storage of leftovers, and were less informed about cross-contamination and bacterial risks.

Culture and identity are tied intimately to food practices and consumption and provide a link to home and source of wellbeing for those living in a different culture. More work is required in understanding the cultural importance of food behaviours. Transitioning to an unfamiliar culture carries several implications relevant to food behaviours. For those new to the culture, the psychological impact can be significant, leading to negative dietary impacts. In addition, a lack of familiarity with food products, pricing and preparation, as well as the potential for being socially isolated, could mean that individuals lack the knowledge and awareness to address their nutritional needs adequately in a different culture, leading to a reliance on unhealthy foods that are easy to prepare or ready to eat. However, over time, as individuals adjust, they can adapt to their surroundings and shift their diets accordingly. In terms of intervention, focus could be given to new migrants in terms of teaching food preparation and cooking skills, as well as ensuring that food assistance schemes, such as food banks, anticipate a wider range of needs, particularly for those who are more likely to rely on them, such as migrants.

4.1.7 Health-related change

Transitions between wellness and illness occur throughout the life-course, bringing about a range of discontinuities and obstacles to everyday life inherent in the illness experience (**O'Connor, 2004**). Ten studies were identified in which direct or indirect experiences of illness impacted on food-behaviours. Table 9 summarises the evidence, which is primarily based on qualitative interview methods. Seven studies used qualitative approaches, while 3 were quantitative. Of these, 9 used cross-sectional analyses and only 1 was longitudinal.

Table 9. Summary of results from ten studies providing evidence for associations between cultural transitions and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Andersson & Stanich	1996	Quantitative/Cross-sectional	Sweden	Older adults (n=370)	Illness led to mostly positive dietary changes	Medium
Anyanwu et al.	2011	Quantitative/Cross-sectional	USA	Older adults transitioning from hospital to home (n=512)	Discharge from hospital for older housebound patients associated with potential nutritional deficiency	Low

Brown & Kromm	2012	Qualitative/Cross-sectional	USA	Older women (n=43)	Ill health associated with negative dietary impacts from comfort eating	High
Delaney & McCarthy	2011	Qualitative/Cross-sectional	Ireland	Older adults (n=60)	Illness linked to positive dietary change	Medium
Dickinson et al.	2014	Qualitative/Cross-sectional	UK	Older adults (n=10)	Food safety not a priority for older adults due to complex transitions in domestic life	Medium
Edfors & Westergren	2012	Qualitative/Cross-sectional	Sweden	Older adults (n=12)	Illness and injury in later life linked to food-related behaviour change	High
Ezendam et al.	2019	Quantitative/ Longitudinal	Denmark	Partners of individuals with a cancer diagnosis (n=699)	Bereaved partners shifted to less healthy diets compared to those non-bereaved	High
Harrison et al.	2011	Qualitative/Cross-sectional	USA	Elderly adults (n=15)	Medical conditions in later life associated with disruptions to maintenance of dietary patterns	Low
Henkusens et al.	2014	Qualitative/Cross-sectional	Canada	Families with a dementia sufferer (n=27)	Decreased satisfaction with mealtimes in a family	Medium

					where a family member enters residential dementia care	
Younginer et al.	2015	Qualitative/Cross-sectional	USA	Food bank users (n=15)	Ill health associated with food insecurity, consumption change and food-saving practices	Medium

Significant illness and incapacity comprised one type of transition to which both negative and positive dietary changes were linked. The qualitative evidence, in which participants reflected on their life-course, dietary changes, and the reasons for those dietary changes, highlighted changes in health of either themselves or family members as motivating a positive (healthier) change in diet, such as reducing consumption of high fat and high energy foods, salt and fried foods, while increasing consumption of fish, fruit and vegetables (**Delaney & McCarthy, 2011**). However, there were also negative (less healthy) changes highlighted, such as eating comfort food as a coping mechanism **(Brown & Kromm, 2012)**. **Younginer, Blake, Draper et al., (2015)** investigated household food insecurity in interviews with adult US food bank users with children (n=15). They reported that loss of employment and ill health were both linked to food insecurity and consumption of low-cost foods and discounted products. Chronic food insecurity was then linked to changes in food practices including preserving foods in advance of anticipated shortages and growing foods. The authors conclude that food insecurity appears to depend on a household's capacity to adequately adjust to a crisis (such as ill health). Changes in health were also linked to a change in care needs and subsequent mealtime experiences. For instance, **Henkusens, Keller, Dupuis et al., (2014)** found that the moving of a family member who has dementia to a care home results in low quality, shared eating experiences which lacked the privacy and intimacy of previous mealtimes at the family home.

Andersson and Stanich (1996) surveyed older Swedish adults (n=370) and asked them to recollect life change events and their consequences. Health status transitions linked to illness and disease (e.g. being diagnosed with diabetes, intestinal problems and infarct) catalysed the most positive dietary lifestyle changes and self-care amongst all other types of life event change reported. In interviews with 12 older Swedish adults living independently, **Edfors and Westergren (2012)** found that participants reported their capacity to be responsible for their own food purchasing and meal preparation was significantly disrupted by sudden life changes such as suffering serious injury or illness. Similarly, **Harrison et al., (2011)** conducted another qualitative study, involving 15 interviews with adults aged 80+ to examine the influence of life events on family food consumption. They also reported that some of the most disruptive changes influencing dietary habits were related to serious medical conditions and changes in health status. In another qualitative study, **Dickinson, Wills, Meah et al., (2014)** investigated

food safety practices amongst older people involving observational, informal interview and diary methods in ten households where participants were aged 60+. The authors report how changes in long-term health problems, social isolation and bereavement were linked to a relegation of the importance of observing food safety practices at home.

Evidence from one longitudinal survey following the partners of those diagnosed with cancer found that bereaved partners showed changes in their diet, with a decrease in fruit, an increase in sugared beverages, and a decrease alcohol intake. In contrast, partners of persons who remained alive generally did not change their diets (**Ezendam, Karlsen, Christensen et al., 2019)**. As such, in this instance, it may be the death of a partner that is associated with a change in diet, rather than the experience of illness itself.

Food-consumption could also be affected following the transition from hospital to home. **Anyanwu, Sharkey, Jackson et al., (2011)** studied the domestic food practices of 512 housebound older adults (aged 60+) discharged from hospital and found that whilst participants had a stock of foods at home, a significant proportion of the sample did not have items such as fresh fruit (16%) or fresh vegetables (15%). The authors conclude that older adults may be at risk of nutritional deficiency following discharge from hospital, leading to additional barriers to recovery based on an inability to prepare meals.

Overall, there is evidence that experiencing either a change in health or a partner's change in health and its consequences can change people's diets and food-related behaviours, particularly among older adults. However, the evidence is predominantly based on recollections and so subject to post-hoc explanations and interpretations and limited in the ability to identify specific behaviour changes. Further longitudinal work to explore the effect of health-related changes is needed to identify the more specific effects of health-related change.

4.1.8 Retirement

Ending paid employment is a key life transition characterised by substantial psychological, behavioural and financial changes (**Bradley, 2001**). The constraints of paid employment are removed, with implications for significant change. As part of the transition, food-related routines that were subject to working patterns become liberated, allowing for changes to food consumption habits. We identified 16 studies providing evidence for retirement as a catalyst for food-related behavioural changes. Methodologically, the majority (11) were quantitative and 5 used qualitative methods. Of these, 7 were cross-sectional and 9 were longitudinal. These studies are summarised in Table 10.

Table 10. Summary of results from sixteen studies providing evidence for associations between retirement and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Ali-Kovero et al.	2020	Quantitative/ Longitudinal	Finland	Older government employees (n=8,960)	Retirement associated with increased fruit	High

					consumption (men) and decreased vegetable consumption (women)	
Allais & Mink	2020	Quantitative/ Longitudinal	France	Retirees (n=1,626)	Retirement associated with reduced food expenditure	High
Barrett	2012	Quantitative/ Longitudinal	Australia	Households with older adults (n=807)	Retirement associated with decreased food expenditure	High
Brzozowski & Lu	2010	Quantitative/Cross-sectional	Canada	Older adults (n=2,188)	Retirement associated with decreased food expenditure due to shift in food preparation	High
Burningham& Venn	2020	Qualitative/Cross-sectional	UK	Retirees (n=40)	Retirement associated with anticipation of increased consumption but also avoidance of unnecessary consumption and waste	Medium
Chung et al	2007	Quantitative/ Longitudinal	USA	Older adults (n=6,012)	Retirement associated with decreased food expenditure	Medium
Delaney & McCarthy	2011	Qualitative/Cross-sectional	Ireland	Older adults (n=60)	Retirement linked to increased enjoyment of meals and	Medium

					positive and negative diet impacts	
Helldán et al.	2012	Quantitative/ Longitudinal	Finland	Older adults (n=2,285)	Retirement associated with healthier diet change for women only	High
Hunter & Worsley	2009	Quantitative/Cross-sectional	Australia	Shoppers (n=352)	Retirement associated with anticipated reductions in food expenditure	Medium
McBey et al.	2019	Qualitative/Cross-sectional	UK	Adults (n=60)	Retirement associated with willingness to shift to more sustainable dietary patterns	Medium
Miniaci et al.	2010	Quantitative/ Longitudinal	Italy	Adults (n=not stated)	Retirement associated with decreased food expenditure and shift to home preparation	High
Plessz et al.	2015	Quantitative/ Longitudinal	France	Older employees of a gas company (n=15,681)	Retirement associated with increased daily vegetable consumption	High
Smeaton et al.	2017	Qualitative/Cross-sectional	UK	Retirees (n=55)	Retirement associated with both opportunities for healthy changes and	Medium

					continuity of habits	
Stephens	2012	Quantitative/ Longitudinal	Japan	Older adults (n=8,000)	Retirement associated with decreased food expenditure for low-income households	High
Velarde & Herrmann	2014	Quantitative/Cross-sectional	Germany	Older household heads (n==3,304)	Retirement associated with increase in home food production	High
Venn et al.	2017	Qualitative/ Longitudinal	UK	Retirees (n=31)	Retirement associated with expectations of increasing consumption but avoidance of unnecessary consumption and waste, including food	High

The most common evidence from studies on dietary change at retirement relates to declining food expenditure and/or consumption. In interviews with older adults in the UK (n=31), **Burningham and Venn (2020)** found that while retirees anticipated increasing their material consumption, they also aimed to avoid unnecessary consumption and waste in line with inherited moral principles, with participants reporting spending less on food. **Brzozowski and Lu (2010)** analysed data from two large Canadian panel studies to examine relationships between food-related consumption, expenditure and production on the one hand and employment status on the other. They found that while retired households spent less overall on food than those in employment, more time was invested in domestic food preparation, consumption and grocery shopping. The authors attribute the decline in expenditure to a shift from food consumed outside the home to consumption at home and having more time to browse for special offers. In interviews with older UK adults planning to retire, retirement was associated with increased domestic food preparation. Similarly, **Velarde and Hermman (2004)** found that home food production was higher in retired households in a large German dataset of household heads and their spouses (n=3,304). The authors conclude that changing time use patterns at retirement enables domestic food consumption to offset any potential income reduction.

Hunter and Worsley (2009) issued questionnaires to 352 shoppers ranging in age, at two shopping malls in Melbourne, Australia, in which they asked how food-related routines might change for them at retirement. Almost half those sample anticipated a lower standard of living, requiring them to change their food shopping habits. Such changes included switching to cheaper brands and seeking out special offers. More longitudinal evidence also supports reduced food expenditure following retirement. **Miniaci, Monfardini and Weber (2010)** analysed data from a cohort of Italian households to examine changes in consumption habits over an 11-year period. They found following retirement, there was a small reduction in food expenditure and consumption of food eaten outside the home, while home food preparation and consumption rose slightly.

Allais and Mink (2020) studied changes in food purchasing during the transition to retirement using home-scan data on consumption of six product types within 33,188 French households over a nine-year period. Transition to retirement was associated with an overall decrease of 12-14% in the total quantity of food purchased, while food expenditure decreased by 14%. These reductions were commoner in households with lower pre-retirement incomes (households with the lowest incomes reduced food consumption after retirement by 16.4% while those with highest incomes saw only a 10.7% reduction). Taking product categories into account, consumption of animal products, plant-based products and 'unhealthy' food items decreased by 10-12%, while expenditure decreased by around 13%. Other products (e.g. oils and condiments, soft drinks) also decreased but only slightly. The dietary changes were also associated with negative health impacts (e.g. reduced intakes of protein, calcium and other vitamins). Conversely, saturated fats and salt also decreased, carrying a positive health impact.

In a study tracking 6,000 older adults over time in Florida, **Chung, Popkin, Domino et al., (2007)** reported that retirement led to a 13% monthly reduction in food expenditure compared to those in employment. In addition, retired citizens ate out less frequently, which was associated with a modest amount of weight loss, more so in households where the female partner had retired. However, the amount of food consumed at home did not change when comparing those retired and non-retired.

Stephens (2012) analysed data from older Japanese citizens who were planning to retire and changes in their food consumption at home and outside the home. The authors found little evidence for any uniform change in food consumption at retirement. For those households receiving a retirement bonus, food consumption increased for a short period at retirement. For lower-income households, non-statistically significant reductions in food and consumption away outside the home (related to giving up work) were found.

Barrett (2012) also found variations in grocery expenditure following retirement in a panel study tracking 807 Australian households over a six-year period. Grocery expenditure declined slightly by 3.9% for those in planned retirement compared to those employed. However, where retirement was involuntary (e.g. due to sudden ill health or incapacity), food expenditure decreased by 7.5%. Therefore, while planned retirement was found to have a minimal impact on food expenditure, those forced into early retirement faced a marked decline in food expenditure.

In addition to a shift in dietary habits towards more home-based food consumption following retirement, other evidence provides limited support that retirement can lead to healthier diets. In a series of interviews with 55 older adults who were in full-time employment but planning to

retire in the next 12 months, **Smeaton, Barnes and Vegeris (2017)** found heterogeneity of responses, in which some participants viewed retirement as a transition associated with the opportunity to make positive lifestyle changes (e.g. changing to healthier diets than they currently had due to unhealthy workplace food consumption). Conversely, others saw retirement in terms of continuity of habits and an opportunity for immediate gratification over health (e.g. continuing to enjoy fried foods). **Delaney and McCarthy (2011)** interviewed 60 older Irish adults, who were asked to subjectively recall times in life when dietary changes had occurred. Participants reported having the time to enjoy meals more in retirement, particularly breakfast. For some, retirement and the availability of time meant an increased focus on eating healthily, while, for others, having more time led to increased snacking or comfort eating due to boredom or being inactive.

In a Finnish study, **Helldán, Lalluka, Rahkonen et al., (2012)** examined shifts in healthy food habits in older adulthood at two timepoints (n=2,285). While there were differences between the diets of retired and working women at baseline, at follow-up, the diets of retired women were healthier, though no such differences were found for retired men. Meanwhile, **Ali-Kovero Pietiläinen, Mauramo et al., (2020)** investigated changes in consumption of 22 food items (including fruit, vegetables and fish) of older working adults (aged 40-60) at four timepoints between 2000 and 2017. They found that as people transitioned from working life to retirement their diets changed, depending on gender. For men, fruit consumption increased following retirement and vegetable consumption increased very slightly, though consumption of fish did not change. For women, consumption of fruit and fish did not change following retirement, however, vegetable consumption declined. This evidence supports the theory that retirement can exercise mixed effects on food consumption. **Plessz Guéguen and Goldberg (2015)** surveyed a cohort of older employees of the French national gas company as they reached retirement (n=15,681), reporting that retirement was associated with an increase in daily vegetable consumption, especially for those who had eaten lunch outside the home when they had been working. However, the change in consumption only reached statistical significance for men.

Finally, **McBey and Johnstone (2019)** set out to investigate interventions to encourage reduction of meat consumption for health, environmental and ethical reasons in 11 focus group in the UK. They reported that there was little evidence that life-course transitions predisposed participants to reduce meat consumption. However, retired participants were willing to consume less popular offcuts of meat, which could yield environmental benefits by making meat production more efficient. This willingness was associated with dietary patterns in childhood, suggesting that meat reduction interventions might target dietary preferences at a young age, which could have enduring implications throughout the life-course.

In sum, retirement is a time of significant change in food-related behaviour. Individuals are required to negotiate changes in everyday routines from ceasing work and potential changes in income. In addition, the current generation of retirees anticipate increasing their consumption but, at the same time, avoiding unnecessary consumption and waste. There is therefore a potential to target interventions at the frugal values adopted by this generation earlier in life. There is solid evidence that food expenditure and preparation change substantially following retirement. Most notably, less money tends to be spent on food, which is explained by a substitution effect in which the home becomes the focus for food preparation and consumption, while eating outside the home declines in line with the end to working life. The evidence for health-related change following retirement is less clear. While the limited

evidence on health-related dietary change has found positive and negative change, there are gender differences and more research is needed to clarify consumption change following retirement; though whether retirees see retirement as a threshold for positive change could be relevant to improving diets.

4.1.9 Exogenous changes

In this review we identified 12 studies in which changes in food-related behaviours following exogenous events have been found. Nine studies used quantitative approaches and 3 used qualitative. Of these, 7 conducted cross-sectional analyses and 5 were longitudinal. These studies are summarised in Table 11.

Table 11. Summary of results from twelve studies providing evidence for associations between exogenous changes and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Birkenmaier et al	2016	Quantitative/ Longitudinal	USA	Household heads (n=21,063)	Economic crisis and job loss linked to food insecurity	Medium
Chatzivagia et al	2019	Quantitative/Cross-sectional	Greece	Adults receiving food assistance (n=499)	Economic crisis associated with dietary change	High
Deli-Gray et al	2013	Quantitative/Cross-sectional	Hungary	Households (1,000)	Economic change linked to change in food expenditure	Low
D'Souza & Joliffe	2014	Quantitative/ Longitudinal	Afghanistan	Households (n=20,483)	Economic crisis associated with dietary change	High
Duquenne & Vlontzos	2014	Quantitative/Cross-sectional	Greece	Households (n=930)	Economic crisis associated with food consumption change	High
Harrison et al	2011	Qualitative/Cross-sectional	USA	Older adults (n=15)	Economic crisis and technological change	Low

					linked to food-related practices	
Hartini et al	2005	Qualitative/Cross-sectional	Indonesia	Pregnant women (n=450)	Economic crisis linked to changes in diet and food preparation	Medium
Hikichi et al	2019	Quantitative/ Longitudinal	Japan	Older adults (n=8,576)	Natural disaster displacement linked to negative dietary impact	High
Ivanova et al	2006	Qualitative/ Longitudinal	Bulgaria	Household heads (n=6,000)	Economic crisis linked to shift in food choices	High
Maia et al	2019	Quantitative/Cross-sectional	Portugal	Older adults (n=604)	Compared to those who were married, unmarried people more likely to be food-insecure	Low
Shabnam et al	2016	Quantitative/ Longitudinal	Pakistan	Households (n=16,341)	Economic crisis linked to changes in food choice and consumption	Medium
Vlontzos et al	2017	Quantitative/Cross-sectional	Greece	Households (n=238)	Economic crisis linked to food consumption change	High

Nearly all the evidence relating to wider exogenous change and shifts in food behaviours has focused on contexts of national economic crisis. Some of the evidence comes from qualitative work. **Harrison et al., (2011)** interviewed 15 adults aged 80+ and asked them to recollect life events that had influenced family food consumption. Participants recalled how major historical events like the Great Depression had profound impacts on diet and food behaviours. For example, participants discussed how food behaviours became increasingly focused on

saving, preserving and not wasting food. Social class differences influenced the extent to which people adopted the changes. In another qualitative study, **Hartini, Padmawati, Lindholm et al., (2005)** interviewed pregnant women in Indonesia during a period of economic crisis (n=450). Participants reported behaviours such as reducing the amount of food consumed and reduced snacking since the crisis began. In addition, food preparation methods became simplified and greater emphasis was given to cooking meals that tasted good (with higher amounts of oil and spices) instead of using more nutritious ingredients that were more expensive.

In a cross-sectional survey of 499 recipients of food assistance in mainland Greece 10 years into a period of national economic crisis, **Chatzivagia, Pepa, Vlassopoulos et al., (2019).** The diets of these participants differed from the general population in several ways. Following food insecurity, energy intake reduced, along with dietary shifts from animal to more plant-based consumption, less fish, fruit, vegetables and lower levels of monounsaturated fats (but higher levels of polyunsaturated fats). Three-quarters of food assistance recipients were also skipping breakfast daily. **Duquenne and Vlontzos (2014)** conducted a single-timepoint analysis of a stratified random sample of 930 Greek households following the onset of economic crisis and austerity measures. Households reported significant changes in their food consumption as a result of austerity. While few (20%) households reduced consumption of basic food products (e.g. rice, pasta, potatoes, olive oil, bread, fruit and vegetables, milk), a higher proportion (40%) reduced consumption of meat and dairy products. Food consumption impacts were most felt in lower-income and in semi-urban and rural areas. **Vlontzos, Duqueen, Haas et al., (2017)** also studied changes in fruit and vegetable consumption during the economic crisis in Greece using a cross-sectional survey (n=238). Independently of the degree of economic impact, fruit and vegetable consumption decreased. However, for those who were most impacted, cost was the most important factor in deciding whether to purchase fruit and vegetables, while for those less affected, locality of production and health concerns were primary.

Maia, Monjardino, Frias et al., (2019) examined surveyed 604 Portuguese adults during an economic crisis, finding that those who subjectively assessed their household income as insufficient were more likely to be classified as food insecure. Moreover, those who were unmarried were also more likely to live in a food–insecure household, regardless of age, sex, education and household income perception. **Deli-Gray Árva and Matura (2013)** examined domestic consumption patterns of Hungarian citizens' during an economic crisis in a cross-sectional survey (n=1,000). While 15% of the sample reported that they did not discern changes in their food expenditure, another 20% felt that their food spending had decreased slightly over the previous three-year period, and that purchases of cheaper brands and discounted products increased.

Longitudinal research has also examined food-related change in response to economic crisis. **Birkenmaier, Huang and Kim (2016)** analysed data from a large panel survey of households during economic crisis (n=21,063), finding that job loss was a significant factor (78% of household heads who had lost their job during the observation period were food insecure). The authors conclude that financial security significantly affects food security during economic crisis generally and that without savings as a buffer, households are at much higher risk. **Huang and Birkenmaier (2016)** analysed links between unemployment and food insecurity against the backdrop of economic recession in a longitudinal survey of data from working age

heads of households (n=15,865) from 2008-11. Unemployment was positively related to food insecurity even when controlling for food insecurity prior to unemployment. Having one or more periods of unemployment increased the chances of food insecurity by 8%.

D'Souza and Joliffe (2014) tracked data from nationally representative sample of households in Afghanistan during a food price crisis (n=20,483). The analysis revealed that the households with the lowest energy intakes had very little variation in their diets and had sacrificed variation in their diets in order to purchase cheaper foods just to maintain energy intake, with potential health implications. Conversely, households with high energy intake made significant reductions across most major food groups (fruit, vegetables, sugars and oils/fats), with most energy from grains. Similarly, in a study of a food price crisis in Pakistan, **Shabnam, Santeramo, Asghar et al., (2016)** found that in response to the crisis, poorer households shifted their diets by reducing the variety of foods that they ate and reducing consumption of costly food items in favour of basics. Conversely, in a longitudinal analysis of dietary change in 6,000 Bulgarian households during economic transition between 1985-2002, **Ivanova, Dimitrov, Ovcharova et al., (2006)** found that while consumption of most major food products decreased (with consumption of more expensive foods decreasing more than basic foods), per capita energy intake decreased but dietary patterns did not significantly change.

Other studies have investigated other exogenous changes and their impact on food-related changes. **Hikichi Aida, Kondo et al., (2019)** tracked the effects of household displacement on obesity longitudinally during a natural disaster (the 2011 Japanese earthquake and tsunami). Data came from a larger cohort study of older adults in the Japanese coastal city of Iwanuma (n=8,576). BMI was found to be positively correlated with proximity to food outlets/bars for people who had been displaced by the disaster.

In addition to reporting on the food-related impacts of economic crisis, **Harrison et al., (2011)** also discuss the role of technological advances and their retrospective impacts on food practices in participants' discussions. Technological changes such as domestic refrigeration, food storage and availability of canned food were reported as substantially changing household food practices.

In sum, most studies on exogenous change and shifts in food behaviours have focused on national economic crises. Changes to diet during these times are profound, particularly for lower-income groups, and include reduced food consumption, choosing cheaper brands, eating fewer animal products and fruit or vegetables, in favour of more basic foods (e.g., grains). Much less is known about how natural disasters, technological advances, or other exogenous shocks, impact food behaviours.

4.1.10 Other life transitions

In this review we identified 13 studies providing evidence for links between other life transitions and food-related behaviours. Of these, four investigate unemployment and two focus on residential relocation. There are also single examples of evidence in the context of school exams, transition from adolescence to adulthood, and holidays. The final two studies look more generally at generic life event impacts on food-behaviour. Six studies used

quantitative methods, while the other 7 were qualitative. The majority (10) conducted cross-sectional analyses and 3 were longitudinal. These studies are summarised in Table 12.

Studies have documented evidence for food-related behaviour change following change loss of employment. Unsurprisingly, some research has found that losing one's job is associated with changes in food expenditure and greater risk of food insecurity. **Prayogo, Chater, Chapman et al., (2018)** explored the characteristics of food bank users in a cross-sectional survey of food bank users in the UK (n=270) and a matched sample of users of citizens' advice centres as a control group (n=245). Amongst other factors relating to food bank use such as benefit delays/changes and low income, a significant percentage of food bank users were males who were unemployed, under significant financial strain and affected by adverse life events. **Etana and Tolossa (2017)** conducted a cross-sectional survey of a random sample of Ethiopian households (n=410) and compared food insecurity status between adults who were employed and unemployed. They found that while the majority of both employed and unemployed households were food insecure, food insecurity was significantly more likely if the head of the household was unemployed. Conversely, in a cross-sectional, qualitative study of 19 Italian consumers, **Naspetti, Zanoli and Brachhi (2008)** reported that increased salary (or other income) did not drive increases in consumption of organic food. The authors speculate that organic food consumption is instead primarily driven by a shift in awareness and personal values.

Winpenny et al., (2018) tracked dietary changes amongst Norwegian adolescents and young adults between the age of 14-30 (n=1,100). Entering the job market was associated with a slight increase in consumption of fruit. **Smed, Tetens, Lund et al., (2018)** examined the effects of unemployment on diet using a longitudinal dataset of monthly food purchasing from 3,340 Danish households over a four-year period. In the short term, unemployment was associated with an initial increase in food expenditure, along with increased use of discount stores. Food consumption also changed. Unemployed participants increased consumption of saturated fats, total fats and protein, linked to consuming more animal products. In the medium term, food expenditure declined along with consumption of animal products (with commensurate reduction in saturated fats, total fats, and protein). In the longer term, consumption of carbohydrates and sugars increased. The authors conclude that unemployment has substantial effects on dietary composition, but these effects change in accordance with the duration of the period of unemployment.

Table 12. Summary of results from thirteen studies providing evidence for associations between other life transitions and food-related behaviour change

Study	Year	Method	Location	Sample	Main finding	Relevance
Andersson & Stanich	1996	Quantitative/Cross-sectional	Sweden	Older adults (n=370)	Illness associated with the most positive dietary changes	Medium
Anyanwu et al	2011	Quantitative/Cross-sectional	USA	Older adults transitioning from hospital to	Discharge from hospital for older housebound	Low

				home (n=512)	patients associated with potential nutritional deficiency	
Dickinson et al	2014	Qualitative/Cross-sectional	UK	Older adults (n=10)	Food safety not a priority for older adults due to complex transitions in domestic life	Medium
Edfors & Westergren	2012	Qualitative/Cross-sectional	Sweden	Adults (n=12)	Illness and injury in later life linked to food-related behaviour change	High
Etana & Tolossa	2017	Quantitative/Cross-sectional	Ethiopia	Adults (n=410)	Unemployment linked to food insecurity	Low
Gojard & Véron	2019	Qualitative/Cross-sectional	France	Women (n=2)	Holidays associated with changes in food shopping routines	Low
Harrison et al	2011	Qualitative/Cross-sectional	USA	Older adults (n=15)	Medical conditions in later life associated with disruptions to maintenance of dietary patterns	Low
Jabs et al	1998	Qualitative/Cross-sectional	USA	Vegetarians/ Vegans (n=19)	Residential relocation as a catalyst for vegetarianism	Low
Menzies & Sheeksha	2012	Qualitative/Cross-sectional	Canada	Ex-vegetarians /continuing vegetarians (n=34)	Residential relocation catalysed changes in dietary choices	Medium
Michaud et al.	1990	Quantitative/ Longitudinal	France	High school students (n=225)	On exam day, student energy and fat intake	High

					increased significantly	
Naspetti et al.	2008	Qualitative/ Cross-sectional	Italy	Consumers (n=19)	Salary (or other income) increase does not drive organic consumption	Low
Smed et al	2018	Quantitative/ Longitudinal	Denmark	Households (n=3,340)	Unemployment linked to changes in food expenditure	High
Winpenny et al	2018	Quantitative/ Longitudinal	Norway	Young adults (n=1,100)	Starting work associated with slight increase in fruit consumption	High

A couple of qualitative studies have found evidence that residential relocation can influence dietary changes in positive ways. **Jabs et al., (1998)** investigated transitions to vegetarianism as part of a wider study on people's experiences of vegetarianism. In interviews with vegetarians and vegans in New York (n=19), the authors found that moving to a new area catalysed dietary shifts towards eradicating meat consumption. Similarly, **Menzies and Sheeksha (2012)** examined factors related to giving up vegetarianism by conducting interviews with 19 ex-vegetarians and 15 continuing vegetarians. Participants reported that life transitions such as moving to a new house disrupted existing dietary habits. This was especially the case for young people who tended to live in shared housing where adaptation to food practices with new housemates could incur adjustments, such as resuming meat consumption.

With reference to transitions in youth, in a longitudinal study of a major exam period at a French high school, **Michaud, Kahn, Musse et al., (1990)** examined the effects of what they considered a critical life event on dietary behaviours among the students (n=225). The authors recorded food consumption on the day of an examination and on a matched non-examination as a control. The results revealed that students' energy and fat intakes were significantly higher on the exam day than on the matched control days. **Delaney and McCarthy (2011)** looked at food choices across the life=course using a qualitative approach in which a subsample of 60 older Irish adults (aged 61-79) were asked to recall life events that had caused dietary changes. The transition to adulthood was associated with exposure to a wider range of foods and eating contexts that had been far more limited in childhood.

Very limited evidence has found changes to food consumption during holidays. **Gojard and Véron (2019)** examined detailed case studies involving two French women transitioning from home to holiday. Compared to food shopping practices at home, time devoted to food shopping increased, along with the range of retailers visited, and a switch of focus towards purchasing more local produce; these changes effectively transformed routine food shopping

into a leisure activity. While local produce was sought back home in Paris, such shopping practices were constrained by the availability of produce and higher cost.

More generally, **Wood (2010)** conducted a series of experiments to investigate whether major life upheaval leads to familiar, comfort-related food choices. In several studies with US undergraduate students (n=203) students were more likely to choose novel snack options during times of significant life upheaval in which the more significant the change, the more likelihood of the novel snack being chosen. This finding disconfirms the assumption that people turn to more familiar snack products during periods of significant life change. Finally, **Jackson and Vaughn (2017)** used interviews and self-report surveys to examine relationships between disruptive life events and food insecurity across a panel of 6,270 US households. Multiple disruptive life events created an additive effect that statistically significantly increased the likelihood of persistent household food insecurity by up to six-times relative to houses where no disruptive life events were reported.

Overall, from the evidence that was not quite studied frequently enough to form its own category, it is shown that financial insecurity (either through unemployment, having a low income, having delays in benefits or having multiple, additive life-events) was associated with food insecurity. Longitudinal evidence suggests that there is a change in dietary composition associated with unemployment, however, these effects change in accordance with the duration of the period of unemployment. Residential relocation was found to disrupt eating habits, particularly away from or towards eating meat. Specific periods of stress, such as exams, were found to cause an increase in energy and fat on the day of the exam (this was not longitudinal, however, so no conclusions about the longevity of this disruption can be drawn). More generally, becoming an adult and visiting a holiday home were identified as periods in which food related behaviours change, with exposure to a wider variety of food. Some experimental work showed that greater self-reported experiences of (unspecified) upheaval in their life lead to participants being more likely to select snacks that were novel to them, as opposed to ones they were familiar with. This gives evidence that being in a period of change can make people be more open to novel experiences.

4.2 Methodological context of study

Surveying all the reviewed studies on moments of change and food-related behaviour change, there was a reasonable balance between quantitative and qualitative studies, though slightly in favour of quantitative methods. However, for some transitions (e.g. retirement, and exogenous change) methods were more skewed towards the use of quantitative approaches. For other transitions (e.g. cultural and health transitions), qualitative methods dominated. Only 2 studies incorporated mixed methods. There were also significantly more cross-sectional analyses than longitudinal overall. Some categories (e.g. cultural transitions and health change) had very little or no longitudinal evidence. A summary of methods for each transition category is presented in Table 13.

Table 13. Summary of Methods, analytic approach, and subjective relevance across transition categories2

Category	Quantitative	Qualitative	Mixed methods	Cross-sectional	Longitudinal	Mean relevance
Leaving education/ home	8	6	0	7	7	2.57
Cohabitation	6	7	0	8	5	2.23
Relationship change	12	9	0	14	7	2.09
Pregnancy and parenthood	13	12	1	13	13	2.65
Cultural transition	3	6	1	10	0	2.20
Health change	3	7	0	9	1	2.40
Retirement	11	5	0	7	9	2.56
Exogenous change	9	3	0	7	5	2.08
Other transitions	6	7	0	10	3	1.90
All	**71**	**62**	**2**	**84**	**50**	**2.32**

In addition to categorising each article by methodological and analytic approach, we also gave a subjective rating of the relevance of each article to the literature review question. This was based on a score of 1 (Low relevance), 2 (medium relevance) and 3 (high relevance). The overall mean score indicates the relevance of the literature base to the research question. The means show that in almost all categories there was medium-high relevance. Only in one category (Other transitions) did relevance fall below 2, which likely reflects the limited attention given to food behaviours in the context of these transitions.

While qualitative studies are useful in providing rich levels of detail on the perspectives and understandings expressed by study participants, many of the qualitative studies reviewed asked participants to recall life transitions and their impacts on food-related behaviours in retrospect through subjective accounts (e.g. **Andersson & Stanich, 1996**), making them potentially open to biases, post-rationalisation of cause and effect, and incomplete or incorrect recall of events, particularly when those events occurred a long time in the past. In contrast, **Hunter and Worsley (2009)** asked younger participants to speculate on how their consumption would change when they came to retire.

In addition, many studies, both quantitative and qualitative, used cross-sectional methods to deduce associations between life transitions and food-related behavioural changes (e.g. **Edfors & Westergren, 2012**). Cross-sectional studies gauged at a single timepoint are valuable in that they provide a snapshot that can be used to compare observed differences between different populations. However, they also have limitations in the study of life transitions in that they do not provide clear evidence for cause-and-effect relationships; neither do they provide clear evidence for behavioural change over time.

[2] NB. Totals exceed the size of the literature base (110) because some studies were cited in multiple categories.

There were fewer longitudinal studies than cross-sectional studies in the review, and these were almost exclusively quantitative. While longitudinal analyses provide more reliable evidence for behaviour change over time, the methods used only provide evidence that a change has or has not occurred. However, the cause of change is often speculative, therefore caution should be exercised in interpreting the findings.

Sample size is also relevant to the generalisability of behavioural effects in the studies reviewed. The qualitative evidence presented typically uses smaller, non-representative samples (e.g. **Gojard & Véron, 2019**), limiting confidence in the extent to which any effects observed can be generalised to the wider population. Quantitative evidence with larger, more representative samples therefore offers a greater degree of confidence in the generalisability of observed effects.

The timing of the study also potentially limits the value of the evidence presented. As mentioned above, qualitative studies that require participants to reflect on past events and behaviour can introduce biases into responses. Likewise, quantitative evidence may also differ in quality depending on when data is collected. For example, several studies investigating the impacts of economic crisis on food behaviours (e.g. **Chatzivagia et al., 2019**) analysed data collected sometime after the onset of change. It is therefore more difficult to speculate on the relationships between specific life transitions and behavioural changes when the gap between one and the other is significant. Longitudinal studies that measure behaviour pre- and post- change therefore offer better evidence that the observed changes are attributable to the transition(s) in question.

On a related point, there was significant variation in the way that food-related behaviours were operationalised and measured. More generally, many studies rely on self-reported food expenditure or consumption, including food diaries or surveys (e.g. **Winpenny et al., 2018**). However, there are some exceptions where more objective data has been collected, such as supermarket scanner data (e.g. **Reitmeier & Roosen, 2015**). Some quantitative longitudinal studies (e.g. **Bassett-Gunter et al., 2015; 2013**) recruited participants (pregnant women) after they became pregnant and asked them to estimate their dietary intake pre-pregnancy. Similarly, other studies measured behaviour based on short time periods or a limited range of foods. For example, **Beasley et al., (2014)** compared differences in food consumption between university students living at home or away from home based on consumption over a single 24-hour period. Meanwhile, **Reitmeier and Roosen (2015)** studied change in consumption of a single type of dairy product, underlining the point that the nature, duration and comprehensiveness of food behaviour measurement is crucial to assessing the quality and generalisability of evidence provided.

4.3 Prospects for food-related behavioural interventions at moments of change

The review shows that disruptions to established behavioural routines and habits at various transitions across the life-course and more widely across societies appear to influence changes in relation to a range of food behaviours. Indeed, the sheer range of transitions studied, methods used, and behaviours measured underline the heterogeneity of the evidence base. While the review found that behaviours appeared to change during these life transitions, methodological gaps and limitations in many studies constrain the extent to which it is possible to draw firm conclusions about the nature of such shifts. Moreover, the evidence

highlights that transitions carry different implications based on factors such as culture, gender, income and age and should therefore be carefully tailored. A one-size-fits-all approach is unlikely to leverage change uniformly.

Adolescence is a period of substantial transition to adulthood. While few significant shifts in food-related behaviours were found by the review, this may be related to the fact that during such transitions, adolescents are only just beginning to engage in food-related behaviours. During the transition to more independent living, interventions might capitalise on the desire for autonomy and the relative lack of cooking skills and knowledge that need to be gained to live independently **(Koehn et al., 2016; Blichfeldt, 2013)**. Interventions that target new students or young people setting up home might impart food-related skills to target dietary quality and food practices.

Following cohabitation, potential interventions might target opportunities for discussion and negotiation between partners in the blending and reconstruction of consumption and food practices (**Anderson et al., 2004**). Attention to household dynamics and relationships might be exploited by interventions through counselling couples as they begin to cohabit in order to maintain healthy diets and prevent weight gain (**Mata et al., 2018; Hartmann et al., 2014**). Further to this, related transitions to marriage and parenthood provide additional opportunities for intervention. While these life changes influence both positive and negative dietary health changes, it may be important to try to change practices before they become increasingly routinised in line with the transition to a marital relationship and starting a family (**Harrison et al., 2011**), which might limit the effectiveness of interventions.

Conversely, targeting interventions to life transitions in which individuals are liberated from food routines (e.g. empty nesters or retirees), might provide increasing scope for change. Encouraging behavioural change would also need to attend to budgets, which are particularly stretched during early marriage and parenthood (**Burningham, 2020**) as well as at retirement for some groups. However, alternative food practices and provisioning may gain traction, as observed in retirement in which there is a shift towards domestic food production (**Brzozowski & Lu, 2010**). Targeting mothers might be especially fruitful, as they are still most commonly the partner primarily responsible for family nutrition and food preparation in heterosexual relationships (**Delaney & McCarthy, 2011**). Interventions that target first-time parents in ways that increase their sense of organisation and control over domestic practices could ensure that parents do not neglect their own diets during the chaos of early child-rearing (**Bassett-Gunter et al., 2013**). Moreover, interventions might be more effective if they engage with parents on an interpersonal level, rather than simply through information provision (**Schäfer, Jaeger-Erben & Bamberg, 2012**).

Interventions following the ending of relationships (e.g. following divorce or loss of a spouse) present another important opportunity at a time when negative dietary impacts are increasingly likely. Key to addressing these changes appears to surround food preparation and meals when alone and without anyone to cook for or to share meals with. Interventions might target those who are not in relationships, or socially isolated and encourage the sharing of meals with others. In addition, providing the opportunity to develop food-related skills, knowledge (especially for men who may be lacking these skills) might reduce negative dietary impacts.

This review has also highlighted how other marginalised and disenfranchised groups in society (including those with chronic health conditions, the unemployed, and immigrants) also face significant risks including food insecurity and negative dietary impacts. Interventions are required that provide protection from negative food-related impacts. Evaluations of reforms in existing welfare systems should be considered in order to provide buffers to minimise the health-related dietary impacts of negative life transitions (**Smed et al., 2018**).

5 Summary and conclusion

This rapid literature review set out to investigate existing evidence concerning the implications for a range of lifestyle transitions on changes in food-related behaviours. This included a review of evidence on food purchasing and expenditure, food consumption, food preparation, food safety, waste and sustainability. Life transitions comprised a range of endogenous/exogenous, voluntary/involuntary and short-term/longer-term life changing events throughout the life course.

Most of the evidence focused on food consumption, expenditure and preparation, and there was very little evidence in relation to life changes and food safety, waste and sustainability. However, the review was not exhaustive, and it is not possible to rule out the existence of additional studies. The evidence presented indicates that, for some people, within certain contexts, life transitions carry implications for both positive and negative food-related behaviour change. However, we have pointed out that the diversity and methodological heterogeneity of studies provide little causal evidence for clear behavioural changes. Where differences have been found, these have been more related to food expenditure, consumption and preparation, while little research has investigated life transitions in the context of food safety and sustainability.

Interventions targeting specific moments of change should be tailored to specific groups, as the effects of transitions appear to differ based on factors such as culture, gender, income and age. In addition, while some transitions appear to involve the increasing routinisation of food-related practices (e.g. cohabitation, marriage, parenthood), others are more disruptive (e.g. divorce, children leaving home).

Certainly, there is initial evidence that diet and some food-related behaviours are susceptible to disruption from moments of change. However, despite the size of the literature base, there is relatively little coherence in terms of defining how and when food-related behaviour change in response to moments of change might be observed and measured. Linking back to the introduction, this also reprises questions of what counts as a moment of change, as well as when do such transitions begin and end? Furthermore, the multiplicity of changes that make up a life transition and overlap with others, make specific causal agents difficult to determine, particularly if these are additive. Therefore, more research is necessary to give clarity to the field and to advance the theoretical understanding of moments of change. This, along with methodological advances will help to address the large gaps that exist in the literature and to facilitate the implementation of policy and interventions in relation to other relevant life transitions.

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