Cambridgeshire County Council

Sheffield Hallam University | Centre for Behavioural Science and Applied Psychology

Supporting healthy diets amongst residents in Cambridgeshire

Phase one report: Insight gathering and intervention recommendations

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Executive Summary

Sheffield Hallam University were commissioned by Cambridgeshire County Council and Peterborough City Council to undertake research to understand the barriers and facilitators for seven health behaviours.

In Cambridgeshire, we explored:

- Physical activity, **Diet**, Smoking in adults, Alcohol consumption, Uptake of NHS health checks, and Vaping in young people

In Peterborough, we explored:

- Uptake of routine childhood vaccinations

This report presents the findings from the diet workstream in Cambridgeshire. The findings for other health behaviours in Cambridgeshire and Peterborough are presented in separate reports.

The aim was to:

- Identify the barriers and facilitators to dietary behaviours in Cambridgeshire.
- Make recommendations for interventions that have the potential to address those identified needs

Our approach

We used the Capability, Opportunity and Motivation – Behaviour (COM-B) [1,2] model to explore factors influencing dietary behaviours.

We conducted a survey and interviews of local residents in Cambridgeshire. We also conducted a rapid evidence review using the Behaviour Change Wheel (BCW) [1,2] to understand what types of interventions have been implemented to support healthy diets amongst underserved communities.

We then produced a heat map [3] to explore whether, and to what extent, existing interventions have the potential to address these identified barriers and facilitators.

Informed by the BCW, we made intervention recommendations to address those identified barriers.

We used the APEASE evaluation criteria [2] to explore which intervention recommendations are likely to be acceptable, practical, effective, and affordable for parents to receive, and for Cambridgeshire County Council and/or wider stakeholders to deliver, and whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.

Key findings – local survey

We surveyed 1,037 residents in Cambridgeshire about their dietary behaviours. We used fruit and vegetable consumption as a marker for dietary quality. We found that Capability, Opportunity, and Motivation (COM) for eating 5 portions of fruit and vegetables a day varied based upon key factors, including:

District – residents in **Fenland** reported lower consumption of fruit & veg, whereas residents of **Huntingdonshire** reported greater consumption of daily sugary snacks and drinks, and takeaways. **Huntingdonshire** residents also reported **lower COM factors** to eating 5 fruit and vegetables a day.

Age – younger adults aged **18-29 years old** reported poorer dietary behaviours, as well as **weaker Capability and Motivational** factors to eating 5 fruit and vegetables a day.

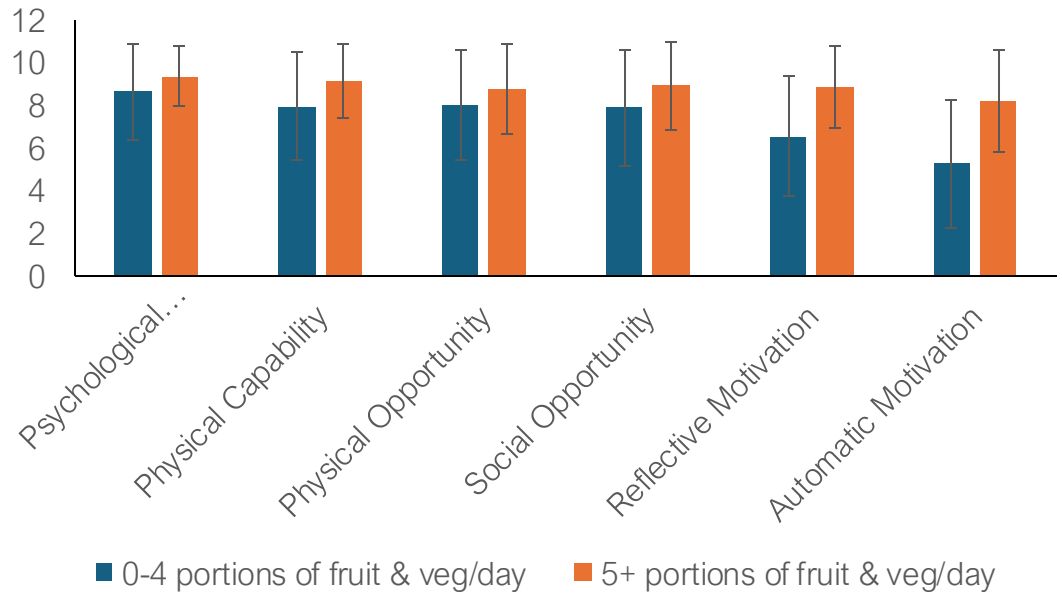
Employment – was related to **higher** fruit and veg consumption, as well as **higher** daily snacks, sugary drinks and weekly takeaways. **Unemployed** residents reported **lower COM factors** to eating 5 fruit and vegetables a day.

Education - residents that were **educated to degree level or above** reported **higher** consumption of fruit and vegetables per day, and **lower** consumption of snacks and sugary drinks per day.

Health Condition - Residents that had a **limiting health condition** reported consuming **less** fruit and vegetables per day, **less** snacks and sugary drinks per day, and less takeaways per week.

Residents who reported consuming <4 portions of fruit and vegetables a day reported weaker Capability, Opportunity and Motivation to eat 5 portions of fruit and vegetables a day, compared with those who eat ≥5 portions a day.

Capability, Opportunity and Motivation for eating five portions of fruit & vegetables a day by those who do & do not eat five portions a day



Key findings – interviews

We interviewed 9 residents of Cambridgeshire between the ages of 18 and 45. We identified a range of barriers (B) and facilitators (F) for adopting a healthy diet, including:

- Knowledge and understanding about what a healthy diet means, including understanding nutritional information (F)
- Skills to plan and prepare healthy and/or fresh meals (F)
- Perceived ease of access to healthy ingredients OR fast food (B/F)
- Perceived affordability of healthy ingredients (B/F)
- Perceived short "shelf life" of healthy ingredients e.g. fruit and vegetables (B)
- Having enough time (or not) to prepare healthy meals (B/F)
- Being "health conscious" and having intentions to have a healthy diet (F)
- Learning about healthy eating and food preparation from family or friends (F)
- Growing up around others with healthy dietary behaviours (e.g. eating fruit and vegetables) (F)
- Being around others making unhealthy diet choices (B)
- Believing (or not) that healthy eating is important for health (B/F)
- Confidence (or lack of confidence) that you have the skills and ability to make healthy diet changes (B/F)
- Eating more unhealthy foods at times of stress (B)
- Not enjoying foods considered to be healthy OR enjoying eating unhealthy foods (B)
- Having specific goals related to healthy eating (e.g. eating a certain amount of fruit and vegetables, weight loss goals) (F)

I try to plan ahead. So when I do the food shop, I try and plan the week ahead. It doesn't always go as planned but we've always got plenty of food to base it round. It's always healthy enough and stuff [Participant 9]

... having to change what we eat to something we are actually not used to would be quite hard for us to adjust. So it would be difficult. [Participant 3]

when my mum does the groceries, she's a bit... like I did say food's cheap here. So she occasionally buys those pizzas, fries and all of that. [Participant 4]

I'm quite lucky that my parents brought me and my sister up to cook...I know not everyone has that. So I think it's from just being around people that cook. And then also cooking from a young age. [Participant 8]

Key findings – rapid evidence review

We conducted a rapid evidence review to identify which types of interventions support healthier dietary behaviours across three domains: promoting healthy eating, reducing intake of unhealthy foods, and influencing food purchasing behaviours.

We included 30 studies, all targeting adults from lower socio-economic positions. Some studies targeted more than one dietary behaviour (e.g., promoting healthy diet and reducing intake of unhealthy foods at the same time).

Interventions utilised a range of intervention functions, including:

- Enablement (used in 15 interventions promoting healthy diets; 8 reducing unhealthy food intake; 4 influencing purchasing behaviours) – aimed to support participants in setting goals, problem-solving diet related challenges, and plan changes.
- Environmental Restructuring (11, 3, and 11 interventions respectively) – aimed to modify physical or social environments to support intake of healthier diets.
- Training (11, 7, 4 interventions respectively) – aimed to build skills such as label reading, cooking, budgeting.
- Education (11, 5, 5 interventions respectively) – aimed to improve knowledge and understanding of healthy diets and consequences of unhealthy food consumption.
- Modelling, Incentivisation, and Persuasion were less frequently used but played important roles in some settings.

Commonly used **behaviour change techniques (BCTs)** included:

5.1 Information about health consequences – used in 11 healthy diet interventions, 5 targeting unhealthy food intake, and 4 targeting purchasing behaviours: raised awareness of diet-health links.

1.1 Goal setting (behaviour) – appeared in 11 interventions promoting healthy diets, 5 targeting unhealthy food intake and 1 targeting purchasing behaviours: helped participants set and monitor personal dietary targets.

1.2 Problem solving – used in 9 healthy diet, 5 unhealthy food intake and 2 targeting purchasing behaviours interventions: addressed practical barriers to dietary change.

12.1 Restructuring the physical environment – most common in food purchasing interventions (6 interventions): changed store layouts, product placement, or introduced new food access points.

Less frequently used than some of the most common techniques, **1.4 Action planning, 4.1 Instructions on how to perform the behaviour, 7.1 Prompts/cues,** and **3.1 Social support** contributed to enhancing participants' Capability, Opportunity and Motivation to adopt healthier dietary habits.

Key findings – Heatmap

We identified whether 30 published interventions have the potential to address each of the identified barriers and facilitators for a healthy diet.

No interventions in the review addressed emotion and how this might impact upon a person's diet. The interviews highlighted that emotions and particularly enjoyment from eating, preparing food, and enjoying food with family/friends was a facilitator to a healthy diet. Therefore, we need to consider how to promote positive emotions related to a healthy diet.

Interventions have primarily focused on reinforcing the behaviour of eating a healthy diet and extrinsic (externally-driven) factors such as providing information about health consequences. However, interview participants discussed how their diet choices were reinforced by more intrinsic factors, such as improved mood and feeling full of energy. Interventions should therefore consider how we can encourage individuals to consider these more intrinsic reinforcements to promote a healthy diet.

Goal setting was the most frequently used behaviour change technique in interventions included in the review and focused on goals related to a specific behaviour (e.g. eating 5 fruit & vegetables per day). Participants also discussed how having goals related to outcomes (e.g. weight loss) were effective. Encouraging a person to consider their goals in relation to wider factors, other than just the behaviour may help to reinforcement positive outcomes.

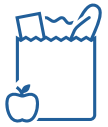
The skills that a participant reported having and their confidence in their skills was a facilitator to preparing healthy meals. The review highlighted that several interventions have focused on promoting a person's skills to prepare food. There are potentially other skills that are important to be considered when encouraging a person to have a healthy diet, including shopping and meal planning, which may not have been addressed through previous interventions.

Our recommendations

Intervention recommendation 1.1:
Overcoming temptations for Impulsive Eating

Findings from the qualitative insights highlighted that when some participants were stressed or preoccupied, they were more likely to eat impulsively or reach for unhealthier foods. We recommend creating resources to support individuals to consider situations that trigger them to eat impulsively and to make plans for overcoming those temptations. Resources would guide people:

- To reflect on and identify the situations and cues that tempt them to eat unhealthily (e.g. stress or social cues).
- Identify a strategy to address each of these temptations.
- To create a Coping Plan in which a person links each of the temptations with an appropriate alternate response and commits to sticking to this coping plan.



Intervention recommendation 1.2:
Shopping & Meal Planning

Interview participants who planned and/or batch-cooked their meals reported having a healthier diet. Action planning was a frequently reported behaviour change technique used within previous interventions for both promoting a healthy diet and reducing unhealthy food consumption. Resources to help an individual plan their weekly meals for either themselves or family could support them to consume healthier meals. This could be delivered in the form of a paper-based worksheet or online resource. This would guide people:

- To plan meals that their family like and therefore know what food they need to purchase.
- Reduce any impulses to purchase unnecessary and potentially unhealthy foods whilst shopping.
- To plan and purchase foods that meet their budget and circumstances.

Intervention recommendation 2:
Implementing choice architecture to nudge healthy purchasing behaviours

Participants expressed knowledge about what constitutes a healthy diet, yet did not necessarily consume a healthy diet, indicating that potentially people are making unconscious food choices. Participants in the interviews discussed how they sometimes purchased and consumed unhealthy food impulsively, which could be overcome by considering the choice architecture in which people are making these decisions and purchases.

Nudges could be introduced to different environments (e.g. cafeterias, shops, in universities, workplaces) to increase purchasing behaviours of healthy foods. A toolkit or guidance on how to nudge healthier food options could be created, to encourage places to consider how they can promote healthier food options, which in turn could improve diet.

Intervention recommendation 3:
What's on the Menu

Participants in the interviews identified that having the knowledge, ability and confidence to cook healthy meals was an important factor in them eating healthily. Some interventions in the rapid review included cooking classes although accessing these may be difficult for some. Social media, however, provides a useful, easy-to-access platform that could be utilised to share healthy recipes and cooking skills. Our recommendation is therefore a community-led cooking intervention in which residents cook a 'healthy dish', film it, and share the video/ recipe with others in their community via an online platform/social media. In addition to providing knowledge and skills about cooking healthy foods, this would also act to provide positive social norms for cooking and eating healthily.

Conclusions

This mixed-methods research has identified key capability, opportunity, and motivational barriers and facilitators for a range of dietary behaviours amongst residents in Cambridgeshire.

We have made a series of recommendations about how to best support local residents to have a healthy diet, which include:

- creating additional tools and resources to support local residents to plan their shopping, meals, and how to overcome temptations to eat unhealthily.
- supporting residents to purchase healthier food choices by implementing 'behavioural nudges' in key contexts, such as workplace cafeterias.
- delivering a community-led intervention which supports residents to share their own healthy dishes and recipes with others in their community via an online platform.

Recommended citation:
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Healthy Diets: Main report

Background

Having a healthy diet is broadly defined as consuming a wide variety of foods in the correct portions to maintain a healthy weight [4]. Diet is complex and includes a wide range of helpful behaviours (i.e., eating '5-a-day' portions of fruit and vegetables) and unhelpful behaviours (i.e., eating a high intake of fast food or convenience outlets) [5].

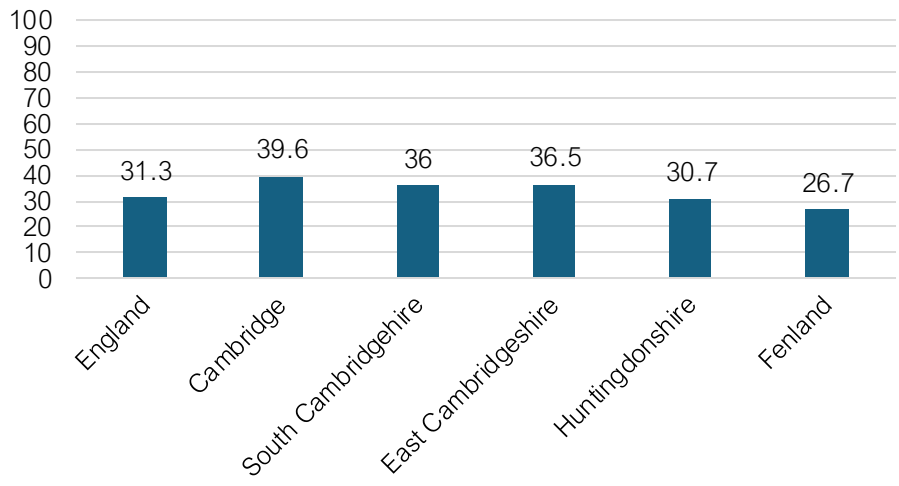
There are certain areas across Cambridgeshire where indicators of diet are lower than the national averages. A lower proportion of adults are consuming 5 fruit and vegetables a day in Fenland (26.1%) and Huntingdonshire (30.7%) compared with England (31.3%). All other districts are above the national average [6].

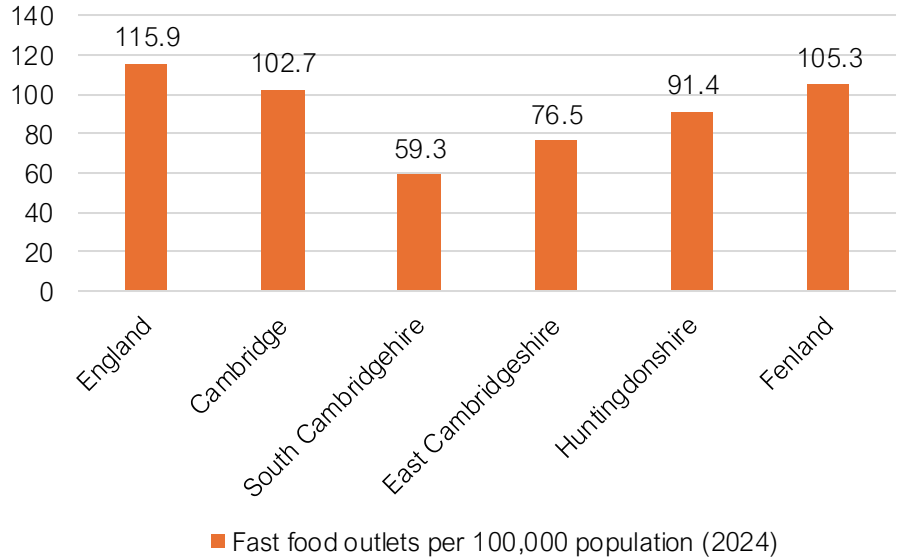
In relation to the availability of fast-food outlets, although all Cambridgeshire districts are below the national average (115.9 per 100,000), Fenland (105.3 per 100,000) and Cambridge (102.7 per 100,000) have a higher number of fast-food outlets than other districts in Cambridgeshire [6].

Poor diet is one of the biggest preventable risk factors to poorer health [7] and strongly associated with obesity and excess body weight, and its related health problems [8]. People experiencing health, social, or economic deprivation or marginalisation are more at risk of diet-related ill health [9], with inequalities in diet contributing to overall inequalities in health [8].

Several initiatives have been implemented locally, including the HealthyYou service which offers a range of programmes to support local residents to have a healthy diet.

However, without an in-depth understanding of the barriers and facilitators relating to a healthy diet amongst residents in Cambridgeshire, we don't know what else needs to be put in place to address any unmet needs.





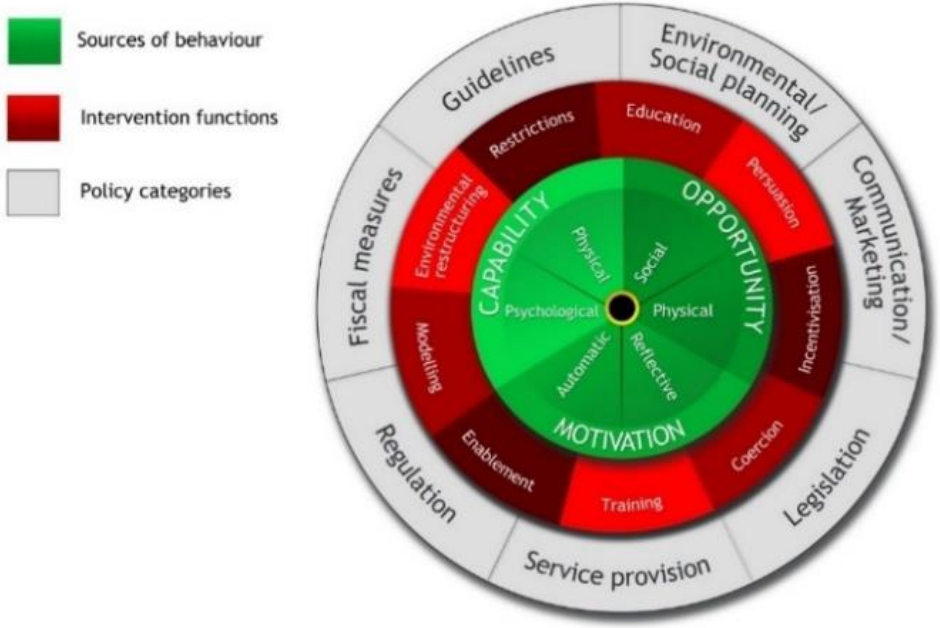
How we used behavioural science in this context

Theoretical approach

We used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for improving diets. This involved:

- Understanding the barriers and facilitators for dietary behaviours such as following '5 a day' fruit and vegetable guidelines* using the capability-opportunity-motivation model of behaviour (COM-B) (green circle) and the Theoretical Domains Framework (TDF) [10].
- Matching the types of intervention functions that are likely to address those identified barriers and facilitators (red circle)
- Matching the types of policy categories that can help to deliver those identified interventions (grey circle).

We described the content of the intervention recommendations in terms of its Behaviour Change Techniques (BCTs), which are the 'active ingredients' of the intervention [11].



We used the APEASE evaluation criteria [2] and the IN-CASE framework [12] to explore which intervention recommendations are likely to be acceptable, practical, effective, and affordable, and whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.

*We used fruit and vegetable consumption as a marker of dietary quality, as this is the standard behavioural measure used in public health research

Local survey of residents in Cambridgeshire

We conducted a survey of residents in Cambridgeshire.

The objectives were to identify:

(1) The patterns of dietary behaviours in adults across Cambridgeshire

(2) Who is less likely to have healthy diet

(3) The barriers and facilitators to eating five portions of fruit and vegetables a day

(4) Whether the barriers and facilitators to eating five portions of fruit and vegetables a day vary by those who are and are not eating five portions

(5) Whether the barriers and facilitators to eating five portions of fruit and vegetables a day vary by key demographic and health variables

Individuals were recruited via on-street market researchers between August – October 2024.

Eligibility criteria included: participants aged 18 or above; Cambridgeshire resident; able to provide consent. A purposive sampling strategy was used to recruit a diverse sample e.g., living in areas of varying deprivation, varying by ethnicity and age.

The survey measured:

- **Dietary behaviour** – we measured four aspects of diet [13]:
  - daily fruit and veg consumption
  - daily portions of high fat, salt or sugary snacks
  - daily sugary drinks consumed
  - weekly take-away/convenience foods.
- **Capability, Opportunity and Motivation for** eating at least 5 portions of fruit and vegetables a day [14].
- **Demographic and health data** (i.e., age, partial postcode, gender, ethnicity, country of birth, languages other than English spoken at home, employment status, health status, annual household income, education level).

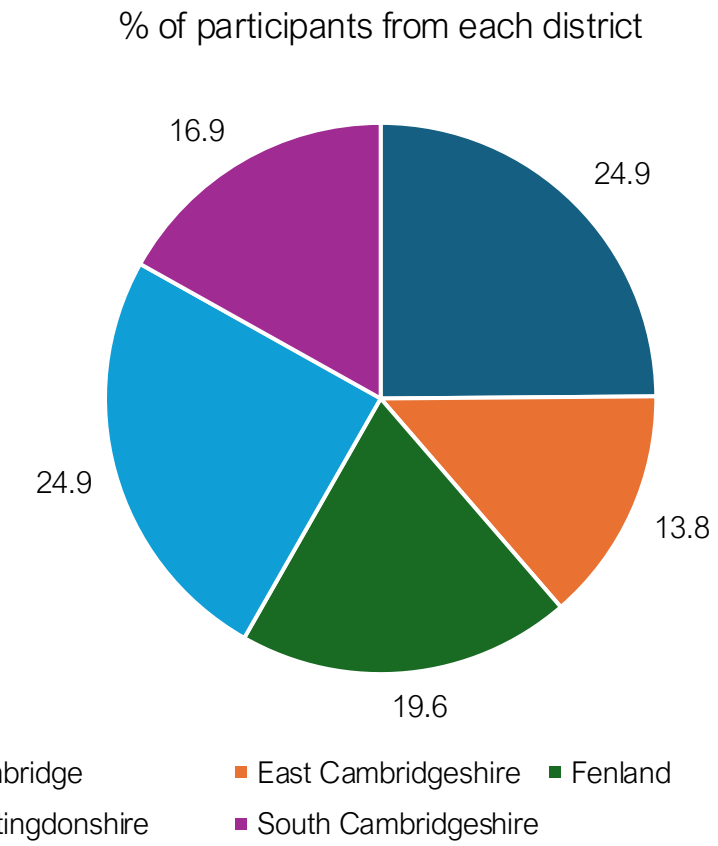
Descriptive statistics and/or statistical tests were conducted to address each research question. The analysis was done using SPSS version 26.0 (IMB Corp).

Ethical approval

Ethics approval was granted by Sheffield Hallam University Research Ethics Committee (ID ER65436549) and Cambridgeshire County Council. All participants provided informed consent before participating.

Survey findings – Participants

In total, 1,037 residents in Cambridgeshire took part in the survey.



The mean age of participants was 47.27 years (18.46), and 52.3% were female

49.9% were from moderately deprived (IMD 3 – 6) and 43.6% were from the least deprived (IMD 7 – 8) areas of Cambridgeshire

73.5% identified as being White British,13% identified as being White Other, and 6.8% identified as being Black or Black British

18.2% reported that they spoke a language other than English at home and 19.9% reported that they were born outside of the UK

32% reported having at least one health condition or disability

61.3% were employed, 22.1% were on maternity/paternity leave or retired, and 16.5% were not working. In total, 28.9% reported having no formal educational qualifications

22.6% reported an annual household income of under £20,000

Research Question 1: *What are the patterns of dietary behaviours in adults across Cambridgeshire?*

The survey found that on average residents consumed:

5.38 pieces of fruit or veg a day, with **38.8%** of participants reporting that they had 5 or more pieces of fruit or veg a day.

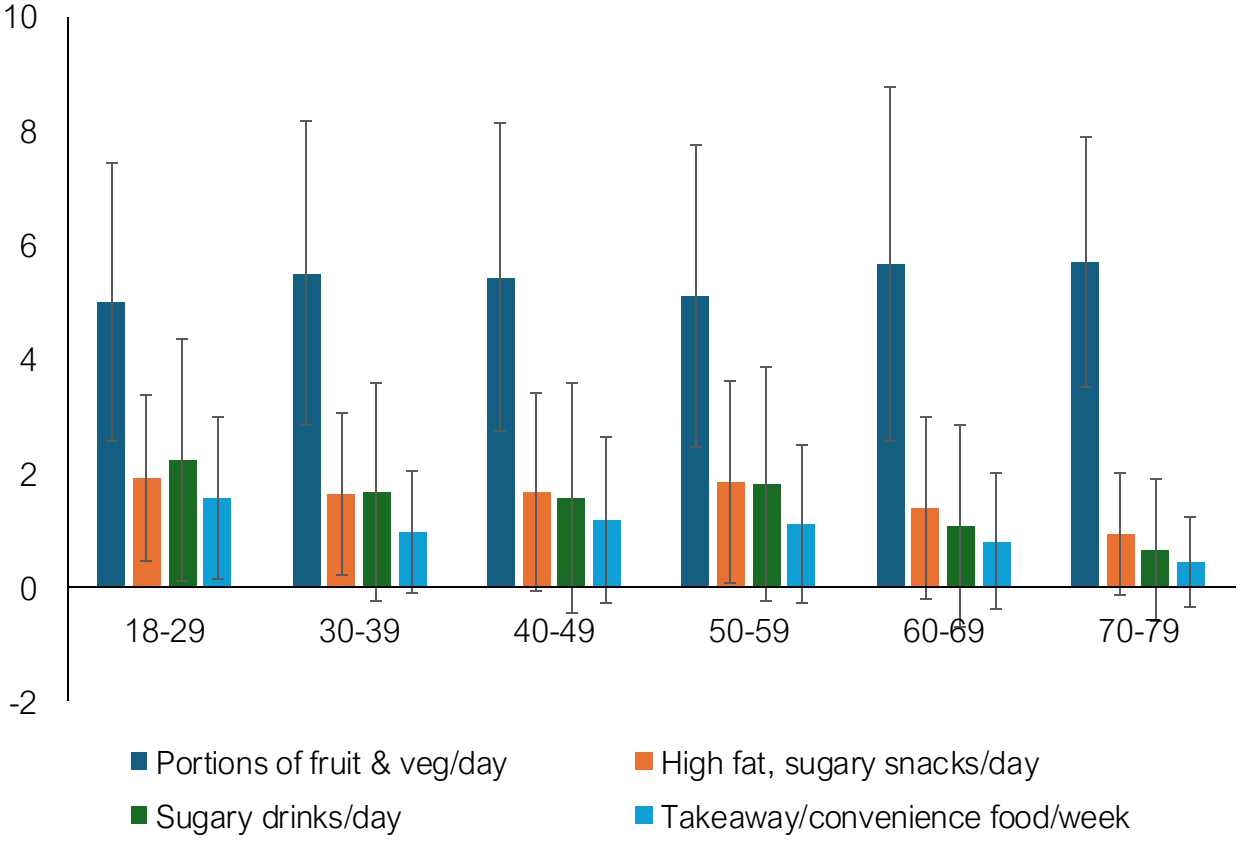
1.59 high fat, salt, sugary snacks a day

1.55 sugary drinks a day

1.04 takeaways/ convenience foods a week

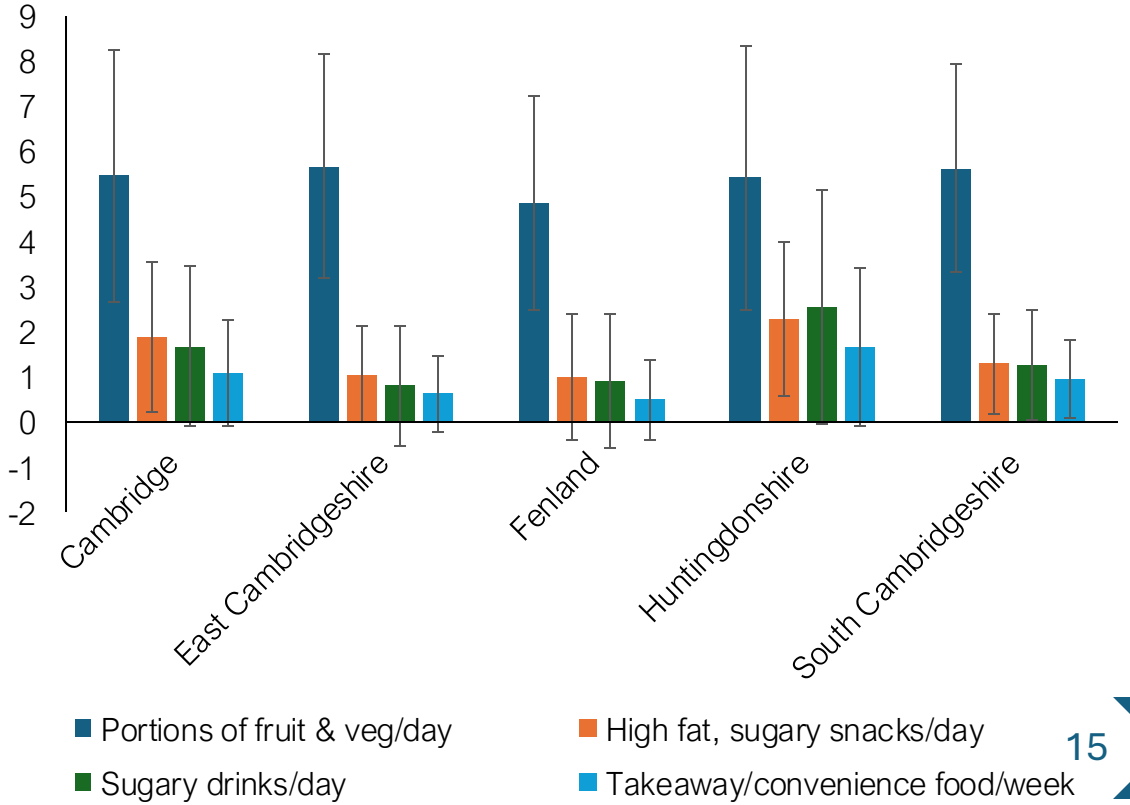
Research Question 2: *Who is less likely to have a healthy diet across Cambridgeshire?*

Residents **aged 18-29 years old** reported consuming significantly **less fruit and vegetables** per day, **more sugary snacks and drink a day**, and **more takeaways** a week compared to other age groups.



Residents in **Huntingdonshire** reported **higher consumption of daily sugary snacks and drinks, and takeaways** compared to residents from other districts.

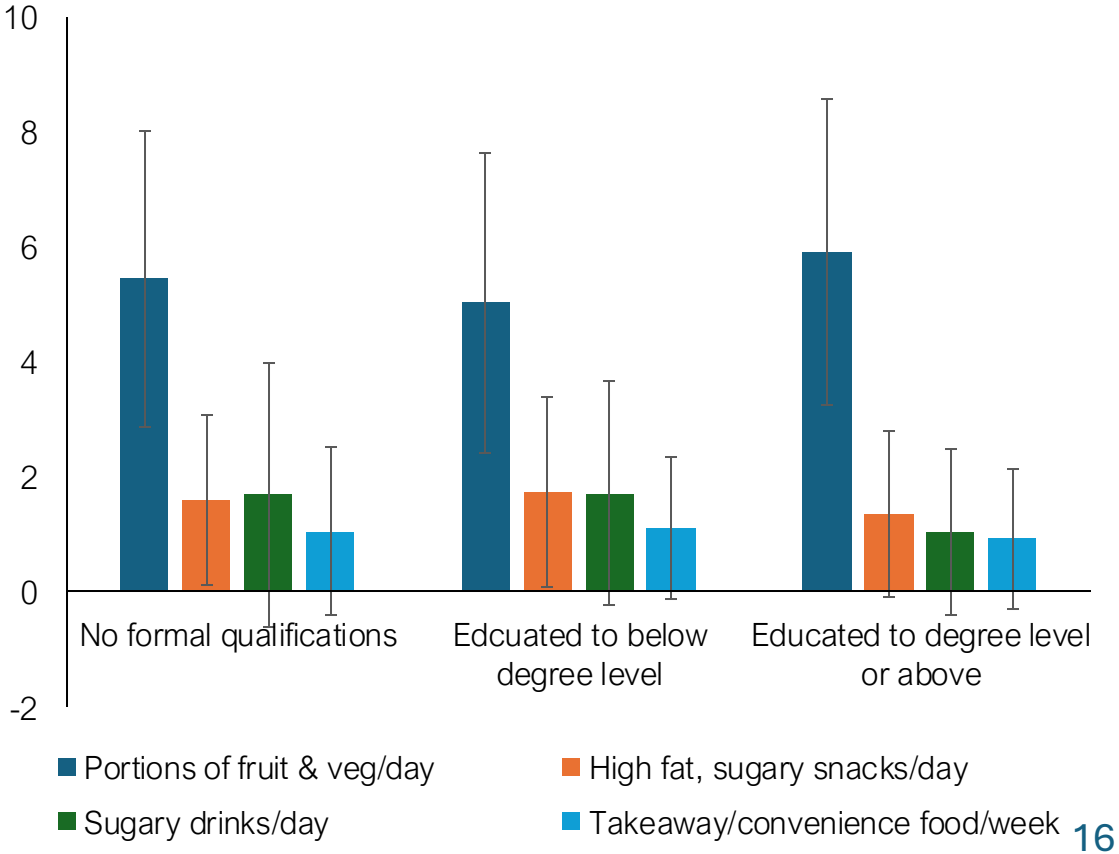
Residents in **Fenland** reported **lower consumption of fruit and vegetables** per day than other districts.



Research Question 2: *Who is less likely to have a healthy diet across Cambridgeshire?*

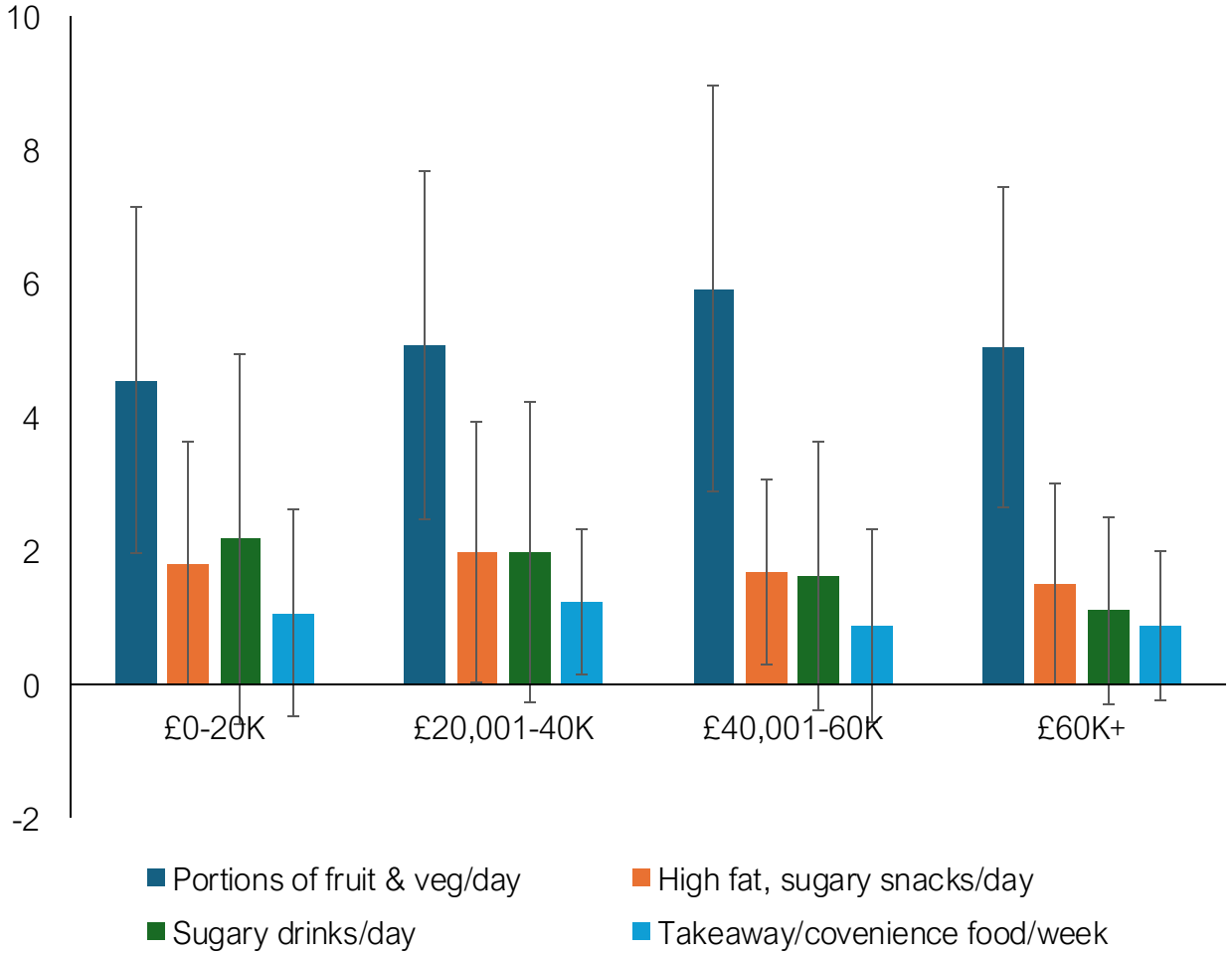
Residents in **employment** reported consuming **more fruit and vegetables**, **more snacks and sugary drinks**, and **more takeaways** than residents that were not currently employed.

Residents who were **educated to degree level or above** reported **higher consumption of fruit and vegetables** per day, and **lower consumption of snacks and sugary drinks** per day.

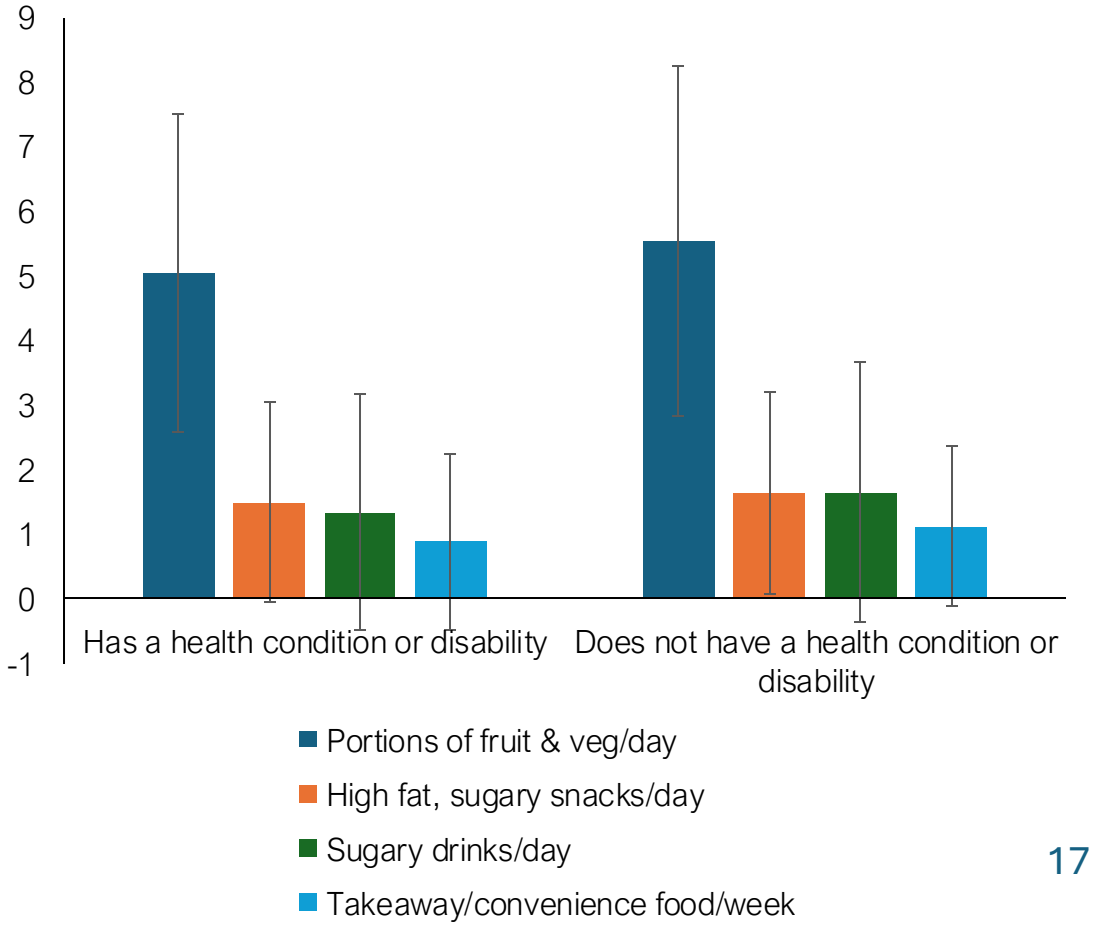


Research Question 2: *Who is less likely to have a healthy diet across Cambridgeshire?*

Residents with an annual household **income below £20k** reported consuming **less fruit and vegetables** per day.



Residents that had a **limiting health condition** reported consuming **less fruit and vegetables** per day, **less snacks and sugary drinks** per day, and **less takeaways** per week.

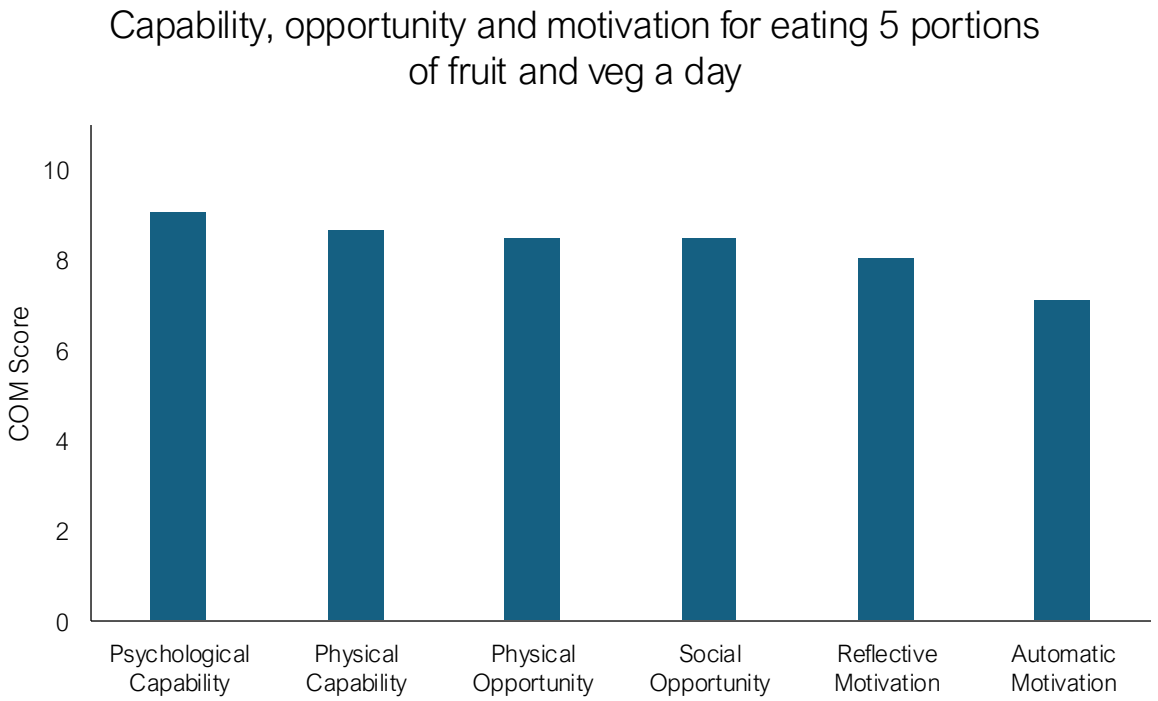


Research Question 3: *What are the barriers and facilitators to eating five portions of fruit and vegetables a day?*

This graph shows the mean Capability (psychological, physical), Opportunity (physical, social), and Motivation (reflective, automatic) (COM) scores for consuming 5 portions of fruit and vegetables per day. Across the entire sample, residents reported that they:

- Know about the importance of eating 5 portions of fruit and veg a day and have the skills to make decisions and plans to eat 5 portions of fruit and veg a day (**Psychological Capability**)
- Have the physical skills to be able to eat 5 portions of fruit and veg a day (**Physical Capability**)
- Have sufficient time and the necessary resources (e.g., access to shops & time) to eat 5 portions of fruit and veg a day (**Physical Opportunity**)
- Have the necessary support from people (e.g., from friends and family) to eat 5 portions of fruit and veg a day (**Social Opportunity**)
- Intend to (or want to) eat 5 portions of fruit and veg a day (**Reflective Motivation**)

The lowest score was for **Automatic Motivation**. Compared with the other COM items, residents reported weaker beliefs that eating 5 portions of fruit and veg a day is something they do automatically (without thinking about it).



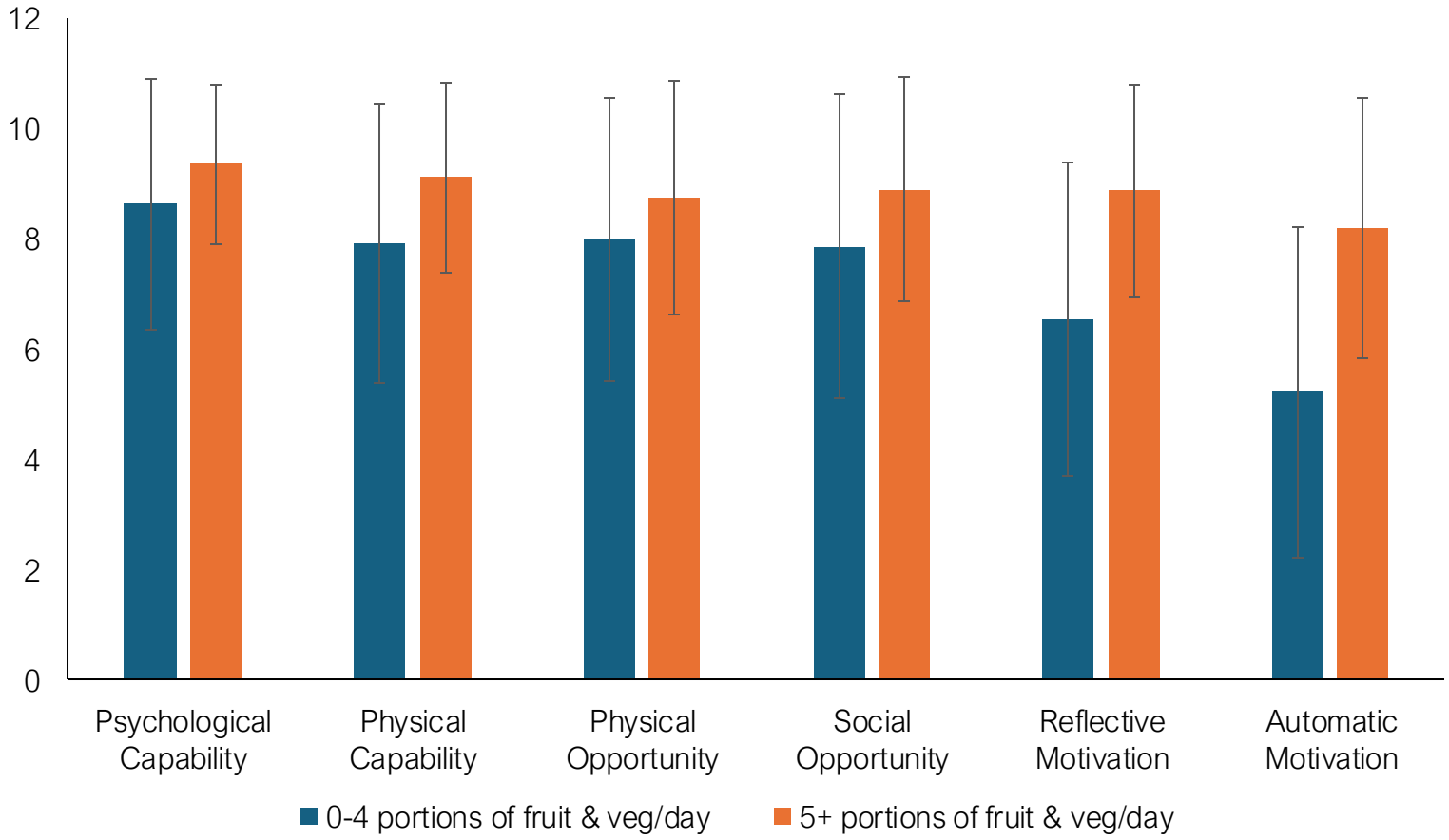
COM scores in the graph: Each COM item is assessed on an 11-point scale, from strongly disagree (=0) to strongly agree (= 10), with higher scores indicating stronger capability, opportunity, and motivation to be physically active

Research Question 4: *Do the barriers and facilitators to eating five portions of fruit and vegetables a day vary by those who are and are not eating five portions?*

Residents who do not eat five portions of fruit and vegetables a day were more likely to report:

- Weaker knowledge about the importance of eating 5 portions of fruit and vegetables a day and weaker skills to make decisions and plans to eat 5 portions of fruit and vegetables a day **(Psychological Capability)**
- Weaker physical skills and physical stamina to eat 5 portions of fruit and vegetables a day **(Physical Capability)**
- Having less time and resources (e.g., time to prepare food) to eat 5 portions of fruit and vegetables a day **(Physical Opportunity)**
- Having less support from people (e.g., from friends and family) to eat 5 portions of fruit and vegetables a day **(Social Opportunity)**
- Weaker intentions to (or willingness to) eat 5 portions of fruit and vegetables a day **(Reflective Motivation)**
- Weaker beliefs that eating 5 portions of fruit and vegetables a day is an automatic behaviour (i.e., something they do without thinking about it) **(Automatic Motivation)**

Capability, Opportunity and Motivation for eating five portions of fruit & vegetables a day by those who do & do not eat five portions a day

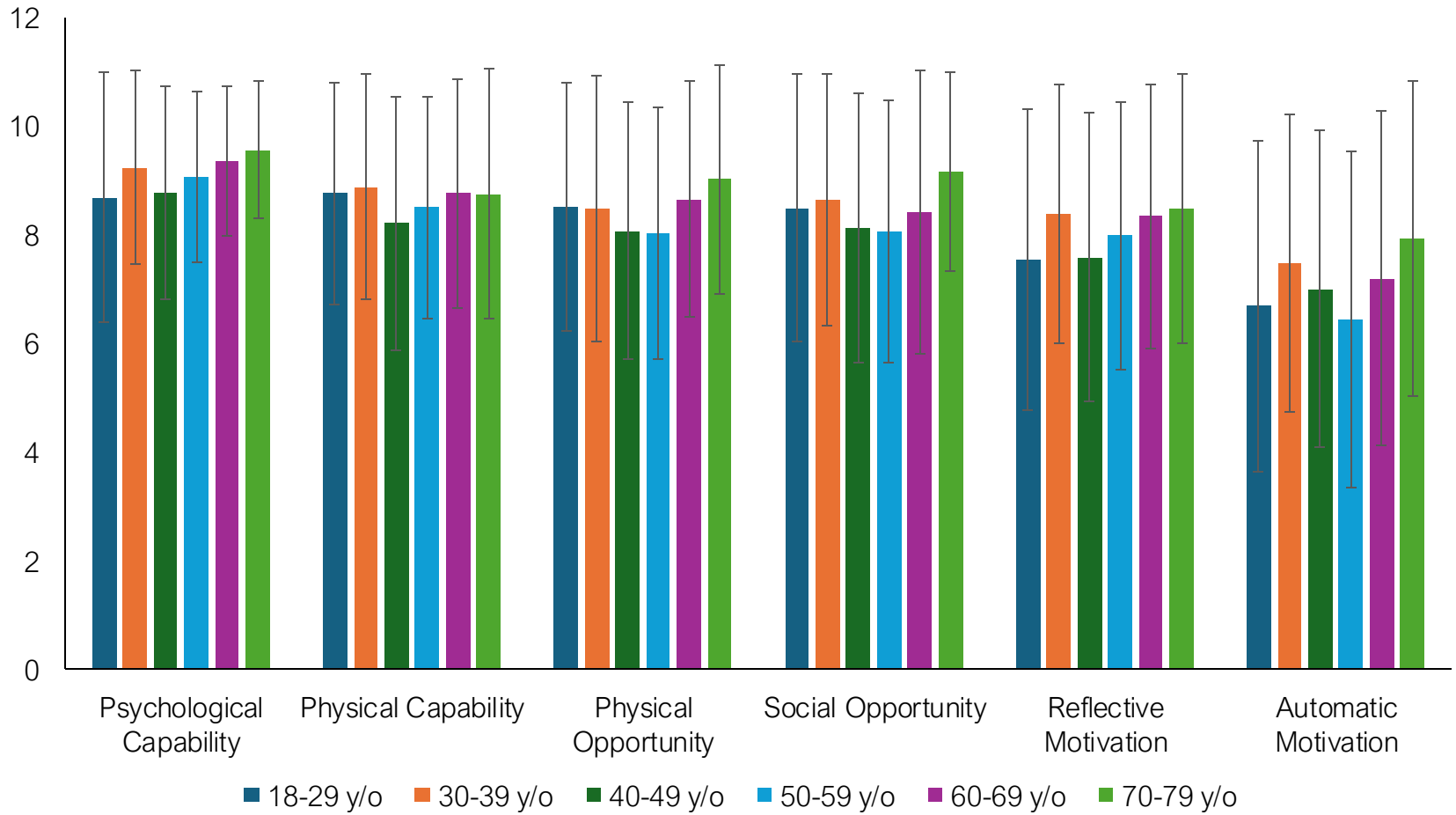


Research Question 5: *Do the barriers and facilitators to eating five portions of fruit and vegetables a day vary by key demographic and clinical variables?*

Residents **aged 18-29 years old** were more likely to report:

- Weaker knowledge about the importance of eating 5 portions of fruit and vegetables a day and weaker skills to make decisions and plans to eat 5 portions of fruit and vegetables a day **(psychological capability)**
- Weaker intentions to (or willingness to) eat 5 portions of fruit and vegetables a day **(reflective motivation)**
- Weaker beliefs that eating 5 portions of fruit and vegetables a day is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**

Capabilities, Opportunity and Motivation for eating five portions of fruit and vegetables a day by age

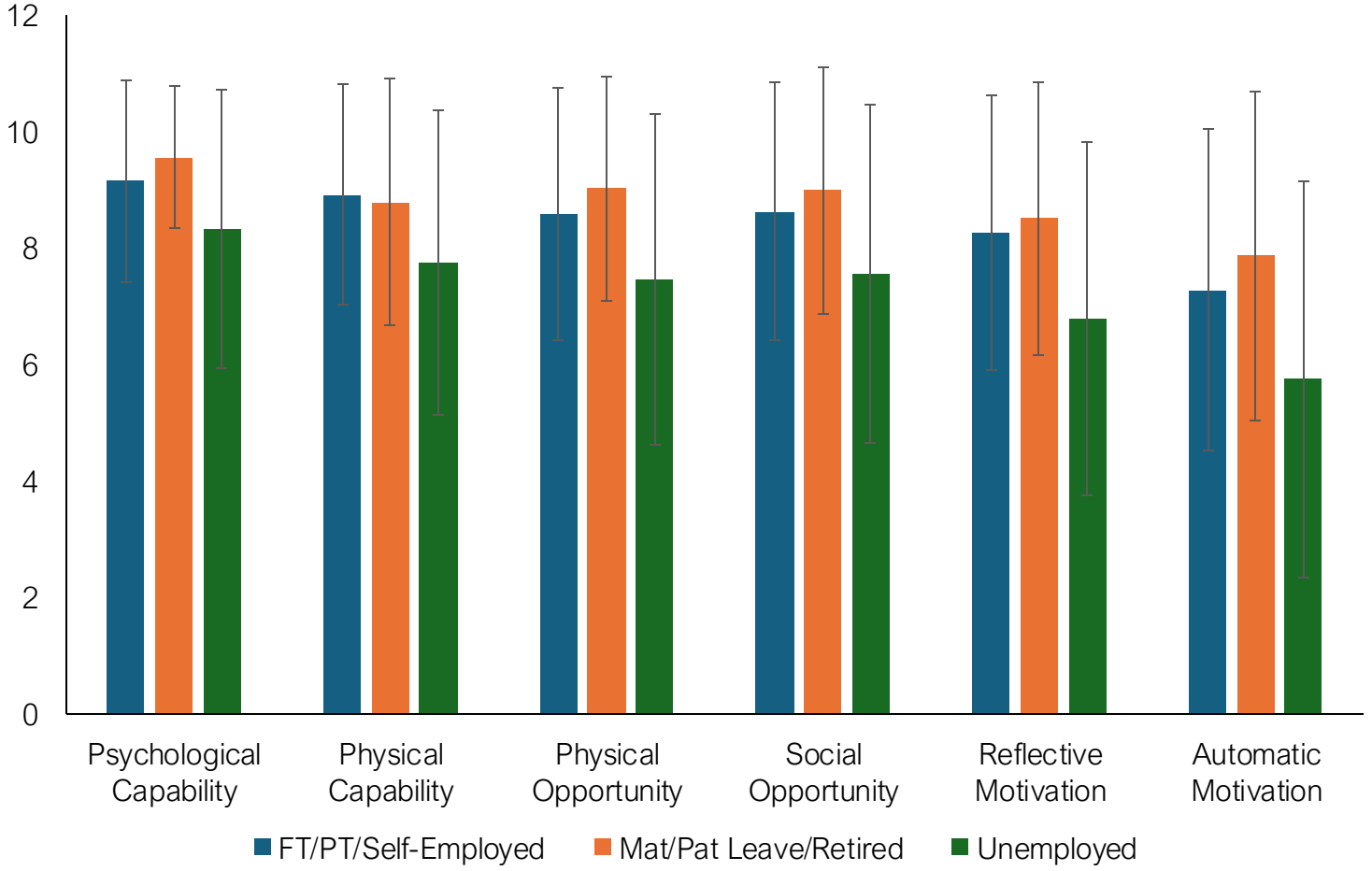


Research Question 5: *Do the barriers and facilitators to eating five portions of fruit and vegetables a day vary by key demographic and clinical variables?*

Residents who identified as being **unemployed** were more likely to report:

- Weaker knowledge about the importance of eating 5 portions of fruit and vegetables a day and weaker skills to make decisions and plans to eat 5 portions of fruit and vegetables a day **(psychological capability)**
- Weaker physical skills and physical stamina to eat 5 portions of fruit and vegetables a day **(physical capability)**
- Having less time and resources (e.g., time to prepare food) to eat 5 portions of fruit and vegetables a day **(physical opportunity)**
- Having less support from people (e.g., from friends and family) to eat 5 portions of fruit and vegetables a day **(social opportunity)**
- Weaker intentions to (or willingness to) eat 5 portions of fruit and vegetables a day **(reflective motivation)**
- Weaker beliefs that eating 5 portions of fruit and vegetables a day is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**

Capability, Opportunity and Motivation for eating five portions of fruit and vegetables a day by employment

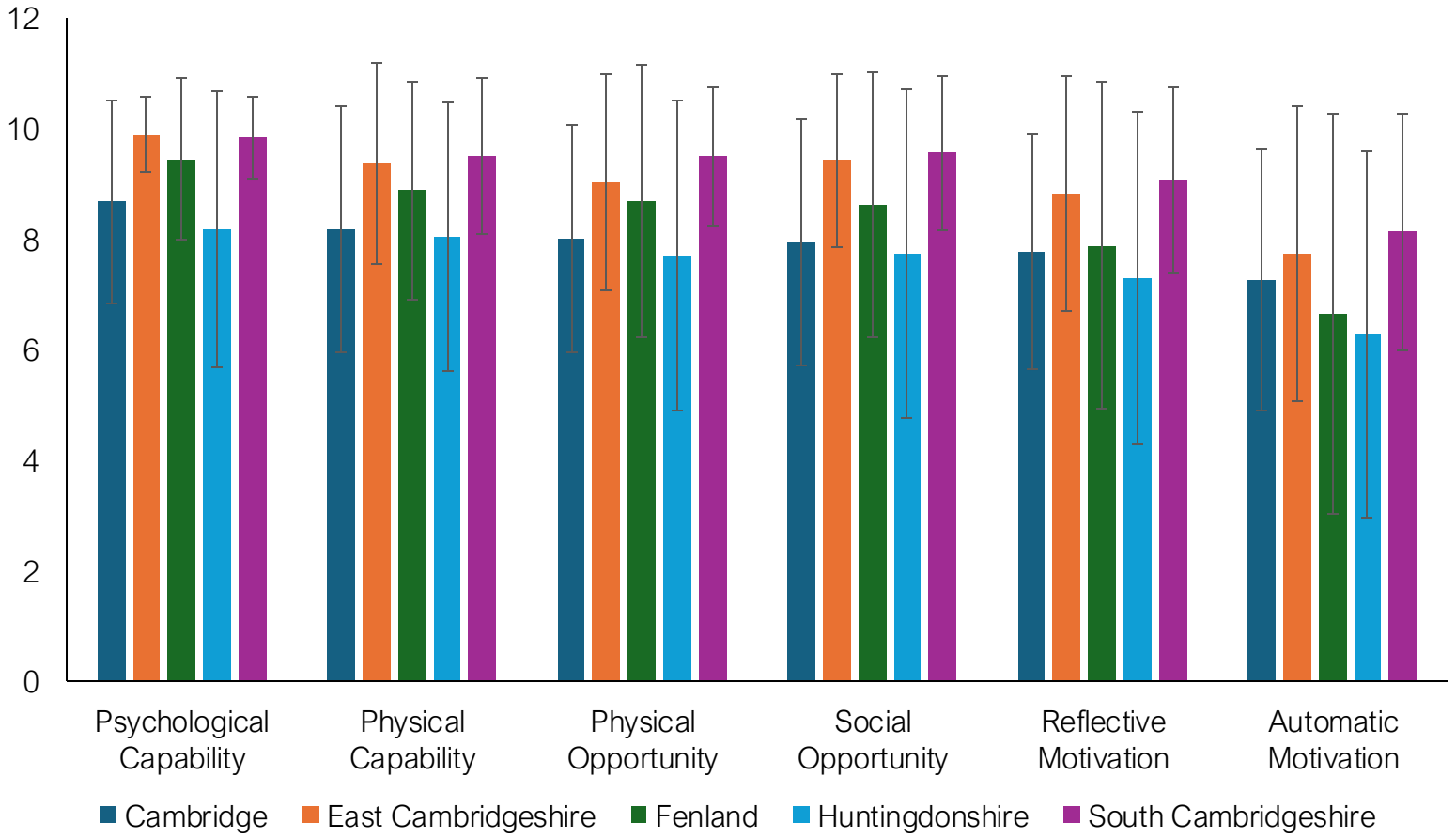


Research Question 5: *Do the barriers and facilitators to eating five portions of fruit and vegetables a day vary by key demographic and clinical variables?*

Residents from **Huntingdonshire** were more likely to report:

- Weaker knowledge about the importance of eating 5 portions of fruit and vegetables a day and weaker skills to make decisions and plans to eat 5 portions of fruit and vegetables a day **(psychological capability)**
- Weaker physical skills and physical stamina to eat 5 portions of fruit and vegetables a day **(physical capability)**
- Having less time and resources (e.g., time to prepare food) to eat 5 portions of fruit and vegetables a day **(physical opportunity)**
- Having less support from people (e.g., from friends and family) to eat 5 portions of fruit and vegetables a day **(social opportunity)**
- Weaker intentions to (or willingness to) eat 5 portions of fruit and vegetables a day **(reflective motivation)**
- Weaker beliefs that eating 5 portions of fruit and vegetables a day is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**

Capability, Opportunity and Motivation for eating five portions of fruit and vegetables a day by district



Summary – local survey

We surveyed 1,037 residents in Cambridgeshire, and found that dietary behaviours varied based upon different variables, including:

District – residents in **Fenland** reported lower consumption of fruit & veg, whereas residents of **Huntingdonshire** reported higher uptake of other dietary behaviours. **Huntingdonshire** residents also reported **lower COM factors** to eating 5 fruit & veg a day.

Age – younger adults aged **18-29 years old** reported poorer dietary behaviours, as well as **weaker Capability and Motivational** factors to eating 5 fruit & veg a day.

Employment – was related to **higher** fruit and veg consumption, as well as **higher** daily snacks, sugary drinks and weekly takeaways. **Unemployed** residents reported **lower COM factors** to eating 5 fruit & veg a day.

Education - residents that were **educated to degree level or above** reported **higher** consumption of fruit and vegetables per day, and **lower** consumption of snacks and sugary drinks per day.

Health Condition - Residents that had a **limiting health condition** reported consuming **less** fruit and vegetables per day, **less** snacks and sugary drinks per day, and less takeaways per week.

The next phase of the research was to gather qualitative insights from Cambridgeshire residents to explore the barriers and facilitators to having a healthy diet.

Based on our survey findings, we targeted adults living in Huntingdonshire and residents aged 18-30 years old. We sought to recruit a mix of genders, ethnicities, employment status, and those with existing health conditions.

Interviews with residents in Cambridgeshire

We conducted interviews to explore the barriers and facilitators for healthy diets in more depth. The objectives were to:

(1) Explore the barriers and facilitators for adopting a healthy diet

(2) Understand how residents could be supported to have a healthy diet

Sampling and recruitment

Individuals were recruited between January - April 2025. Eligibility criteria were Cambridgeshire residents aged over 18-years old. We specifically aimed to recruit residents who were aged between 18-30 years old and lived in Huntingdonshire based on the findings from the survey. Individuals were recruited via different strategies, including adverts and social media, via an online research panel, and expressions of interest from participants of the earlier survey. All participants were offered a £20 gift voucher as a thank you for their participation.

Ethical approval

Ethical approval was granted by Sheffield Hallam University Research Ethics Committee (ID ER68324734) and Cambridgeshire County Council.

Data collection

Interviews were conducted online (e.g. Teams) or via telephone. A semi-structured topic guide was developed which consisted of questions about a person's current diet, factors influencing their consumption of 5 portions of fruit and veg a day, and consumption of fast food and takeaways.

Analysis

Data were audio-recorded, transcribed, and anonymised. Framework analysis was used to code the data [15] using NVivo. The data were analysed by behaviour type, specifically healthy diet, fruit and vegetable consumption, and fast food consumption. The transcripts were coded into domains, using the 14 TDF domains as a framework. Text was coded under the domain (theme) that best matched the content. Text relating strongly to more than one TDF domain was coded in both. The types of statements under each TDF domain were than analysed using inductive content analysis. Sub-themes arising from the data (under each TDF domain) were identified to create sub-categories.

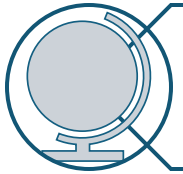
Qualitative interview findings – Participants

In total, 9 Cambridgeshire residents took part in an interview

Participants ranged in age from 18-45 years old

Two participants were male; seven were female

Seven participants were aged 30 years or younger



Three participants identified as being White British

Five participants lived in Huntingdonshire

*Are there **Capability** barriers (B) and facilitators (F) for **eating a healthy diet**?*

Residents reported the following **Capability** barriers (B) and facilitators (F):

Knowledge

- Having or needing knowledge of which foods are and are not healthy (B/F)
- Awareness & understanding of a what a balanced diet is (F)

I would like to know about the organic, inorganic, especially, which is healthy, which is not healthy, the right amount to take and the right amount to supplement it with... [6]

Behavioural Regulation

- Meal planning & preparing food/meals in advance (F)
- Monitoring food intake (B/F)

I try to plan ahead. So when I do the food shop, I try and plan the week ahead. It doesn't always go as planned but we've always got plenty of food to base it round. It's always healthy enough and stuff [9]

Skills

- Ability to prepare fresh food and meals (B/F)
- Ability to understand nutritional content (F)

So every Sunday I sit down and do an online food shop and I plan the meals for the whole week. So we know what we're having. So I don't have to, you know, think, "Oh my God, what am I making? What have I got in?" It's just, you know what you're doing and you've got it in the fridge. [2]

*Are there **Opportunity** barriers (B) and facilitators (F) for **eating a healthy diet**?*

Parents reported the following **Opportunity** barriers (B) and facilitators (F):

Social influences

- Meal choices influenced by others (B/F)
- Positive or negative reinforcement from friends/family about food choices (B/F)
- Learning about food and diets from friends and family (F)

I think that my dad being on a specific diet impacts us quite a lot, but I don't think that's in a negative way because the diet that he's on is healthy for most people anyway. [1]

My mum has always been big on, we have to have a well-balanced meal. You have to have your vegetables, your proteins, your carbohydrates. So yeah, it started when I was a kid. So, I've learned to carry that as I've grown up and it's now just like a simple, it's a mandatory for me to have a well-balanced meal [4].

Environmental context and resources

- Access to supermarkets & different foods (B/F)
- Cost of food (B/F)
- Lack of time to eat & prepare food (B/F)

I think living in the countryside makes it slightly more difficult [to buy food] because you are going to have to travel to get food. There's no shops within walking distance; you can't just do that. So that's a bit of a negative but in general it's mostly a positive environment. [1]

I'm quite lucky that my parents brought me and my sister up to cook. You know, I know not everyone has that. So I think it's from just being around people that cook. And then also cooking from a young age. [8]

*Are there **motivation** barriers (B) and facilitators (F) for **eating a healthy diet**?*

Parents reported the following **Motivation** barriers (B) and facilitators (F):

Social/ professional role and identity

- Identify as a being health conscious (F)

I've always been someone that eats quite healthy, I've always grown up wanting to go to the gym, do exercise, be someone that's into that kind of thing. [2]

If I've got shifts that people are putting shifts for me and I cannot have control of my life, that triggers, because you want to organise. [7]

Beliefs about capabilities

- Confidence in their ability to cook and prepare food (F)
- Belief in being able to sustain a healthy diet (F)
- Believing that they control what they eat (B/F)
- Challenges to break habits and eat healthier (B)

It would be really difficult because having to change what we eat to something we are actually not used to would be quite hard for us to adjust. So it would be difficult. [3]

I would make it affordable. So, if that meant spending less on, I don't know, like petrol or other things, I'd make it so I can still buy the same things... Because it's quite important to me that I have nice food that I like to eat, so I would manage, I would make it work. [8]

Intentions

- Enjoy things in moderation (B/F)
- Prioritise eating healthy (F)
- To enjoy the moment and eating what they want (B)

*Are there **Motivation** barriers (B) and facilitators (F) for **eating a healthy diet**?*

Beliefs about consequences

- Negative implications from eating poorly (F)
- Positive expectations from eating healthily (F)
- Diet has an impact upon a person's physical & mental health (F)
- Impact upon quality of life & ageing (F)
- Need to eat certain things to have enough energy to perform activities (F/B)

I would say significantly important because it helps- you might not see the benefit now but at old age and also when you're sick, your body tends to fight your health when you consume a healthy diet. [6]

Reinforcement

- Experiencing a positive physical & mental health impact of diet (F)
- Experiencing positive or negative implications from eating healthy or unhealthy foods (F)

It makes me feel great because right now my self-esteem has increased because I am maintaining the weight or the size I want. So it does increase my self-esteem. [6]

I mean it makes you feel- Sometimes you go on like a- when you wake up the day after and you have a [fast food brand], and it's just so groggy. [8]

*Are there **Motivation** barriers (B) and facilitators (F) for **eating a healthy diet**?*

Goals

- Other priorities in life over having a healthy diet/food (B)
- To feel well and functioning (F)
- Specific outcome goal, such as weight loss (F)

Emotion

- Eating unhealthy foods during stressful times (B)
- Enjoyment from food (F/B)

Yeah, that is something that we really prioritise because if you don't have at least quality of life, we need to have it. [7]

When I'm stressed, I don't tend to consider what I eat. I just want to eat to get my strength. And work, if I'm in a hurry or if I have a lot of workload, I tend to just grab anything and eat. [6]

I like cooking for myself because it's like a bit of self-care, because it means that I wake up and I've got nice food to eat [8]

I regularly go to the gym four days a week, so I want to be able to sustain the progress that I make. Plus, I've also got a holiday coming up, so I've got the motivation to look good, feel good for that holiday as such. As well I want to look good for my partner as well. [9]

*Are there **Capability & Opportunity** barriers (B) and facilitators (F) for **eating fast food?***

Residents reported the following **Capability & Opportunity** barriers (B) and facilitators (F):

Knowledge

- Knowledge of fast food (B/F)

I suppose the food that's, I don't know, is from fast food places like [fast food retailers]. I'm thinking- I'm thinking deep fried foods, I'm thinking lots of meat... [7]

Environmental Context

- Cost of fast food (B/F)
- Accessibility of fast food (B/F)

when my mum does the groceries, she's a bit, because of how I said, like I did say food's cheap here. So she occasionally buys those pizzas, fries and all of that. [4]

And even at [Hospital], there's a [fast food outlet] in the hospital. [8]

Social Influence

- Eating fast food with friends/family

I'd say friends and family, they get in the way and impulse buys. So, you just want to get it and try something new. [6]

*Are there **Motivation** barriers (B) and facilitators (F) for **eating fast food**?*

Parents reported the following **Motivation** barriers (B) and facilitators (F):

Beliefs about Consequences

- Being physically active counteracts the need to eat healthily
- Eating fast food leads to negative health consequences

No, personally. I'd say because myself, and then my partner as well, we're both quite fit people and the frequency in which we have it, I don't think it's enough to really be worried about due to the fact how frequently I go to the gym and train and the amount of steps I do at work as well for the four days I am in. I average about 25,000 steps a day so I feel like having one fast food once every couple of weeks doesn't really affect me unhealthily in a way. [9]

Emotion

- Enjoyment from fast food (F)
- Enjoy prepare fresh food/cooking at home (B)
- Stress (F)

I like eating the pizza. [5]

Like I said, we do just really, especially when you are stressed out and you can't think of getting a proper meal, we just tend to go for this instead. [6]

Intentions

- Variety and choice of fast food is appealing to people
- No intention to purchase fast food
- Eating fast food as a treat

I don't know if this is a thing but say I have a bag of sweets in the evening, I feel rubbish the next day or if I have a [pizza takeaway] or something in the evening, I feel really groggy and sluggy the next day. [9]

If I'm being completely honest, if I eat junk foods, I will enjoy it at the moment but soon after that, I feel dirty. I feel like I've disrespected myself... [4]

Reinforcement

- Negative impact of eating fast food (B)

*Are there **Capability & Opportunity** barriers (B) and facilitators (F) for **eating 5 Fruit & Veg a day**?*

Residents reported the following **Capability & Opportunity** barriers (B) and facilitators (F):

Knowledge

- Unclear about fruit and vegetables guidelines (B)
- Knowledge that fruit and vegetables are healthy (F)

I mean, for in my opinion, in a week if we can eat one apple or two bananas are enough. And vegetables as well like, if we can eat, my idea is one dish is enough for me. I'm not sure. Yeah. [5]

Environmental Context

- Cost & availability of fruit and vegetables (B/F)
- Short shelf life of fruit and vegetables (B)

So, if fruit was a bit cheaper, you'd be more inclined to buy more fruit because it goes out of date, doesn't it, after a few days so it goes so yeah. [9]

Social Influence

- Influence of family growing up promoting fruit and vegetables (F)

My auntie always used to – all my cousins I suppose – she always said you have to have a piece of fruit after every meal. [8]

*Are there **Motivation** barriers (B) and facilitators (F) for **eating 5 Fruit & Veg a day**?*

Parents reported the following **Motivation** barriers (B) and facilitators (F):

Beliefs about Consequences

- Believing there is no impact from meeting guidelines (B)
- Benefits from consuming fruit and vegetables (F)

The impact? I mean no, it's never really been significant enough to impact I'd say. [9]

Emotion

- Enjoyment of fruit and vegetables (B/F)

Broccoli never, I'm not a big fan of it. [5]

Goals

- Aiming to eat a variety of fruit and vegetables (F)
- Not aiming for 5 fruit and vegetables (B)

Yeah, as long as you're eating different fruit and veg, so you're not having, I don't know, loads of apples and stuff all the time. [8]

What did interview participants think would help people like themselves to eat a healthy diet?

Content:

- Education, awareness & promotion about the benefits of a healthy diet
- Making cooking look easy & accessible for people to participate in
- Financial support e.g. reducing the cost of healthy foods or providing vouchers
- Information and advice needs that is believable and relatable to local people

Delivered by:

- GP/NHS professionals – although some participants voiced reservations about whether professionals have sufficient knowledge and highlighted the complexity of the subject
- Healthy You/Cambridgeshire County Council services
- Personal experience

Delivery Method:

- Social media platforms such as Instagram and TikTok for younger people and Facebook for older people
- Including healthy diet information and/or support to other services/programmes that are already being delivered e.g. at the end of local exercise classes
- Online / Leaflets

Summary – Healthy Diet

We interviewed 9 residents of Cambridgeshire and identified key Capability, Opportunity, and Motivation barriers and facilitators to having a healthy diet.

Capability

Participants who reported having knowledge and understanding aboutvwhat a healthy or balanced diet means also reported eating a healthier diet. Behavioural regulation techniques, particularly meal preparation and advanced meal planning facilitated having a healthy diet. Monitoring one's diet in some cases facilitated healthy eating but was perceived as negative for those who had historically struggled with dieting. Having the skills to prepare fresh food and meals could be a facilitator to having a healthy diet but was a barrier for those who thought they lacked those skills.

Opportunity

Perceived ease of access to supermarkets and a variety of foods was a barrier or facilitator depending upon accessibility. The cost of food was also perceived to be a barrier or facilitator, particularly if a person perceived healthy foods to be too expensive, or more expensive than less healthy options. Perceptions about whether a person had the time to prepare and eat healthy foods could also be a barrier or facilitator.

Social influences around food choices and behaviours were commonly discussed, particularly around family influence. Participants with healthier diets described learning about healthy eating and how to cook healthy meals from family members, typically from a young age. Friends and family also influenced food choices, for example being aorund people eating certain foods (healthy or unhealthy) made it more likely that you would also eat those foods.

Motivation

Having an identity as a health-concious person meant that someone was more likely to have intentions (and to prioritise and act on those intentions) to consume a healthy diet. In contrast, a potential barrier to having a healthy diet was having the intention to 'enjoy the moment' and seek pleasure from eating less healthy foods. Diet-related goals such as weight loss influenced people's intentions and were related to having a healthier diet.

A participant's beliefs and confidence in their ability to cook and prepare food was a facilitator to a healthy diet, and their belief in being able to sustain a healthy diet. Some participants believed it would be challenging to change their diet due to other habits that they had formed. Participants who believed that there could be negative implications from eating poorly and positive implications from eating healthily consumed a healthier diet. Believing that a healthy diet had a positive impact upon mental health and positive ageing later in life also facilitated a healthy diet.

Some participants discussed how during stressful times they were more likely to eat unhealthily. The type of food a person enjoyed also influenced their dietary behaviour, prompting them to eat less healthy foods if they perceived them as less enjoyable.

Summary – 5 Fruit & Vegetables

Capability
Understanding and knowing UK public health guidelines regarding fruit and vegetable intake and having knowledge that eating fruit and vegetables was healthy, was a facilitator to increased consumption of fruit and vegetables.

Opportunity
Perceived cost and availability could be a barrier of facilitafor to fruit and vegetable consumption. Some participants thought that fruit and vegetables were too expensive or less readily unavailable. Others described concerns about the short shelf life of fruit and vegetables as a deterrent to buying them.

Being around people who regularly consumed fruit and vegetables during childhood was described by some participants as having led them to emulate this behaviour later in life.

Motivation
Some participants described beliefs that consuming five fruit and vegetables a day would lead to positive outcomes, whereas others believed there would be no impact. Enjoyment of eating fruit and vegetables could also be a barrier or facilltator. Some participants described having specific goals related to eating a variety of different fruits and vegetables, whereas others did not report having any specific intentions or goals related to fruit and vegetable consumption.

Summary – Fast Food

Capability
Knowledge of what was classed as fast food was either a barrier or facilitator to consumption. Most participants were aware of foods that were classed as fast food, but unclear if all convenience foods were classed as fast foods (e.g. a sandwich from a supermarket).

Opportunity
The cost of fast food could be either a barrier and facilitator. Some participants perceived it to be too expensive, whereas others felt it was cheaper than healthier foods. Perceptions about the accessibility of fast food also influenced people's views, with some participants reporting it to be very easy to have things delivered or collect themselves, but those in more rural locations describing more access barriers.

Motivation
Believing that fast food had negative health consequences was described as a potential barrier to eating it. However, at least one participant described believing that leading active lifestyle could 'offset' the negative consequences of fast food.

Emotions played a role in fast food consumption, with some people describing how they enjoyed eating fast food and likely the variety of choices they could access. Some described stress as a possible trigger making them more likely to seek out fast food.

Other participants discussed how they preferred preparing and eating fresh food rather than fast food takeaways. Some participants had no intentions to eat fast foods or would only do so as a treat (e.g. someone's birthday). Some participants also associated fast food with negative emotions or effects (e.g. feeling sluggish).

Rapid evidence review of interventions

We conducted a rapid evidence review to identify what types of interventions have been implemented to promote a heathy diet in an adult population.

The research question for the review was:

What interventions have been used to change dietary behaviours in adults?

Searches

We conducted a rapid evidence review using a recent systematic review [16] to identify interventions targeting dietary behaviours in adults from lower socio-economic positions. This approach was chosen due to the vast existing literature on diet interventions, which made a database search unfeasible. The selected review focused on health behaviour interventions (including diet) among adults with lower socio-economic status, aligning with local survey findings indicating poorer dietary behaviours in Fenland and Huntingdonshire.

Data extraction

Data relating to the content of the intervention was extracted and classified using the Behaviour Change Wheel [2] and the BCT taxonomy [11]. Data were managed in Excel.

Analysis

Using the Theory and Techniques Tool (a heat map identifying links between BCTs and Mechanisms of Action: MoAs) [3], we then identified whether these previously tested interventions have the potential to address the barriers and facilitators for healthy diet in Cambridgeshire, as identified in our survey and qualitative insight gathering activities. That is, we explored the extent to which there was a *match* between the content of the interventions (i.e., how they seek to change behaviour) and the barriers and facilitators to healthy diet, and whether there were any gaps.

Rapid evidence review of interventions:

Description of included studies

In total, 30 interventions were included in the review.

- 19 interventions were conducted in the USA, with others originating from Australia (3), the United Kingdom (3), the Netherlands (2), and single studies from Brazil, France, and a combined study across Panama and Trinidad & Tobago.
- All included studies focused on populations experiencing disadvantage, with diverse demographic and socio-economic characteristics.
- Examples of these populations include low-income seniors, African American women, families with young children in deprived schools, pregnant and postpartum women, food-insecure individuals with hypertension, and overweight adults with type 2 diabetes.
- Additionally, the studies featured supermarket customers from deprived urban areas, primary household food shoppers, and residents of low-income or rural communities.

Types of interventions

We identified 7 types of interventions:

Education

- Interventions using education-based techniques provided participants with knowledge and practical guidance to support healthier eating such as providing information about the health benefits of fruits and vegetables or linking healthier diet to reduced risks of chronic diseases. Examples include:
- Some interventions included behaviour substitution strategies, encouraging participants to replace sugary drinks with water or milk, or swap high-fat, high-sugar foods for more nutritious alternatives, often supported by interactive sessions or take-home resources.
- Others addressed common barriers through problem solving focused discussions, such as explaining nutritional content in accessible terms and offering tips like growing own spices or finding affordable local food options.

Rapid evidence review of interventions:

Persuasion

- Interventions using persuasion-based techniques aimed to influence attitudes and beliefs around healthy eating by using subtle messaging and social cues. Examples include:
- Some challenged common perceptions, such as the belief that healthy foods are always expensive, by encouraging participants to rethink cost and see nutritious choices as affordable and accessible.
- Social comparison strategies included placing messages in shopping trolleys that showed what other customers were buying such as the most popular vegetables purchased in the supermarket to encourage similar behaviour.
- Visual campaigns also used relatable imagery and slogans that emphasised community and strength to inspire healthier eating within specific cultural groups.

Enablement

- Interventions using enablement-based techniques combined goal setting, where participants set specific dietary targets, planned meals and monitored progress with weekly sheets, visual reminders and tailored resource packs. Examples include:
- Problem-solving activities encouraged open discussion of obstacles, practical skills such as budgeting, shopping and meal preparation, and collaborative solution-finding.
- Action planning was used to guide individuals to map clear steps, anticipate barriers and weave new habits into everyday routines.
- Some interventions encouraged social support via peer discussions, partner involvement or counselling that normalised experience-sharing and reinforced progress.
- Some interventions used pre-printed goal sheets, class reviews or personalised counselling that provided feedback on progress and achievements.

Training and Modelling

- Interventions using training-based techniques focused on building practical, hands-on skills to help participants adopt healthier eating habits. Examples include:
- Many programmes provided instructions on tasks like meal planning, budgeting, shopping, label reading, and cooking, often delivered in small-group sessions led by nutrition educators.
- Participants were also given opportunities to practice these behaviours through guided cooking sessions.
- Interventions using modelling-based techniques aimed to demonstrate healthy behaviours and encourage participants to observe, reflect, and apply what they saw. Examples include:
- Using interactive exercises, such as arranging food items on a healthy eating pyramid, to visually model healthy choices.

Rapid evidence review of interventions:

Environmental restructuring

- Environmental restructuring interventions used a range of strategies to make healthy eating more accessible and more appealing. Examples include:
- Interventions targeting purchasing behaviours introduced mobile fresh produce vans or opened new supermarkets in underserved areas to increase access to fresh foods.
- Others redesigned store layouts with improved product displays, shelf labels, and in-store promotions to guide healthier choices.
- Several interventions used visual prompts like posters, tip sheets, or calorie labels on menus, while others added messages to shopping trolleys to encourage fruit and vegetable purchasing.
- Some programmes focused on organisational changes, such as workplace policies that ensured healthier food options during meetings and events.
- Group sessions, workshops and individual counselling in certain interventions created supportive environments where participants could review their progress and strategies to overcome challenges.

Incentivisation

- Incentivisation aimed to motivate healthier eating by offering either external rewards or encouraging internal motivation.
- Some programmes provided tangible incentives, such as vouchers to support and reward the purchase of fruits and vegetables.
- Other interventions encouraged participants to create their own personal rewards for healthy eating behaviours.

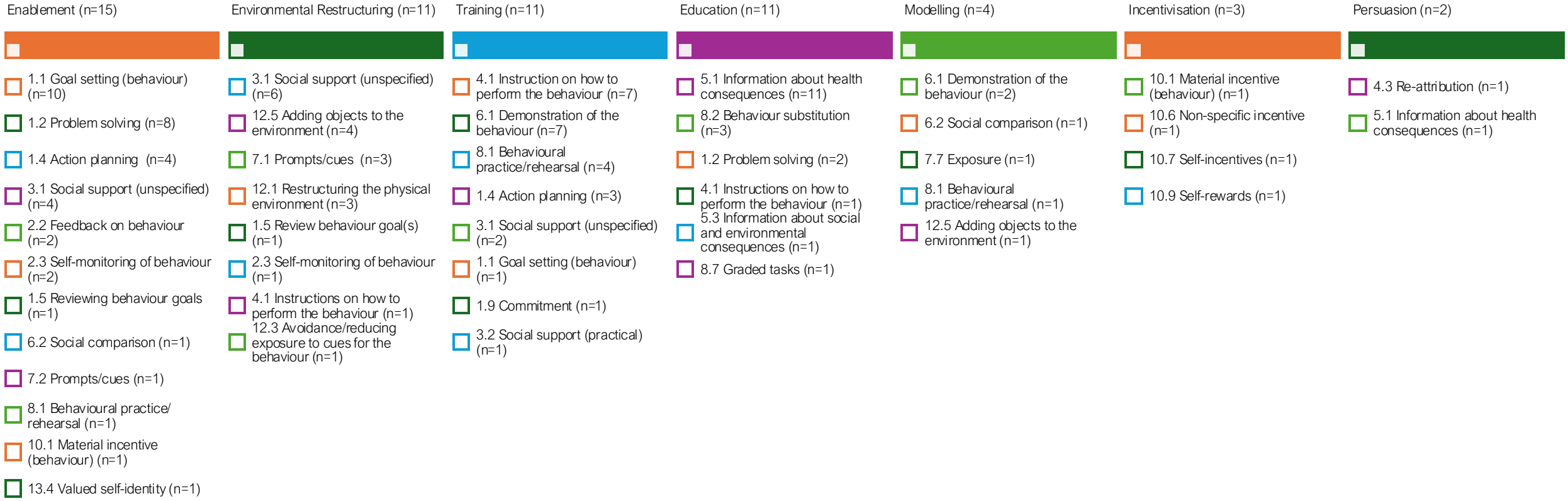
Intervention categories

We grouped interventions into three broad categories:

i) Interventions promoting healthy diet
ii) Interventions reducing intake of unhealthy foods
iii) Interventions targeting food purchasing behaviours

- 20 studies aimed to promote healthy dietary behaviours, such as increasing fruit and vegetable consumption.
- 9 studies sought to reduce the intake of unhealthy foods, such as sugary drinks or processed foods.
- 13 studies explored purchasing behaviours, aiming to influence what individuals or households buy, often through in-store interventions or price incentives.
- Several studies tackled more than one of these domains.

Behaviour change techniques used in interventions promoting healthy diet



Note: (n=x) describes how many interventions used the type of intervention or the behaviour change technique.

Rapid evidence review of interventions:

Promoting healthy diet

The most frequently used techniques for promoting healthier diets were:

(BCT 1.1 Goal setting (behaviour)) which appeared in 11 interventions (mostly linked to enablement and, to a lesser extent, training), offering a structured way for individuals to define and monitor personal dietary targets.

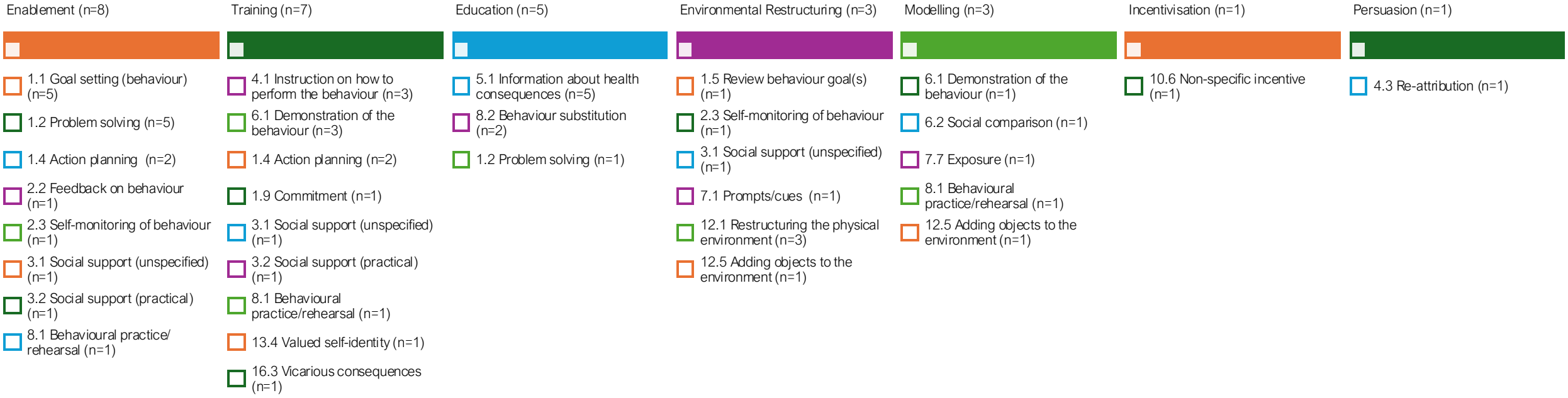
(BCT 5.1 Information about health consequences) which also employed in 11 interventions (within education and persuasion functions). This approach can be critical in raising participants' awareness of how dietary changes help reduce chronic disease risk and enhance overall health.

The third most common technique was **(BCT 1.2 Problem solving)** was also adopted in 9 interventions, helping participants recognise barriers to healthy eating and work out practical solutions.

Effectiveness

- Most interventions promoting healthy diet commonly reported short-term improvements in health promoting behaviours such as fruit and vegetable consumption intake among various underprivileged populations. [e.g. rapid review (RR) IDs 1-4, 7, 12, 16,18-20, 22, 24, 25, 27, 28].
- A smaller number of studies either observed no meaningful changes in fruit and vegetable consumption or noted effects that were not maintained. [e.g. RR IDs 9, 16, 29].

Behaviour change techniques used in interventions reducing intake of unhealthy foods



Note: (n=x) describes how many interventions used the type of intervention or the behaviour change technique.

Rapid evidence review of interventions:

Interventions reducing intake of unhealthy foods

Similarly to healthy diet promoting interventions, we found that the **three most used techniques** for reducing unhealthy diets were **(BCT 1.1 Goal setting (behaviour))**, **(BCT 1.2 Problem solving)**, and **(BCT 5.1 Information about health consequences)**, each employed in **5** interventions. These techniques likely play a critical role by helping participants define and pursue personalised targets (goal setting), work through practical barriers (problem solving), and understand the health benefits of changing their eating habits (information about health consequences).

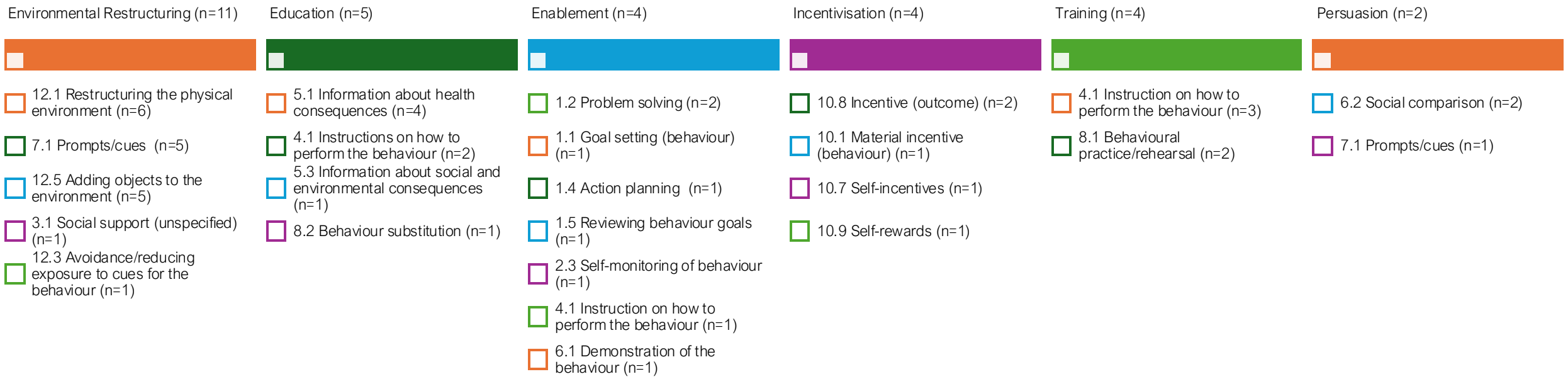
The **next most frequently used technique, (BCT 1.4 Action planning),** appeared in **4** interventions, providing a structured way for individuals to plan how, when, and where to make specific dietary changes.

Other widely used techniques, such as **(BCT 12.1 Restructuring the physical environment)**, **(BCT 4.1 Instructions on how to perform the behaviour)**, and **(BCT 6.1 Demonstration of the behaviour)**, featured in **3** unique interventions each, addressing capability and opportunity barriers by offering practical guidance, and real-life demonstrations.

Effectiveness

- Interventions aimed at reducing unhealthy dietary behaviours demonstrated consistent improvements across multiple outcomes. For example, participants in several studies reduced their frequency of fast-food consumption while others adopted lower-fat food preparation methods or curtailed sugary foods. [e.g. RR IDs 4, 7, 19, 20, 25].
- Some interventions emphasised limiting sugar-sweetened beverages, leading to a sizeable decrease in consumption, whereas others focused on overall energy or fat reduction, yielding weight loss, lower BMI, or improved diet quality. [e.g. RR IDs 6, 9, 15].

Behaviour change techniques used in interventions targeting food purchasing behaviours



Note: (n=x) describes how many interventions used the type of intervention or the behaviour change technique.

Rapid evidence review of interventions:

Interventions targeting food purchasing behaviours

We found that the most frequently used technique for encouraging healthier food purchasing was **(BCT 12.1 Restructuring the physical environment)**, adopted by **6** unique interventions. This approach included expanding supermarket provision through local government incentives, modifying store layouts and displays, or adding point-of-purchase promotions to nudge customers towards healthier food choices.

Next in popularity were three techniques **(BCT 7.1 Prompts/cues)**, **(BCT 12.5 Adding objects to the environment)**, and **(BCT 4.1 Instructions on how to perform the behaviour)**—each used in **5** interventions. These strategies involved mandatory calorie labelling on menus, placing social norm messages on trolleys, installing new retail outlets or designated produce sections, and providing customers with step-by-step guidance on selecting and preparing healthier foods.

Additionally, **(BCT 5.1 Information about health consequences)** appeared in **4** interventions, raising awareness about the link between healthier eating and reduced chronic disease risks.

Effectiveness

- Interventions aimed at modifying purchasing behaviours produced mixed findings. Some showed no or limited changes in purchasing patterns or reported non-significant shifts in specific items. [e.g. RR IDs 3, 8, 14, 26, 30].
- Others successfully influenced shopping venues or frequency, with small to substantial increases in supermarket or supercentre visits, improved perceptions of food access or higher farmers' market usage. [e.g. RR IDs 5, 9, 10, 27].
- Interventions featuring in-store labelling and promotions saw an increased likelihood of purchasing promoted healthier foods, though in some cases these effects were short-lived. [e.g. RR IDs 11, 13, 23].
- One study documented significant declines in the percentage of energy derived from free sugars and foods high in fat, sugar, and salt, highlighting the potential for targeted strategies to enhance the nutritional quality of purchased products. [RR ID 17].

Heatmap

We identified whether 30 published interventions have the potential to address each of the identified barriers and facilitators for a healthy diet.

No interventions in the review addressed emotion and how this might impact upon a person's diet. The interviews highlighted that emotions and particularly enjoyment from eating, preparing food, and enjoying food with family/friends was a facilitator to a healthy diet. Therefore, we need to consider how to promote positive emotions related to a healthy diet.

Like the above point, interventions have primarily focused on reinforcing the behaviour of eating a healthy diet and extrinsic (externally-driven) factors such as providing information about health consequences. However, the participants in interviews discussed how their diet choices were reinforced by more intrinsic factors, such as improved mood and feeling full of energy. Interventions should therefore look at how we can encourage individuals to consider these more intrinsic reinforcements to promote a healthy diet.

Goal setting of behaviour was the most frequently used BCT in interventions included in the review and focused on goals related to a specific behaviour (e.g. eating 5 fruit & veg). Participants discussed how having goals related to outcomes (e.g. weight loss) were effective in the interviews and again encouraging a person to consider their goals in relation to wider factors, other than just the behaviour may help to reinforcement positive outcomes.

The skills that a participant reported having and their confidence in their skills was a facilitator to preparing healthy meals. The review has also highlighted that a number of interventions have focused on promoting a person's skills to prepare food. There are potentially other skills that are important to be considered when encouraging a person to have a healthy diet, including meal planning, which may not have been considered by interventions.

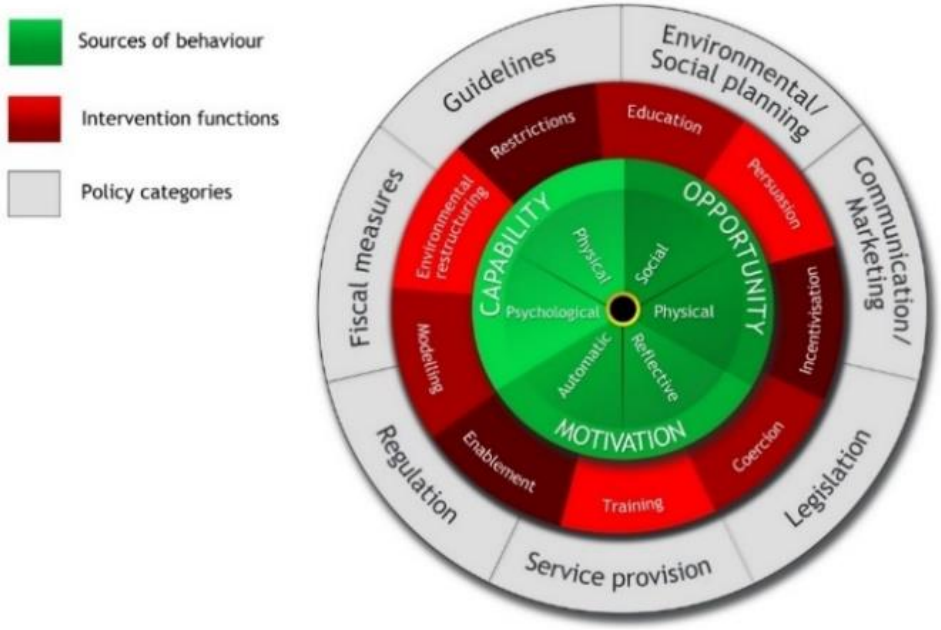
Intervention recommendations

We used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for supporting a healthy diet. We have matched the types of intervention functions (red circle) that are likely to address the identified barriers and facilitators for healthy dietary behaviours (green circle).

We have also matched the types of policy categories that can help to deliver those identified interventions (grey circle).

We describe the content of the intervention recommendations in terms of its Behaviour Change Techniques (BCTs), which are the 'active ingredients' of the intervention [11].

Using the APEASE evaluation criteria [2] and the IN-CASE framework [12], we have explored the likely acceptability, practicality, effectiveness, and affordability of the interventions (both from the perspective of the resident, and those who would deliver the intervention), and explored whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.



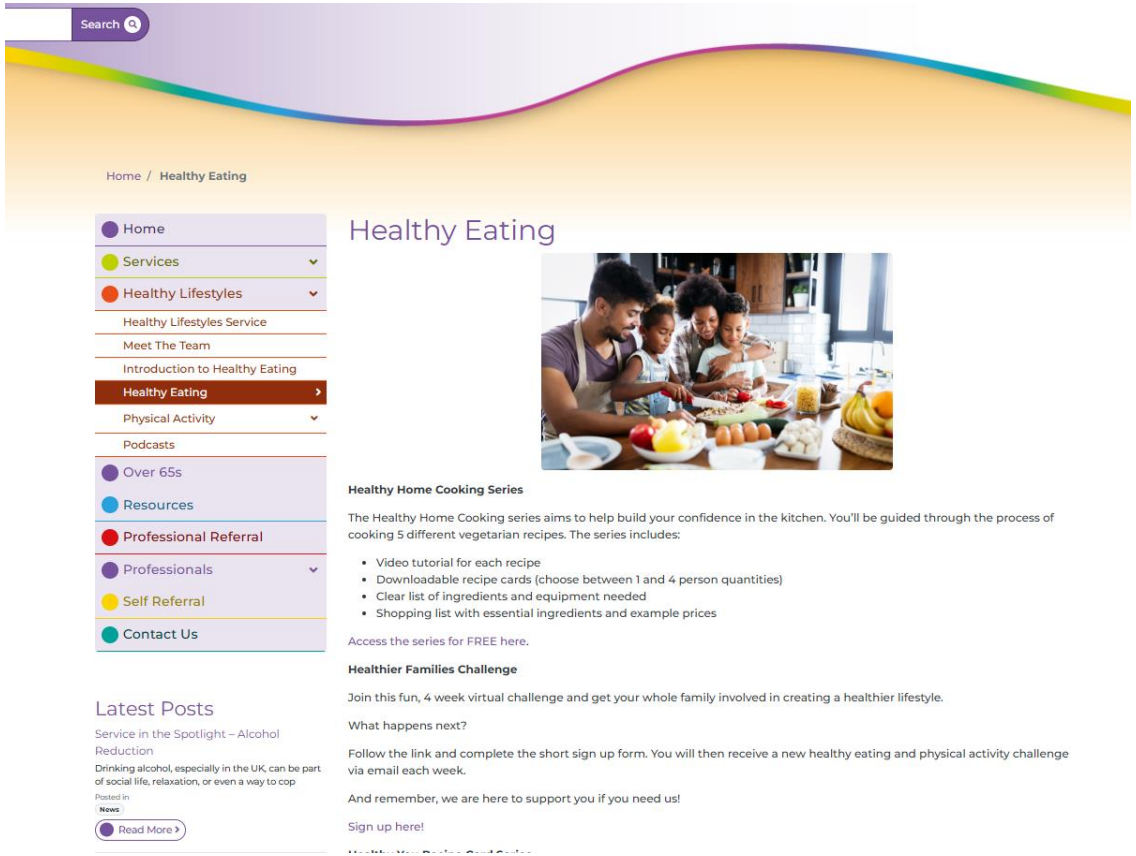
Intervention recommendation 1:

It is important that we use the findings of our research and build upon the work that is already being done across Cambridgeshire to support residents to have a healthy diet. It is apparent from the stakeholder workshops that were held, that there are multiple programmes already being delivered across Cambridgeshire, particularly by Healthy You.

Although Healthy You are delivering programmes and there are resources online, these resources focus on promoting skills relating to cooking and preparing a healthy diet. Although these skills are important and were found to be so in our qualitative work, there are also other behaviours that influence residents having a healthy diet. Behaviours such as meal planning, shopping and budgeting, are all related to whether a person has a healthy diet.

Our first intervention focuses on complementing the Healthy You resources currently available. We propose two additional tools, which are outlined in the next slides:

1. Overcoming temptations for impulsive eating
2. Shopping and meal planning



Screenshot of the current Healthy You website and services that are offered as part of the 'Healthy Eating' tab. https://healthyyou.org.uk/healthy-eating/

Intervention recommendation 1.1:

Overcoming temptations for Impulsive Eating

Findings from the qualitative insights highlighted that when a participant is stressed or preoccupied with something else, they are more likely to eat impulsively and reach for unhealthier foods. Interventions included in the rapid review did not address the emotional aspect of eating or the drivers of impulsive eating.

Evidence shows that planning how to overcome temptations to eat unhealthily in advance can impact on dietary behaviours [17]. Resources could be created to support an individual to consider situations that tempt them to eat impulsively and to make plans as to how to overcome these temptations. This could be delivered in the form of a paper-based worksheet or online resource. This would guide people:

- To reflect on and identify the situations and cues that tempt them to eat unhealthily (e.g. stress or social cues).
- Identify a strategy to address each of these temptations. This might be eating a healthier food, or undertaking a different behaviour that meets the same goal (e.g. if stress is the trigger for the temptation to eat unhealthily then engaging in a different behaviour that serves to reduce stress)
- To create a Coping Plan in which a person links each of the temptations with an appropriate alternate response and commits to sticking to this coping plan.

The resources could be self-directed or completed with the support of a Healthy You advisor or peers.

Behaviour change Wheel

Policy categories:

Service Provision

Intervention functions:

Education

Training

Key BCTs:

1.2 Problem Solving

1.4 Action Planning

4.2 Information about antecedents

8.2 Behaviour substitution

Identified need

Overcoming impulsive eating when stressed

Understanding factors and situations that lead to impulsive eating

Develop strategies to overcome barriers that lead to unhealthy eating

Intervention recommendation 1.2:

Shopping & Meal Planning

Participants in the interviews that planned their meals and batch cooked meals, reported having a healthier diet. Action planning was a frequently reported BCT used within previous interventions for both promoting a healthy diet and reducing unhealthy food consumption.

Evidence shows that people who meal plan [18] and plan for food shopping trips are more likely to adhere to nutritional guidelines and make healthier purchases, particularly so for low-income families [19]. Resources could be developed to help an individual plan their weekly meals for either themselves or family to help ensure they consume healthier meals. This could be delivered in the form of a paper-based worksheet or online resource. This would guide people:

- To plan meals that their family like and therefore know what food they need to purchase.
- Reduce any impulses to purchase unnecessary and potentially unhealthy foods whilst shopping.
- To plan and purchase foods that meet their budget and circumstances.

The resources could be self-directed or completed with the support of a Healthy You advisor or peers. They could also be used to complement Healthy You's 'Heathier Family's Challenge'.

Behaviour change Wheel

Policy categories:
Service Provision

Intervention functions:

Enablement

Training

Key BCTs:

1.4 Action Planning

7.1 Prompts/Cues

12.5 Adding objects to the environment

Identified need

Planning leading to people consuming healthier diets

Skills to shop effectively and efficiently

Engaging families in the experience of food planning

Intervention Recommendation 1: APEASE Evaluation

Due to the intervention recommendations presented being aligned with the Health You service and their website, the APEASE criteria can be applied to both recommendations. The mode of delivery for these ideas would need considering as this would influence the implications of implementing these interventions.

Acceptability – professional stakeholders found these ideas acceptable, particularly as it is using resources/programmes that are already available.

Practicability – these ideas could be practical to implement, as the tools could be added to current websites or resources, therefore the platform to deliver these resources is already operational.

Effectiveness – the Healthy You service is already accessed by residents, and it is accessible to anyone that visits the website, therefore could be effectively delivered and reach a wide-range of residents. There is also evidence from the literature which supports the use of these techniques [17-19].

Affordability – the primary cost in implementing these recommendations would be the time it would take to develop the resources.

Side-Effects – as these recommendations focus on the behaviours and strategies to promote a healthy diet, we do not feel there would be any negative consequences. They may encourage an individual to consider how they could apply some of the strategies to other aspects of their health/life.

Equity – if this is only delivered online, then this would exclude certain population groups. However, a mixture of in-person and online resources could ensure all residents have access to the resources. Resources could be advertised through social media and newsletters to ensure all residents know the resources are available.

Intervention recommendation 2:

Implementing choice architecture to nudge healthy purchasing behaviours

Participants expressed knowledge of what constitutes a healthy diet, yet did not necessarily consume a healthy diet, highlighting that potentially people are unconsciously making food choices. Participants in the interviews discussed how they sometimes purchased and consumed unhealthy food impulsively, which could be overcome by considering the choice architecture in which people are making these decisions and purchases.

Choice architecture is the deliberate design of how options are presented in an environment to influence the decisions that a person makes. The structure of these environments then 'nudge' a person towards an options, which in this case would be a healthier food choice [20]. Examples of these interventions include moving healthy food options closer to customers in cafeterias, changing the sizing of food portions, and labelling healthy foods to make them more identifiable.

These changes are referred to as nudges. Nudges have been found to promote healthy food purchasing in shops by placing healthier foods near to the cash register desk [21] or by introducing traffic light labelling on food products to guide healthier choices [22].

Nudges could be introduced to different environments (e.g. cafeterias, shops, in universities, workplaces) to increase purchasing behaviours of healthy foods. A toolkit or guidance on how to nudge healthier food options could be created, to encourage places to consider how they can promote healthier food options, which in turn could improve diet.

APEASE evaluation criteria

It does not involve residents having to consciously engage with, or buy-into, an intervention as it works via unconscious processes **(acceptability).** It would consist of small changes to the environment (at relative low cost) and reach a lot of people (**affordability & practicable**). Evidence supports the **effectiveness** of using nudges to improve a person's diet [21-22]. It reaches all people who are in that environment, including underserved groups (**equity**). People respond to and interpret subtle cues in choice architecture differently, so we would need to evaluate any unintended consequences as we don't know how people will respond/ interpret/ make sense of cues in nudges [23] **(side-effects)**.

Behaviour change Wheel

Policy categories:

Environmental/Social Planning

Intervention functions:

Enablement

Environmental Restructuring

Key BCTs:

7.1 Prompts/Cues

12.1 Restructuring the physical environment

12.5 Adding objects to the environment

Identified need

Help individuals to make healthier food purchases when impulsively purchasing food

Promote healthier snacks in different environments

Reduce automatic motivation to consuming unhealthier foods

Intervention recommendation 3:

"What's on the menu?" a community-led cooking intervention

Participants in the interviews identified that having the knowledge, ability and confidence to cook healthy meals was an important factor in them eating healthily. Some interventions in the rapid review included cooking classes although accessing these may be difficult for some. Social media, however, provides a useful, easy-to-access platform that could be utilised to share healthy recipes and cooking skills. Our recommendation is therefore a community-led cooking intervention in which residents cook a 'healthy dish', film it, and share the video/ recipe with others in their community via an online platform/social media. In addition to providing knowledge and skills about cooking healthy foods, this would also act to provide positive social norms for cooking and eating healthily.

APEASE evaluation criteria

Participants identified that they wanted more cooking skills and given the widespread use of smartphones [24] and social media [25] the intervention is likely to be broadly acceptable (**acceptability**) and practical to deliver within the community (**practicability**). There is evidence that shared video-based interventions [26] can positively influence healthy eating (**effectiveness**). The intervention would be relatively low cost with communications via social media to encourage people to take part (**affordability**). The intervention is unlikely to have negative side effects although there may need to be some moderation of video content to ensure that the information and recommendations shared are safe and appropriate (**side-effects**). To ensure accessibility for all, the videos would need to include subtitles with the option to translate into relevant languages (**equitable**).

Behaviour change Wheel

Policy categories:

Environmental/social planning

Intervention functions:

Education

Training

Modelling

Behaviour change techniques:

3.2 Social support (practical)

4.1 Instruction on how to perform the behaviour

6.1 Demonstration of the behaviour

6.2 Social comparison

Identified need

Ability to prepare fresh food and meals

Knowledge of which foods are and are not healthy

Learning about food and diets from friends and family

Dietary Behaviours being Addressed by Interventions

As diet consists of numerous behaviours, each phase of this project has looked at slightly different or variations of different dietary behaviours. For instance, the review reported promoting healthy food choices, reducing intake of unhealthy foods, and on purchasing. The survey measured participants daily fruit and veg intake, daily consumption of high salt, fat and sugary snacks, daily sugary drink intake, and weekly consumption of fast foods and takeaway. The qualitative work explored participants general diet, consumption of fruit and veg, and consumption of fast foods and takeaways.

The figure on the right highlights how the proposed intervention recommendations address the behaviours explored in the previous phases of the project.

1.1 Shopping & Meal Planning

- Purchasing Behaviour
- Healthy Diet
- Reducing Intake of unhealthy foods
- Fruit & Veg consumption
- Promoting Healthy Food Choices

1.2 Impulsive Eating

- Snacks & Sugary Drinks
- Reducing Intake of unhealthy foods
- Takeaways & Fast Food

2 Choice Architecture

- Purchasing Behaviour
- Snacks & Sugary Drinks
- Promoting Healthy food choices
- Reducing Intake of unhealthy foods

3 'What's on the Menu'

- Promoting Healthy Food Choices
- Fruit & Veg Consumption
- Reducing Takeaways & Fast Food

Conclusions

This mixed-methods research has identified key capability, opportunity, and motivational barriers and facilitators for a range of dietary behaviours amongst residents in Cambridgeshire.

We have made a series of recommendations about how to best support local residents to have a healthy diet, which include:

- creating additional tools and resources to support local residents to plan their shopping, meals, and how to overcome temptations to eat unhealthily.
- supporting residents to purchase healthier food choices by implementing 'behavioural nudges' in key contexts, such as workplace cafeterias.
- delivering a community-led intervention which supports residents to share their own healthy dishes and recipes with others in their community via an online platform.

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