



## Effectively implementing healthy and sustainable food practices in out-of-home food service locations: The perspective of the catering staff members

Machiel J. Reinders<sup>a,\*</sup>, Marieke C.E. Battjes - Fries<sup>b</sup>, Emily P. Bouwman<sup>c</sup>,  
 Marieke J.G. Meeusen – van Onna<sup>a</sup>

<sup>a</sup> Wageningen University & Research, Wageningen Economic Research, P.O. Box 29703, 2502 LS, The Hague, the Netherlands

<sup>b</sup> Louis Bolk Institute, Kostertijland 3-5, 3981 AJ, Bunnik, the Netherlands

<sup>c</sup> Wageningen University & Research, Wageningen Economic Research, P.O. Box 35, 6700 AA, Wageningen, the Netherlands

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### ABSTRACT

Restaurants, canteens, residential care, hospitals and other out-of-home food service locations can play an important role in improving people's diet quality by offering healthier and more sustainable food choices. However, the effectiveness of implementing sustainable and healthy food practices at these locations is, at least partly, dependent on the extent to which they are accepted and implemented by the staff members. This study aims to assess staff members' motivation, perceived capability, perceived opportunity and their readiness to change their behaviour (i.e., stages of change) in offering more healthy and sustainable food options to their customers or patients. Eleven out-of-home locations that wanted to adjust their assortment towards more healthy and sustainable product offerings participated in this study and were able to distribute a comparable questionnaire among their staff members to assess their perceived readiness to change. Results among 268 participants show that staff members find both a healthy and sustainable food assortment important and also seem to be motivated to improve their food assortment regarding health and sustainability. Perceived opportunity seems to be the largest barrier for staff members, although there is also room for improvement regarding their perceived capability. In addition, personal motivation seems to play the dominant role in staff members' readiness to change the health of the assortment, whereas perceived capability seems to play the dominant role in their perceived readiness to change the sustainability of the assortment. This study shows that taking into account the perspective of the catering staff members may help to effectively implement healthy and sustainable food practices in out-of-home food service locations.

### 1. Introduction

The importance and urgency of sustainable and healthy food consumption has become increasingly recognized in recent years. The FAO and WHO define sustainable healthy diets as 'dietary patterns that promote all dimensions of individuals' health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable' (FAO and WHO, 2019). Furthermore, a healthy diet is generally defined as one 'in which macronutrients are consumed in appropriate proportions to support energetic and physiologic needs without excess intake while also providing sufficient micronutrients and hydration to meet the physiologic needs of

the body' (Stark, 2013). However, what constitutes a healthy diet is continually shifting to reflect the evolving understanding of the roles that different foods, essential nutrients, and other food components play in health and disease (Cena & Calder, 2020). Diets rich in plant-based foods and with fewer animal-based foods play an important role in transitioning to more healthy and sustainable diets. Diets without or with less meat and dairy have a lower environmental impact and can help mitigate climate change (Willett et al., 2019). Adopting diets high in fruit and vegetables, for example, can decrease the risk of obesity, cardiovascular diseases and several types of cancer (WHO, 2002).

Dietary change interventions can have a significant impact when conducted in settings that are characterized by having pre-determined

\* Corresponding author.

E-mail address: [machiel.reinders@wur.nl](mailto:machiel.reinders@wur.nl) (M.J. Reinders).

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food offerings for their customers, such as restaurants and canteens, as opposed to grocery stores or supermarkets. This is because it is easier to persuade customers to make healthier choices in these settings (Bianchi, Garnett, Dorsel, Aveyard, & Jebb, 2018). As a result, out-of-home food service locations, including restaurants, canteens, residential care facilities, and hospitals, can play an important role in improving diet quality by offering healthier and more sustainable food options on their menus, such as more vegetables and less meat (for a comprehensive overview of this topic, see Kraak, Englund, Misyak, & Serrano, 2017; Lorenz & Langen, 2018).

Changing food practices in these settings typically involves the participation of staff, practitioners or volunteers. In order to effectively implement sustainable and healthy food practices in settings like restaurants and canteens, it is therefore crucial to involve staff, practitioners, or volunteers. Successful implementation is, at least partly, dependent on the extent to which they are accepted and implemented by these staff members (Collins, Huggins, Porter, & Palermo, 2017). The behaviour of staff members can shape the environment in which customers make their food choices and, as such, creates the success of initiatives that aim to instigate behavioural change (Chou, 2014; Kiefe-; de Jong, Mathers and Franco, 2014; Saulais et al., 2019). This has been previously illustrated in a health care setting where it was found that intervention success was prevented when there was no coordinated food service approach and a lack of communication and shared responsibility between different staff members (Ross, Mudge, Young, & Banks, 2011). Additionally, in relation to food service, a series of expert interviews revealed that catering staff can potentially resist to implement interventions that, in their opinion, go against satisfying the customer. This emphasizes the need to motivate catering staff when it comes to implementing healthy and sustainable food practices (Velema, 2019). Therefore, assessing the willingness and readiness of catering staff to offer healthy and sustainable food is crucial to the successful implementation of practices that can impact the food choices of guests (Kahn-Marshall & Gallant, 2012).

### 1.1. Staff members' readiness to change behaviour: Stages of Change Model

Staff members' readiness to implement healthy and sustainable food practices requires their personal motivation and attitude towards sustainable and healthy food (Paillé & Raineri, 2015). Staff members' readiness to change their behaviours can be explained by the Stages of Change Model, also called the Transtheoretical Model (TTM) of behaviour change (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997). This model describes the process of behaviour change as occurring in stages, i.e. it describes how an individual or organization integrates new behaviours, goals, and programs at various levels. It describes the process of behaviour change in five different stages, namely pre-contemplation, contemplation, preparation, action, and maintenance. Effective intervention strategies will differ for each stage, and can help individuals or organisations progress to the next stage. In the *pre-contemplation* stage, individuals have no intention of taking action, while in the *contemplation* stage, they have intentions and a plan to do so in the near future. In the *preparation* stage, individuals have the intention to take action and have already taken some concrete steps towards doing so. In the *action* stage, behaviour has been changed for a short period of time, while in the *maintenance* stage, behaviour has been changed and is maintained for the long-term. The Transtheoretical Model has shown to be useful for understanding the decision-making process involved in dietary behaviour change (Di Noia & Prochaska, 2010) and more recently has also been used to explain shifts in healthy and sustainable food consumption (Bryant, Barnett, & Prosser, 2022; Culliford & Bradbury, 2020; Strässner & Hartmann, 2023). However, to the best of our knowledge the Transtheoretical Model has not yet been applied to assess staff members' change towards more healthy and sustainable behaviours.

### 1.2. Determinants of behaviour change: COM-B framework

To successfully implement sustainable and healthy food practices, practitioners need more than just personal motivation. They also require the knowledge, skills, and facilities necessary to provide such foods. The COM-B framework, developed by Michie, Van Stralen, and West (2011), identifies motivation, capability, and opportunity as the three key factors that predict behaviour change, and can help explain staff members' readiness to adopt new food practices. This model is often used to explain behaviour change in different behavioural domains including the promotion of healthier and more sustainable food choices in out-of-home food service locations (Fuster, Santos, Dimond, Huang, & Handley, 2023; Graça et al., 2023; Naicker, Shrestha, Joshi, Willett, & Spiegelman, 2021). For example, Graça et al. (2023) conclude in their review that the COM-B framework is a useful model to classify intervention components that promote dietary change in collective meal contexts.

When taking a closer look at these three factors, motivation refers to the conscious and unconscious cognitive processes that direct and inspire behaviour (Michie et al., 2011). Staff members may be motivated to engage in a certain behaviour because they find it intrinsically rewarding. For example, Greaves, Zibarras, and Stride (2013) suggest that personal norms, values and beliefs about health and the environment can motivate practitioners to offer more healthy and sustainable food choices. On a related note, people's personal motivation was found to be a factor that positively correlates to exhibiting pro-environmental behaviour (Chou, 2014). However, not all practitioners will possess or develop intrinsic personal motivation to offer more healthy and sustainable food at their work. Instead, they can also be extrinsically motivated, for example by offering recognition from the management or providing financial rewards (i.e., in the form of salary or bonuses; Sibian & Ispas, 2021).

Capability, the second factor in the COM-B framework, refers to the psychological and physical ability to engage in a particular behaviour (Michie et al., 2011). Practitioners may lack the knowledge and skills to prepare and serve sustainable and healthy food, which can hinder their ability to implement these practices. First of all, staff members may not be aware of the environmental and health impacts of the different types of food they serve, and therefore providing them information about the benefits of sustainable or healthy foods is needed to fill this knowledge gap (Mullee et al., 2017). Additionally, capability includes having the necessary knowledge and skills to prepare and serve sustainable and healthy food products. Sustainable and healthy meals can (perceived to) be more complex to prepare (Attwood, Voorheis, Mercer, Davies, & Vennard, 2020). For example, these meals may contain more and varied ingredients that each require different and potentially unfamiliar preparation and cooking techniques. Chefs may not have the background to successfully prepare these meals, also because chef training courses are still much focused on meat-intense dishes (Attwood et al., 2020). This lack of capability can also limit staff members' ability to convey healthy and sustainable food choices to their customers or clients, as they may hold certain beliefs or misconceptions about what constitutes a healthy and sustainable diet and what is best for their customers (Collins et al., 2017). This may also influence staff members' views and appreciation of implementing sustainable and healthy food practices and may even lead to opposing behaviours (Collins et al., 2017). Staff members play a crucial role in interacting with and motivating customers to make healthier and more sustainable food choices, and thus improving their capability is essential for the success of such initiatives.

Finally, a lack of opportunity to offer a sustainable and healthy assortment can also be an important barrier. Opportunities refer to all the factors that lie outside the individual that make the behaviour possible or prompt it (Michie et al., 2011), such as providing the necessary infrastructure like tools and equipment that practitioners can use to prepare and serve more healthy and sustainable food options. For example, when organisations invest in the right equipment for chefs,

they signal their intent to enable its staff to make positive change happen (Attwood et al., 2020). In addition, time and personnel resources are also important factors to consider, as lack of time and capacity have been identified as significant barriers by staff members in various studies on the role of staff in food behaviour interventions (Taufik, Jaspers, Bouwman, & Reinders, 2020).

It is important to note that these three behavioural determinants (motivation, opportunity and capability) affect each other. For example, staff members' motivation to contribute to sustainable and healthy food practices may also be affected by their opportunities and skills related to preparing and serving these sustainable and healthy food options. Moreover, all three behavioural determinants are preconditional to behaviour change. Stated differently, focusing on just one of the behavioural aspects, such as increasing someone's motivation, might not be enough to stimulate staff to implement sustainable and healthy food practices when the other behavioural conditions are ignored.

### 1.3. Current study

In this study, we aim to investigate the readiness of catering staff members to offer more healthy and sustainable food options to customers or patients, taking into account the key factors that predict behavioural change: personal motivation, perceived capability, and perceived opportunity. We hereby looked at a very broad group of catering staff members: from management level to executive level and those involved in procurement, working in the kitchen or serving food. Inviting such a broad group of staff members to participate allowed us to integrate a diverse range of perspectives in our study.

The study was conducted at 11 out-of-home food service locations that were part of a Dutch national research project that aimed to encourage healthier and more sustainable food choices among customers, employees, and patients (Meeusen et al., 2022). All these locations wanted to adjust their assortment towards more healthy and sustainable product offerings. It is worth noting that some of the locations include employee restaurants and to avoid confusion about the term 'employees', we distinguish between staff members, i.e., those who are offering the food in a catering setting and the subjects of our study, and employees, i.e., those who are receiving, buying or consuming the food in some of the settings (next to guests and patients).

## 2. Method

### 2.1. Study design and participants

A cross-sectional study was conducted to evaluate the readiness of staff members to offer healthy and sustainable food options to their customers/employees/patients, by assessing their motivation, perceived capability, perceived opportunity, and stage of change through an online questionnaire. The study protocols of the different locations (cases) received ethical approval from an ethics committee, and all participants provided written consent at the start of the questionnaire.

As noted earlier, the study was conducted at 11 out-of-home food service locations that were part of a Dutch national research project. About 30 organisations participated in this project, distributed across different cases (types of settings, including hospitals, elderly care homes, mental health care homes, restaurants, hotels, holiday parks, schools and child day-care). These organisations subscribed to participate in the national research project after being approached by one of the research institutes, researchers, or project partners. Additionally, recruitment

texts were developed and distributed via social media and newsletters. In half of the cases a comparable baseline questionnaire was distributed among the involved staff members to assess their readiness to change regarding both healthy and sustainable eating behaviour, resulting in 11 different eating locations that eventually participated.<sup>1</sup> To all employees with different functions (management, kitchen, catering and dieticians) in these 11 organisations, a link to the questionnaire was distributed by e-mail with the question to voluntarily and anonymously fill out a survey about healthy and sustainable eating behaviour (in their organisation). The questionnaire was administered via an online system during a couple of weeks in a two year period (July 2019–July 2021) depending on the specific case.

A total of 268 staff members from the 11 participating organisations filled out the questionnaire, divided between four eating locations in the leisure sector (a guest restaurant in a holiday park and three employee restaurants in a hotel;  $n = 112$ ), four eating locations in a hospital (employee restaurants;  $n = 54$ ) and three eating locations in a care facility (patient restaurants of which two in an elderly care home and one in a mental care home;  $n = 102$ ).

### 2.2. Measurements

The staff members' personal motivation, perceived capability, perceived opportunity and stage of change were assessed with an online questionnaire. The questionnaire consisted of about 15 questions (depending on the case the organisation participated in) and it took approximately 10 minutes to be filled out. Table 1 provides an overview of the relevant measures and number of items that were used in the questionnaire for the staff members in this study. The questionnaire was developed by researchers of one of the research institutes, then discussed with the researchers of the other research institutes in the project consortium and subsequently personalised to the various cases in cooperation with the organisations involved at the different food service locations. Furthermore, the project partners urged the researchers to limit the number of questions that could be incorporated in the questionnaire due to limited time from the participants.

*Perceived health and sustainability of the food assortment* – Staff members were asked to score their opinion towards both the healthiness and the sustainability of the current food assortment in their location (Current Situation Food Assortment), on a 5-point Likert scale ranging from 1 (totally not) to 5 (totally).

*Self-reported readiness to change behaviour* – Staff members' self-reported readiness to change behaviour is measured with two outcome variables. First, we measured the staff's attitude towards a healthy and sustainable food assortment by asking them to score their opinion about how important it is that their food assortment is healthy and sustainable (Importance Food Assortment), on a scale ranging from 1 (totally not) to 5 (totally). In addition, we measured whether the staff members had the ambition to make the food assortment more healthy and sustainable by using the concept of stages of change. Stage of Change was assessed for both health and sustainability separately with the following six answering options based on Prochaska et al. (1994): 'No, and I have no intention of starting with it in the coming six months', 'No, but I am planning to start with it in the coming six months', 'No, I occasionally present something [Healthy/Sustainable], but not regularly', 'Yes, I started with it in the last six months', 'Yes, I am doing it for longer than six months' and 'Not applicable, my function does not influence this' as possible answers. This question differed slightly for the three locations in the leisure sector (i.e. three employee restaurants in a hotel care

<sup>1</sup> Note that we worked in close collaboration with all the involved practitioners to arrive at interventions that are suitable in practice. Therefore, the description of the specific interventions and their outcomes slightly differed for each location. The design, execution and evaluation of these interventions are beyond the scope of this article.

**Table 1**  
Overview of the used measures in the questionnaire of this study.

Measure	Variable name	Answer scale	# items	Questions
Perceived health and sustainability of the food assortment	Current Situation Food Assortment	1 (totally not) to 5 (totally)	2	To what extent do you think that your food assortment is <i>healthy/sustainable</i> ?
	Importance Food Assortment (Attitude towards a healthy and sustainable food assortment)	1 (totally not important) to 5 (totally important).	2	To what extent do you think it is important to have a food assortment that is <i>healthy/sustainable</i> ?
Self-reported readiness to change behaviour	Stages of Change	4 or 6 answer categories <sup>a</sup>	2	Do you currently have the ambition to make the food assortment more <i>healthy/sustainable</i> [even though you cannot decide this by yourself]?
COM-B variables	Perceived Capability (having sufficient knowledge to make their food assortment more healthy and sustainable)	1 (very little) to 5 (very much)	2	To what extent do you have knowledge to make the food assortment more <i>healthy/sustainable</i> ?
	Perceived Opportunity (having sufficient time and room to make their food assortment more healthy and sustainable)	1 (very little) to 5 (very much)	2	To what extent do you receive time and room to make the food assortment more <i>healthy/sustainable</i> ?
	Personal Motivation	1 (very low) to 10 (very high)	1	What number (on a scale of 1–10) would you give your motivation for [the intervention]?

Note: we decided not to add the inter-item correlations (although in itself these correlations were moderately to high, with Pearson correlation coefficients of  $r > 0.55$ ) because the two items of the used measures are not items that together form one measurement scale (i.e., they are not multi-item scales). Instead they are two of the same items capturing the same statement for health as well as for sustainability.

<sup>a</sup> This question differed slightly for the three locations in the leisure sector (i.e. three employee restaurants in a hotel care facility) and for one location in a care facility (i.e. an elderly care home).

facility) and for one location in a care facility (i.e. an elderly care home).<sup>2</sup> These locations asked the same question but added the following in brackets: “even though you cannot decide this by yourself”. Moreover, these locations had four answering options instead of six, namely: ‘No, and I do not have plans to start with it in the coming six months’, ‘Yes, and I am planning to start with it in the coming six

<sup>2</sup> In [Appendix I](#) an overview can be found of the demographics and average scores of these locations.

months’, ‘Yes, and I have started with it in the last six months’, and ‘Yes, and I am already doing it longer than six months’.

**COM-B variables – Perceived Capability and Perceived Opportunity** were assessed by statements about respectively having sufficient knowledge and having sufficient time and room to make their food assortment more healthy and sustainable, on a 5-point Likert scale ranging from 1 (very little) to 5 (very much). **Personal Motivation** to make the food assortment of their location healthier and more sustainable was assessed by asking staff members to give a rating from 1 to 10, with a 10 indicating the highest motivation to participate in the intervention at their location to make the food assortment more healthy and sustainable. Contrary to the other questions, this question was a single question that focused on both a healthy and sustainable food assortment. The formulation of this question also differed slightly for three locations in the leisure sector (i.e. three employee restaurants in a hotel care facility) and for one location in a care facility (i.e. an elderly care home),<sup>3</sup> but the overall meaning of the question was the same.

**Socio-demographic factors** - Staff members were asked to fill in their sex (male, female, else), age range (18–24, 25–34, 35–44, 45–54, 55–64, older than 65) and type of work contract (permanent contract, flexible contract, else).

### 2.3. Statistical analyses

The data was analysed using SPSS version 28. Paired sample *t*-tests, ANOVA analyses, Bonferroni post-hoc tests, linear regression models and ordinal logistic regression models<sup>4</sup> were used to analyse the data. All scales have a normal distribution except for the variable ‘Stages of Change’. This variable is treated as an ordinal variable (with results presented as percentages), whereas the other variables were treated as continuous variables (with the results presented as means with SD’s and Beta’s with SE’s). Results were interpreted as significant when  $p < .05$  (two-sided).

## 3. Results

### 3.1. Characteristics of the study participants

In total, 46% of our study participants are female, 21% male and 33% unknown. Most participants who filled in their age are between 25 and 54 years of age. Finally, most participants (78%) have a permanent contract. These percentages differ between the three eating locations (i.e. leisure, hospital, care facility). In the hospitals and care facilities, most participants are female, while in the leisure sector the percentage of males and females is similar. Moreover, in the leisure sector, most of the participants are younger than 35, whereas most participants in the hospitals and elderly care facilities are older than 35. [Table 2](#) provides an overview of the exact percentages of gender, age and employment status for the three groups of food service locations.

### 3.2. Descriptive results

When looking at the opinion of staff members towards both the healthiness and the sustainability of the current food assortment in their

<sup>3</sup> An overview of the demographics and average scores of these three location can be found in [Appendix I](#)

<sup>4</sup> In order to run the ordinal logistic regressions, we checked whether the proportional odds assumption was met, meaning that the regression slopes (or the effects of our predictors) on the dependent variable (i.e., stages of change) are constant across the levels of our dependent variables (i.e., the different stages of stages of change). In both cases, namely the stage of change of offering a healthy food assortment and the stage of change of offering a sustainable food assortment, the proportional odds assumption was met (i.e., the Test of Parallel Lines in SPSS shows non-significance).

**Table 2**  
Overview of gender, age and employment status for the different food service locations.

	Total (n = 268, 11 locations)	Leisure sector (n = 112, 4 locations)	Hospitals (n = 54, 4 locations)	Care facilities (n = 102, 3 locations)
Gender				
Male	31%	46%	24%	19%
Female	66%	55%	76%	74%
Unknown (missing)	3%	–	–	8%
Age <sup>a</sup>				
18–24	13%	27%	4%	2%
25–34	21%	32%	19%	9%
35–44	19%	18%	24%	18%
45–54	21%	15%	28%	23%
55–64	13%	7%	24%	15%
Older than 65	1%	–	2%	2%
Unknown (missing)	13%	1%	–	32%
Employment <sup>a</sup>				
Permanent contract	78%	84%	89%	66%
Flexible contract	5%	6%	9%	1%
Else	4%	9%	–	1%
Unknown (missing)	13%	1%	2%	32%

<sup>a</sup> One location in a care facility (i.e. an elderly care home, n = 34) had no data on age and employment status.

location (Current Situation Food Assortment), results show that staff members scored their current food assortment neutral to slightly positive on being healthy ( $M = 3.3, SD = 0.9$ ) and sustainable ( $M = 3.1, SD = 0.8; t(230) = 3.5, p < .001$ ) (Table 3). Furthermore, scores on Importance Food Assortment ( $M = 4.1, SD = 0.7$  for healthy food assortment and  $M = 3.8, SD = 0.8$  for sustainable food assortment;  $t(231) = 7.3, p < .001$ ) indicate that participants seem to find both a healthy and sustainable food assortment important. Participants also seem to be motivated to improve their food assortment regarding health and sustainability, given that the score is well above the midpoint of the scale ( $M = 7.6, SD = 1.5$  on scale 1–10). Scores on Perceived Opportunity are around the midpoint of the scale ( $M = 3.0, SD = 1.0$  for healthy food assortment and  $M = 2.9, SD = 1.0$  for sustainable food assortment;  $t(225) = 1.7, p = .09$ ), while scores for Perceived Capability are slightly above the midpoint of the scale ( $M = 3.4, SD = 0.7$  for healthy food assortment and  $M = 3.1, SD = 0.8$  for sustainable food assortment;  $t(230) = 7.3, p < .001$ ). As can be seen in the reported test scores, the

**Table 3**  
Overview of the average scores given by staff members for both healthy and sustainable food assortment (N = 268).

	Healthy food assortment		Sustainable food assortment		Two-sided p-values
	n	Mean (SD)	n	Mean (SD)	
Current Situation Food Assortment	231	3.3 (0.9)	231	3.1 (0.8)	< .001
Importance Food Assortment	232	4.1 (0.7)	232	3.8 (0.8)	< .001
Perceived Capability	231	3.4 (0.7)	231	3.1 (0.8)	< .001
Perceived Opportunity	226	3.0 (1.0)	226	2.9 (1.0)	.09
Healthy and sustainable food assortment	n	Mean (SD)			
Personal Motivation	211	7.6 (1.5)			

Note. The motivation question focused on both health and sustainability and ranged from 1 to 10. The other questions were asked for health and sustainability separately and ranged from 1 to 5.

average scores are higher for healthy food assortment than for sustainable food assortment (all  $p < .001$ ), except for Perceived Opportunity where no significant difference was found ( $p = .09$ ).

We ran subgroup analyses for the socio-demographic variables to look whether differences in the scores on our variables of interest could be found between different groups. Generally, we did not find differences in gender, age and employment status, except for a small (marginally significant) difference in gender on Importance Food Assortment. More specifically, women seem to find both healthy ( $M = 4.2, SD = 0.7$ ) and sustainable food assortment ( $M = 3.9, SD = 0.7$ ) more important than men ( $M = 4.0, SD = 0.7$  for healthy food assortment ( $t(235) = -1.7, p < .05$ );  $M = 3.7, SD = 0.8$  for sustainable food assortment ( $t(230) = -1.6, p = .06$ )). In addition, we also found a significant difference between men and women on Perceived Capability; i.e., men provided higher scores on Perceived Capability for a healthy food assortment ( $M = 3.6, SD = 0.7$ ) and sustainable food assortment ( $M = 3.4, SD = 0.8$ ) than women ( $M = 3.3, SD = 0.8$  for healthy food assortment ( $t(231) = 2.9, p = .002$ );  $M = 3.0, SD = 0.8$  for sustainable food assortment ( $t(230) = 3.7, p < .001$ )).

Regarding Stages of Change, results show that when it comes to making the food assortment more healthy and sustainable most participants are in the pre-contemplation and contemplation stage; they either do not have the intention to change or they are planning to change but not doing it yet (Table 4). It seems that participants are a bit further in their stage of change regarding making the food assortment more healthy than making it more sustainable. Results show that regarding healthy food assortment there are more participants in the action stage (9.7% vs. 6.7%) - where they just started changing, and the maintenance stage (12.3% vs. 8.6%) - where they already changed for longer than 6 months and now need to maintain this change. While regarding sustainable food assortment more participants are in the pre-contemplation stage (24.6% vs. 19.4%) - where they are not thinking about changing at all. The share of participants that are in the contemplation stage - where they are thinking of changing but not doing it yet - is comparable between transitioning towards a healthy food assortment and transitioning towards a sustainable food assortment.

### 3.3. Comparing the different types of out-of-home locations

When comparing the three different types of out-of-home locations with each other (the leisure sector,  $n = 112$ ; hospitals,  $n = 54$ ; care facilities,  $n = 102$ ), results show that the Current Situation regarding a healthy food assortment is significantly different between the three types of eating locations ( $F(2,234) = 3.97; p = .02; \eta^2 = 0.033$ ; Table 5). Post-hoc tests show that participants at an eating location in the leisure sector rate the perceived healthiness of their current food assortment significantly higher ( $M = 3.4, SD = 0.8$ ) than participants at an eating location in care facilities ( $M = 3.0, SD = 1.0; p = .019$ ).

Besides, the perceived Importance of having a healthy food assortment is significantly different between the three types of eating locations ( $F(2,234) = 8.59; p < .001; \eta^2 = 0.068$ ). Post-hoc tests show that participants in an eating location in the leisure sector find a healthy food

**Table 4**  
Frequencies of the different Stages of Change towards a healthy and sustainable food assortment.

	Healthy food assortment	Sustainable food assortment
Pre-contemplation	19.4%	24.6%
Contemplation	19.0%	20.1%
Preparation	10.4%	9.7%
Action	9.7%	6.7%
Maintenance	12.3%	8.6%
I don't think my function has an effect on this	4.5%	3.7%
Missing	24.6%	26.5%

**Table 5**  
Descriptive results of the variables per setting.

	Eating location in the leisure sector		Eating location in care facilities		Eating location in hospitals	
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
<b>Health</b>						
Current Situation Food Assortment	105	3.4 (0.8) <sup>a</sup>	81	3.0 (1.1) <sup>b</sup>	51	3.3 (0.9) <sup>a,b</sup>
Importance Food Assortment	103	3.9 (0.7) <sup>a</sup>	82	4.3 (0.7) <sup>b</sup>	52	4.3 (0.7) <sup>b</sup>
Perceived Capability	103	3.4 (0.9) <sup>a</sup>	79	3.4 (0.7) <sup>a</sup>	51	3.6 (0.6) <sup>a</sup>
Perceived Opportunity	104	2.8 (1.0) <sup>a</sup>	74	3.1 (1.1) <sup>a</sup>	51	3.2 (0.9) <sup>a</sup>
<b>Sustainable</b>						
Current Situation Food Assortment	103	3.3 (0.8) <sup>a</sup>	78	2.8 (0.8) <sup>b</sup>	51	3.0 (0.8) <sup>a,b</sup>
Importance Food Assortment	102	3.7 (0.8) <sup>a</sup>	79	3.9 (0.7) <sup>a</sup>	51	3.9 (0.9) <sup>a</sup>
Perceived Capability	102	3.1 (1.0) <sup>a</sup>	79	3.0 (0.7) <sup>a</sup>	51	3.3 (0.7) <sup>a</sup>
Perceived Opportunity	103	2.8 (1.0) <sup>a</sup>	72	3.0 (1.1) <sup>a</sup>	51	3.1 (0.9) <sup>a</sup>
<b>Health &amp; sustainable</b>						
Personal Motivation	93	7.5 (1.8) <sup>a</sup>	74	7.7 (1.2) <sup>a</sup>	44	7.7 (1.1) <sup>a</sup>

Note: Different superscripts (a, b) per row indicate significant differences according to Bonferroni post-hoc tests in which the three types of eating locations are compared.

assortment significantly less important ( $M = 3.9, SD = 0.7$ ) than participants in an eating location in care facilities ( $M = 4.3, SD = 0.7, p < .001$ ) and participants in an eating location in hospitals ( $M = 4.3, SD = 0.7, p = .004$ ).

Finally, results show that the Current Situation regarding a sustainable food assortment is significantly different between the three types of eating locations ( $F(2,229) = 9.65; p < .001; \eta^2 = 0.078$ ). Post-hoc tests show that staff members in an eating location in the leisure sector rate the perceived sustainability of their current food assortment significantly higher ( $M = 3.3, SD = 0.8$ ) than participants in an eating location in care facilities ( $M = 2.8, SD = 0.8, p < .001$ ).

No other significant differences between the settings were found.

### 3.4. Predicting the importance of a healthy and sustainable food assortment

As indicated in the method section, staff members' self-reported readiness to change behaviour is measured with two outcome variables: (1) their opinion about how important it is that their food assortment is healthy and sustainable (Importance Food Assortment) and (2) their Stage of Change of offering a healthy and sustainable food assortment. First, a linear regression model with staff's perceived Importance of a healthy food assortment as the dependent variable and the COM-B variables as predictors shows that only Personal Motivation is a significant predictor ( $B = 0.10 (0.04), p = .005$ ; Table 6). In contrast, the linear regression model with perceived Importance of a sustainable food assortment as the dependent variable, shows that Perceived Capability is the only significant predictor ( $B = 0.17 (0.07), p = .019$ ), although Personal Motivation is marginally significant ( $B = 0.07 (0.04),$

$p = .088$ ).

### 3.5. Predicting the stages of change of offering a healthy and sustainable food assortment<sup>5</sup>

Results from the ordinal logistic regression with Stages of Change regarding the offering of a healthy food assortment as the dependent variable (Table 7) shows that Personal Motivation is statistically significantly associated with Stages of Change, i.e., a higher motivation significantly increases the odds that a person is in a higher stage ( $exp(B) = 1.45, p < .001$ ). In addition, we also see that the level of Perceived Capability is statistically significantly associated with Stages of Change, i.e., Perceived Capability significantly increases the odds that a person is in a higher stage ( $exp(B) = 2.16, p < .001$ ). Finally, we do not see a significant effect for Perceived Opportunity.

Results from the ordinal logistic regression with Stages of Change regarding the offering of a sustainable food assortment as the dependent variable shows that Personal Motivation is statistically significantly associated with Stages of Change, i.e., a higher motivation significantly increases the odds that a person is in a higher stage ( $exp(B) = 1.30, p = .021$ ). In addition, we also see that Perceived Capability is statistically significantly related to Stages of Change, i.e., Perceived Capability significantly increases the odds that a person is in a higher stage ( $exp(B) = 2.37, p < .001$ ). Finally, also Perceived Opportunity is statistically significantly associated with Stages of Change, i.e., Perceived Opportunity significantly increases the odds that a person is in a higher stage ( $exp(B) = 1.39, p = .045$ ).

## 4. Discussion

### 4.1. Summary and discussion of the findings

The results of the present study indicate that staff members see room for improvement in the current availability of healthy and sustainable food options at their locations. Overall, staff members appear to place importance on both a healthy and sustainable food assortment and are motivated to enhance the health and sustainability of their food offerings. Several previous studies identified health as a more important driver for dietary behaviour compared to sustainability (e.g., Blanke, Billieux, & Vögele, 2022; Verain et al., 2022b). In line with this, we also found that health is considered as more important than sustainability. Additionally, it seems that staff members are further along in the process of making their food assortment more healthy than in making it more sustainable, as reflected in their stage of change. Specifically, our results indicate that staff members are in a more advanced stage of change regarding health compared to sustainability.

We found differences between the different types of out-of-home food service locations. Notably, we found contrasting results among staff members from the leisure sector. On the one hand the staff members from the leisure sector perceive that they are already doing well with regard to a healthy and sustainable assortment. They score higher than the organisations from the other sectors. While at the same time they have the lowest scores on the three behavioural factors and on the importance attributed to a healthy and sustainable assortment. Although we must be cautious in interpreting these results because differences may be due to more than just the type of sector, it may be possible that these differences can be attributed to the fact that taste and the social setting of eating are considered more important in restaurant contexts than in home contexts, making health and sustainability relatively less important topics in the leisure context (Claessens, Gillebaart,

<sup>5</sup> Note that we included all locations for this analysis, meaning that we also included the three locations in the leisure sector and the one location in a care facility that missed the answering category 'preparation'. More information on how these locations differed, see appendix I.

**Table 6**  
Regression coefficients for predicting the Importance of a healthy and sustainable food assortment.

Variable	Healthy food assortment				Sustainable food assortment			
	B (SE)	Beta	T	p	B (SE)	Beta	t	p
Intercept	3.13 (0.30)		10.57	<.001	2.93 (0.32)		9.20	<.001
Personal Motivation	0.10 (0.04)	.21	2.84	.005	0.07 (0.04)	.13	1.72	.09
Perceived Opportunity	-0.01 (0.05)	.05	-0.29	.78	-0.06 (0.06)	-.08	-0.99	.32
Perceived Capability	0.08 (0.07)	.07	1.20	.23	0.17 (0.07)	.19	2.37	.019

Note. Healthy food assortment:  $R_{adj}^2 = 0.05$  ( $n = 198$ ,  $p = .005$ ); Sustainable food assortment:  $R_{adj}^2 = 0.05$  ( $n = 195$ ,  $p = .008$ ).

**Table 7**  
Ordinal logistic regression coefficients for predicting the Stages of Change regarding the offering of a healthy and sustainable food assortment.

	Healthy food assortment				Sustainable food assortment			
	B (SE)	Wald $\chi^2$	p	Exp(B)	B (SE)	Wald $\chi^2$	p	Exp(B)
Personal Motivation	0.37 (0.11)	11.64	<.001	1.45	0.26 (0.11)	5.36	.02	1.30
Perceived Opportunity	0.20 (0.15)	1.98	.16	1.23	0.33 (0.16)	4.02	.05	1.39
Perceived Capability	0.77 (0.22)	11.97	<.001	2.16	0.86 (0.21)	16.28	<.001	2.37

Note. Exp(B) stands for the odds ratio, indicating the predicted change in odds for a unit increase in the predictor.

& de Ridder, 2023). It should be noted that our study did not have enough statistical power to examine differences between the different eating locations regarding the stages of change staff members are in, which prevents us from delving further into this finding.

The current study highlights the importance of the three behavioural drivers - personal motivation, perceived capability, and perceived opportunity - in the readiness of staff members to offer healthy and sustainable food options in out-of-home settings. The relatively lowest scores reveal that perceived opportunity seems to be the greatest barrier for staff members, although there is also room to improve perceived capability. In addition, findings show that personal motivation is significantly associated with how important a healthy food assortment is perceived to be, while perceived capability is significantly associated with the importance of a sustainable food assortment. Note that regarding the association between personal motivation and the perceived importance of a healthy food assortment, it still remains difficult to disentangle the causality of the relationship between motivation and importance (attitude) from a conceptual perspective (Glasman & Albarracín, 2006).

Personal motivation and perceived capability seem to be the primary factors for staff members to move to the next stage of change in offering a healthy food assortment, whereas perceived capability seems to be predominant in the case of moving staff members to the next stage of change in offering a sustainable food assortment (and personal motivation and perceived opportunity to a lesser extent). The finding that perceived capability is relatively more important in progressing to next stages in offering a sustainable food assortment may be because the guidelines for a healthy diet are already more well-known than those for a sustainable diet (Wood, Moberg, Curi-Quinto, Van Rysseberge, & Rööös, 2023). Stated differently, for sustainability, which is still a more difficult concept for most people, not only someone's personal motivation, but also providing capability is crucial to trigger behaviour. On the other hand, when it comes to someone's willingness to engage in more healthy behaviour, it is not so much someone's knowledge and skills but someone's motivation that may be decisive in progressing through the stages (Verain et al., 2022a).

#### 4.2. Practical implications

The findings of the current study lead to a number of practical implications, which will be described below.

*Linking health and sustainability of food* - First, the research presented suggests that health is considered as more important than sustainability and that staff members are in a more advanced stage of change regarding health compared to sustainability. Stressing the link between the

environmental sustainability of food with human health may be a route to further enhance the perceived importance of a sustainable food assortment among staff members.

*Intrinsically motivating staff members* - Based on the important role of personal motivation in the findings of our study, companies who want to make their assortment healthier and more sustainable could first of all invest in motivating their staff. For example, in order to engage catering staff in various locations, they could for example be provided with information about the benefits of offering sustainable or healthy foods (Mullee et al., 2017). Another effective way to increase personal motivation might be by leveraging enthusiastic colleagues (Bakker, 2017), particularly those who are already actively involved in a more healthy and sustainable lifestyle. They can take the lead in implementing assortment changes and encourage others to follow suit. Allowing staff members to create recipes and ideas themselves can also be a powerful motivator.

*Extrinsically motivating staff members* - Additionally, motivation can be increased in a more extrinsic way by giving the staff (financial) incentives for implementing changes in food offerings (see Taufik et al., 2020). This might be a good short term solution to motivate the staff to attend a training or education session, especially if they need to do this in their lunch break or own time. Yet, working with incentives may not be a viable long-term solution. When these incentives disappear, people are likely to return to the activities that hold higher priorities for them.

*Improving staff's knowledge and skills* - The results of this study show that improving staff's perceived capability (i.e., in terms of knowledge and skills) is advised for companies who want to make their assortment both healthier as well as more sustainable. This can be achieved, for example, through training courses that are not only educational but also fun, active, creative, and inspiring. Particularly chefs and kitchen staff require further training to be able to prepare food in a healthy and sustainable way (Attwood et al., 2020). Since we found that there is less knowledge about sustainable food than about healthy food, it might be helpful to translate the sustainability concept into easy-to-follow, practical guidelines. This could include offering starter packages with materials, flyers with practical tips and making a concrete implementation plan together to visualize what the intervention will look like in practice.

*Creating a facilitating work environment* - Our study suggests that in order to move staff members to a next stage of change in offering a sustainable food assortment, opportunities to serve sustainable (and healthy) foods should be improved. This implies that it is essential that the transition to a more healthy and sustainable assortment is supported by the management of the organization and that the idea or concept is properly worked out throughout the whole organization. Interaction

and communication between different layers of the organization, from managers to chefs to staff employees, is crucial. Implementing top-down policy decisions without the involvement of staff members can create barriers in moving towards a healthier and sustainable food environment (Hoefnagels, Patijn, Meeusen-van Onna, & Battjes-Fries, 2023).

*Addressing staff members' lack of time and capacity* - Finally, creating opportunities also implies addressing staff members' lack of time and capacity (Taufik et al., 2020). For example, temporary staff may be hired to meet the demand for extra capacity. Introducing healthy and sustainable food options may require additional effort, such as cutting fruits and vegetables. In such cases, suppliers may offer solutions, such as pre-packaged and pre-processed vegetables, that save time.

#### 4.3. Limitations and future research

This study has several limitations. First, this study had a cross-sectional design in which (baseline) questionnaires among staff members in various settings are analysed, even though the study was initially designed as a pre-test post-test intervention study. Due to the COVID-19 pandemic we were unable to perform reliable post-tests. For future research, it would be interesting to investigate the longitudinal effects of implementing interventions that encourage staff members to adopt healthy and sustainable food assortments on consumers' food choices.

Second, the fact that our research was conducted in the period that The Netherlands was dealing with the COVID-19 pandemic (i.e., the data collection was conducted for some part before the pandemic crisis (2019) and for some part during the crisis (2020–2021)), could have affected both the guests/employees/patients as well as the staff members who participated in the studies. The pandemic caused significant restrictive measures, including closures of locations during various lockdowns. This also might have affected the results of this study, and specifically the perceived opportunity of staff members to offer healthy and sustainable food options in out-of-home settings. At some locations staff shortage had increased, which resulted in increased work pressure and other constraints for staff members. Moreover, motivation could also have been affected by the COVID-19 crisis; employees may have felt apathetic and paralyzed by the circumstances and may therefore have been less likely to pick up new initiatives quickly and enthusiastically.

A third limitation of our study is that we could not reliably compare all the different locations with each other, due to 1) the limited number of responses in some settings, such as the hospitals, and 2) the fact that some outcome measures were measured differently in the questionnaires across the different locations. Three locations in the leisure sector (i.e. three employee restaurants in a hotel care facility) and one location in a care facility (i.e. an elderly care home) missed an answering category within the 'stages of change' outcome measure, namely that of the preparation phase. Thus, results from these settings should be interpreted with caution.

Fourth, the study's outcome measures were self-reported in an online questionnaire, which may have elicited socially desirable answers. However, the questionnaires were filled in anonymously and respondents were instructed that the survey measured their opinions, which may have reduced social desirable answering. It is worth noting that self-report is a common limitation in the field of behavioural research which uses surveys to measure behavioural determinants.

Fifth, when designing our study there were no validated measures available for the COM-B variables, which is a limitation of our study. The developments regarding the operationalisation of the COM-B model seem to have accelerated in recent years since we designed and distributed our questionnaire. This is also noted by West and Michie (2023), who observed that the precise definitions of the constructs in the COM-B model have evolved with usage. We recommend future research to use one of the recently developed measurement scales. For example, Keyworth, Epton, Goldthorpe, Calam, and Armitage (2020) developed and validated a generic 6-item self-evaluation COM questionnaire. A measure which is for example also used in an article by Spence et al.

(2021). We would like to stress that future studies should try to re-use and harmonise validated measures as much as possible to allow new data to be interoperable and to build a more comprehensive picture of what drives behavioural change.

Sixth, although we had a broad group of catering staff members in our sample as we recruited and invited catering personnel from different levels in the organisation, we did not explicitly ask the respondents after their function. This is an omission in our study, precluding the possibility to look at differences between different types of staff members. Future research could more specifically pay attention to differences in outcomes between staff members operating at different levels within the organisation. For example, a distinction could be made between management staff and personnel that works on a more operation level.

Finally, future research may also dive deeper into the different dimensions underlying capability, motivation and opportunity. For example, Willmott, Pang, & Rundle-Thiele (2021) successfully used pre-validated measures informed by the Theoretical Domains Framework to capture the latency of the COM (Capability, Opportunity, and Motivation). Future studies capturing staff members may use a similar framework to more fully explore their motivation, capability and opportunity. Furthermore, it would be interesting for future research to further explore additional determinants, besides the variables of the COM-B model, that may explain and facilitate the provision of healthy and sustainable food choice options by catering staff members.

## 5. Conclusion

In this study, we investigated how staff members feel about promoting healthy and sustainable food choices in their catering assortments. Our findings suggest that staff members are generally motivated to improve the health and sustainability of their food assortment. However, personal motivation seems to play a more important role in their readiness to change the health of the assortment, whereas perceived capability seems to play a more prominent role in their readiness to change the sustainability of the assortment. It is important to take the perspective of the catering staff members into account to create support for implementing healthy and sustainable food practices. We believe that a collaborative approach with practitioners is needed when implementing sustainable and healthy food practices, as it can lead to longer-lasting changes and may serve as a starting point for even more activities in this area.

### Data sharing statement

The anonymous dataset is available from the authors upon request.

### CRediT authorship contribution statement

**Machiel J. Reinders:** Writing – original draft, Methodology, Conceptualization. **Marieke C.E. Battjes - Fries:** Writing – review & editing, Methodology, Conceptualization. **Emily P. Bouwman:** Writing – review & editing, Methodology, Formal analysis. **Marieke J.G. Meeusen – van Onna:** Writing – review & editing.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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**Appendix I. Overview of the demographics and average scores of the locations who had slightly different questions regarding Personal Motivation and Stages of Change**

For three locations in the leisure sector (i.e. three employee restaurants in a hotel care facility) and for one location in a care facility (i.e. an elderly care home) the Personal Motivation question and the Stages of Change question differed slightly ( $n = 142$ ). Therefore, in the tables below an overview can be found of the demographics and average scores of these locations.

Overview of gender, age and employment status.

Gender	
Male	35.2%
Female	59.2%
Missing	5.6%
Age	
18-24	17.6%
25-34	23.2%
35-44	18.3%
45-54	22.5%
55-64	12%
Older than 65	-
Missing	6.3%
Employment	
Permanent contract	83.1%
Flexible contract	3.5%
Else	7.0%
Missing	6.3%

Overview of the average score, standard deviation and sample size of employees for the Current Situation Food Assortment, the perceived Importance Food Assortment, Perceived Capability, Perceived Opportunity and Personal Motivation for both healthy and sustainable food assortment.

	Healthy food assortment		Sustainable food assortment		Two-sided p-values
	n	Mean (SD)	n	Mean (SD)	
Current Situation Food Assortment	118	3.1 (1.0)	118	3.2 (0.8)	.56
Importance Food Assortment	117	3.9 (0.7)	117	3.7 (0.8)	< .001
Perceived Capability	117	3.4 (0.8)	117	3.1 (0.9)	< .001
Perceived Opportunity	118	2.9 (1.1)	118	2.9 (1.0)	.26
Personal Motivation	Healthy and sustainable food assortment				
	n	M (SD)			
	108	7.5 (1.7)			

Overview of the Stages of Change participants are in regarding transitioning towards a healthy food assortment and towards a sustainable food assortment.

	Healthy food assortment	Sustainable food assortment
Pre-contemplation	31.7%	38%
Contemplation	28.2%	27.5%
Preparation	-	-
Action	7.7%	5.6%
Maintenance	9.2%	7%
Missing	23.2%	21.8%

Note. The preparation stage was not an answering category for these locations.

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