Sustainable Production and Consumption 31 (2022) 642–656

Contents lists available at ScienceDirect

Sustainable Production and Consumption

journal homepage: www.elsevier.com/locate/spc

Information as an enabler of sustainable food choices: A behavioural approach to understanding consumer decision-making

Y. Ran [a,b,*], A. Nilsson Lewis [a], E. Dawkins [a], R. Grah [a], F. Vanhuyse [a], E. Engström [a], F. Lambe [a]

[a] Stockholm Environment Institute, Sweden
[b] Department of Energy and Technology, Swedish University of Agricultural Sciences, 7032, SE-75007 Uppsala, Sweden

ARTICLE INFO

Article history:
Received 24 September 2021
Received in revised form 21 March 2022
Accepted 22 March 2022
Available online 26 March 2022

Editor: Dr. Laura Piscielli

Keywords:
Sustainable consumption
Consumer behaviour
Food environmental impact
Service design
Sustainable food consumption
Information interventions

ABSTRACT

While consumers often intend to shop more sustainably, food shopping decision-making is complex, involving a decision-making process that is shaped by factors occurring outside of the moment of purchase. Consumers are increasingly being targeted with information aiming to influence their decision-making, but the change mechanisms of such interventions are poorly understood. This study aimed to identify key factors influencing people's capability, opportunity and motivation to make more environmentally sustainable choices when food shopping, and how information can support such behaviour change. Using the COM-B model of behaviour change, we conducted a consumer survey and qualitative interviews with Swedish consumers to identify how capability, opportunity, and motivation to engage in sustainable shopping are influenced, and how consumers use information when food shopping. From our data we mapped a typical customer journey and pinpointed where information could be applied as a technique for supporting behaviour change towards more sustainable food shopping choices.

The key factors motivating the choice were found to be quality, health, locally produced food, animal welfare and convenience. The main constraints to consumers' capability and opportunity to engage in sustainable food shopping were price and time. Our findings suggest that information can be a powerful behaviour change technique if tailored to customers' full shopping journey, including planning, executing, and reflecting on their food shopping. Understanding food shopping as a set of interacting behaviours playing out over time could help to design more effective information-based behaviour change interventions.

© 2022 The Authors. Published by Elsevier Ltd on behalf of Institution of Chemical Engineers. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

A growing, wealthier and more urban world population is increasing the pressure on global ecosystems through higher demand for cultivated food, fuel and fibre (Nyström et al., 2019; Poore and Nemecek, 2018). Today's food supply chain alone contributes 26% of anthropogenic greenhouse gas emissions (Poore and Nemecek, 2018). In addition, food production uses large amounts of limited resources such as land (e.g. Foley et al., 2011), water (Hoekstra, 2017) and contributes to biodiversity loss (FAO, 2019) as well as acidification and eutrophication globally (Poore and Nemecek, 2018). In Sweden alone, carbon emissions from food consumption make up, on average, 31% of the Swedish household total consumption-based carbon dioxide (CO_2) equivalents per person per year (Naturvårdsverket, 2018).

Such negative effects threaten global food security over time and illustrate the importance of considering food supply chains as social-ecological systems, with potential effects on human well-being, food security, social inclusion, and economic prosperity (Hoek et al., 2021; FAO, 2018). To hinder further erosion of our common ecological capital, urgent action is needed to transform the current food system towards more sustainable production and consumption.

Sustainable development of the food system requires a new paradigm of sustainable consumption. This paradigm is centred around the idea that consumption needs should be met without eroding Earth's resilience, carrying capacity and life support systems (Roy, 2021). An early definition of sustainable consumption states that "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations" (Ofstad et al., 1994). The transformation of consumption and production patterns has become imperative as parts of the sustainable development agenda, and such transformation is, for example, included in Agenda 2030, in Sustainable

* Corresponding author at: Department of Energy and Technology, Swedish University of Agricultural Sciences, 7032, SE-75007 Uppsala, Sweden.
E-mail addresses: ylva.ran@slu.se, ylva.ran@sei.org (Y. Ran).

https://doi.org/10.1016/j.spc.2022.03.026
2352-5509/© 2022 The Authors. Published by Elsevier Ltd on behalf of Institution of Chemical Engineers. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Development Goal (SDG) 12 on responsible consumption and production (UN, 2015).

A transformation towards sustainable food consumption will require engagement from a wide variety of actors along the food supply chain (e.g. Hoek et al., 2021). To achieve a food system transformation, however, changing the demand for food by consumers remains instrumental (Hoek et al., 2021), thus, highlighting that consumption patterns must become more sustainable.

It is well established that behaviour is the result of a dual process of decision-making; that combines "fast thinking", which is automatic, quick and unconscious, and "slow thinking", which is deliberative, reflective, and conscious, (Abrahamse, 2020; Kahneman, 2011). Consumers do not necessarily lack intent to change their shopping behaviour towards more sustainable consumption. Research has shown that, for example, over two thirds of people want to buy food with low climate impacts; however, a much smaller amount of consumers actually purchases such products (Sajn, 2020; Tanner and Kast, 2003). Today, a large part of the transformation towards sustainable consumption relies on the expectation that consumers make the "right choices", for example, to choose a more sustainable option when it is available to them, and many interventions are being developed to help them do so (e.g. Fuentes et al., 2021; Reisch et al., 2021; Hedin et al., 2019).

Efforts to influence consumer behaviour have been developed to increase consumer awareness by means of information and education (e.g. Lindahl and Jonell, 2020; White et al., 2019). Information and education are most effective in combination with other strategies (e.g. White et al., 2019; Kahan et al., 2012), for example, where nudging, marketing and information embedded in smartphone apps is packaged together and shared with consumers. However, the actual effectiveness of information and education in influencing long-term consumer behaviour change is not commonly mapped and thoroughly evaluated and, therefore, is not clearly understood (e.g. Grilli and Curtis, 2021; Röös et al., 2020; Temme et al., 2020).

As with all actions to address climate change, there is an unfortunate disconnect between sustainable food shopping behaviour at the individual level, and the impact of this behaviour. The positive impacts are often so far in the future, and geographically disconnected from where the consumption takes place, that it may not even be experienced within the lifetime of the consumer (White et al., 2019). This lack of knowledge contributes to an uncertainty about the consequences of pro-environmental behaviour and, as demonstrated by Kortenkamp and Moore (2006) and Stoknes (2014), may lead to a reduction in such behaviour. To develop interventions that can trigger a long-lasting behaviour change towards more environmentally sustainable consumption patterns requires an understanding of the mechanisms involved in the behaviour, and what factors influence such mechanisms, both in time and space (Weimer, 2019) and further research to investigate the relationship between current behaviour, future intention and underlying psychological factors of such behaviour (Weimer et al., 2017).

This paper presents findings from a study aiming to understand consumer behaviour and decision-making related to sustainable food consumption. Using a survey of 1010 Swedish food consumers, and qualitative interviews with 31 Swedish consumers, we set out to identify the factors that influence capabilities, opportunities, and motivations of food consumption behaviour and decision-making. The behaviour of interest for this study is *Purchase of food products for environmental sustainability of adult consumers in a physical store*.

We focus on the role of information in changing consumption behaviour towards more environmentally sustainable choices. By "information" we mean information that can be presented to consumers at the time of purchase as well as before and after the shopping event. This could be information presented in digital or analogue format and through nudges, labels, in-store signage, and information reaching consumers via media, social media and peer-to-peer information sharing. This study aims to answer the following research questions: (i) What key capabilities, opportunities and motivations influence the purchase of food products for environmental sustainability? (ii) How can information support behaviour change towards more environmentally sustainable food consumption?

To address these questions, we combined elements from a framework for understanding behaviour change in the context of intervention design (Lambe et al., 2020) with a model to understand behaviour (Michie et al., 2011). The COM-B model holds that for any behaviour to occur, a person must have the physical and psychological capability to enact it, the physical and social opportunity to carry it out, and be motivated to do it more than any potentially competing behaviour on relevant occasions (Atkins and Michie, 2013).

2. Literature review

2.1. Sustainable consumption and consumer behaviour

Many studies exist on consumer behaviour and sustainable food consumption. Hoek et al. (2021), for example, studied 32 reviews covering more than 2700 papers to identify sustainable food behaviours and practices (Table 1). Socio-psychological consumer characteristic factors (e.g., attitudes and beliefs, awareness and concern about health and environment) were identified as the most mentioned categories of factors influencing consumer decision-making, described in 31 out of 32 reviews. This was followed by product characteristics (such as brands, labelling), mentioned in 27 of the 32 reviews. Among the least described categories of factors were information and communication (except

Table 1
Identified key categories and factors important for consumer decision-making. Adapted from Hoek et al. (2021).

Categories	Example of factors	Described in number of reviews	Percentage mentioned
Consumer characteristics	*Socio-demographics and physiological factors (e.g. age, education level, gender, household composition)*	*19*	*15%*
	Socio-psychological factors (e.g. attitudes and beliefs, awareness, behavioural control, concern about health and environment, brand sensitivity, expectations, experiences, habits)	*31*	*24%*
Eating and buying context	e.g. acceptance and support by close others, accessibility and type of shopping outlet, choice architecture discounts and offers)	*15*	*12%*
Characteristics of the sustainable food or practice	e.g. brand, certifications, convenience, country-of-origin, credibility, ingredients)	*27*	*21%*
Social factors[a]	e.g. cultural and social norms, religious rules, social importance of certain foods or diets, social prejudice)	*12*	*9%*
Information and communication[b]	advertising and marketing, education, food and nutrition information, framing, mass media, reminders	*8*	*6%*
Geographical and spatial	climatological factors, infrastructure, region or country, urbanisation	*7*	*5%*
Institutional, political, economic factors	e.g. dietary guidelines, fiscal measures, food scarcity, food policies, governance of food production or consumption	*10*	*8%*

[a] Other than directly in the eating or buying context.
[b] Other than directly via food product or packaging.

via the food product or packaging directly) and geographical factors (e.g. climatological factors, infrastructure), described in 7 and 8 out of 32 reviews respectively.

In addition, a number of studies have shown that consumer attitudes towards environmental impact of food is less important than other factors such as health (Hartmann and Siegrist, 2017; Gracia and De Magistris, 2007), price (e.g. Liobikienė et al., 2016; Thøgersen and Nielsen, 2016; Young et al., 2009) and place of origin (Stanton et al., 2018; Denver and Dejgaard Jensen, 2014; Adams and Salois, 2010), in influencing consumers´ food product choices.

In marketing research, consumer decision-making is described as going through phases of recognition of needs, searching for information, evaluation of alternatives, purchase decision and post-purchase behaviour. In addition, the decision to purchase a certain product also depends on a product's characteristics and its price (Kotler et al., 2008).

Currently, several commonly applied behaviour change interventions are used to change consumer behaviour. These include education and information efforts, nudging, limited or increased availability of products and economic incentives (Grilli and Curtis, 2021; Lindahl and Jonell, 2020; Röös et al., 2020). Grilli and Curtis (2021) found that out of five behaviour change methods—(i) education and awareness, (ii) social influence, (iii) outreach and relationship building, (iv) nudges and (v) incentives (both monetary and non-monetary)—education and awareness is the most commonly applied intervention. However, education and awareness also had the lowest success rate among the studied methods. Other studies also find that information efforts are commonly applied due to the relative ease of implementing them and a general acceptance of information and education interventions (e.g. Grilli and Curtis, 2021; Lindahl and Jonell, 2020), since they do not require consumers to actually change their behaviour but only to receive the information.

Information, when combined with other interventions such as economic incentives, can potentially improve the implementation of interventions (e.g. Lindahl and Jonell, 2020; White et al., 2019; Kahan et al., 2012). Interestingly, according to Grilli and Curtis (2021), outreach and relationship building were found to have the highest success rate of the studied behaviour change methods. However, this method is rather a combination of positive relationship building and other methods, such as information and social influence, which suggest that a combination of methods could amplify the success in achieving behaviour change.

2.2. The role of information in triggering consumer behaviour change

Several studies focus on the role of information in changing behaviour, and particularly on the labelling of products. These studies have found that labelling alone has not proved to be effective for changing consumer behaviour. Rather, studies show that consumers are currently confused by labelling of food products (e.g. Lindahl and Jonell, 2020; White et al., 2019; Röös and Tjärnemo, 2011) and that the design of simpler labels (Emberger-Klein and Menrad, 2018; Thøgersen and Nielsen, 2016; Young et al., 2009), as well as labels that include a reference value or that have a user-focused design perform better (Camilleri et al., 2019; Emberger-Klein and Menrad, 2018; Thøgersen and Nielsen, 2016).

A recent study by Edenbrandt et al. (2020) used a web-based survey with a choice experiment to better understand consumers and their relationship to information. The study found that a subsection of consumers who tend to avoid information about the CO_2 emissions from products choose products with lower CO_2 emissions when presented with such information against their will. This points to the complexity of behaviour change and the role that information can potentially play in influencing behaviour. It is important to keep in mind this complexity of consumer behaviour, as well as how, when, and to whom information is presented, in order to have the intended and desired effect.

Few studies have focused on the long-term effect of efforts relating to information to change consumer behaviour (e.g. Lindahl and Jonell, 2020; Röös et al., 2020; Kahan et al., 2012), including the effect of nudges over time or the effect of a combination of nudges (Brandon et al., 2017; Bucher et al., 2016). An increasing number of digital interventions (often focusing on information and nudging) to influence consumer behaviour have been developed recently (Hedin et al., 2019). However, their successfulness and usefulness are also poorly understood. For example, smartphone app developers often lack a thorough understanding of the intended users and other contextual factors that matter to the operation of their application (Fuentes and Sörum, 2019). This poor understanding of the context in which the intervention is thought to operate results in failure to design smartphone apps that deliver the desired effect (Fuentes et al., 2021; Fuentes, 2019). Similarly, to what Gisslevik (2018) found, this shows that information-based instruments must consider the full complexity of the intended user, and from early stages, in order to be effective (Clear et al., 2015). Hedin et al. (2019) further states that interventions seeking to stimulate behaviour change must be better grounded, be based on behaviour change theory, state the target behaviour and include a rigorous evaluation to ensure more robust and effective interventions.

2.3. Theoretical approach

This study investigates consumer behaviour and the role that information can play in triggering a desired behaviour change, thus, as an intervention or as part of an intervention designed to stimulate behaviour change. To study such behaviour, we chose the Lambe et al. (2020) framework which integrates insights from behavioural science and complex adaptive systems dynamics using service design. Service design is a qualitative approach to study and better understand actor behaviours, needs and motivations in their wider context (e.g. Edvardsson et al., 2012). The framework uses service design as an approach to map individual behaviours in relation to a complex system, and to identify where, in time and scale, changes of the decision-making context—for example through the introduction of an intervention—could trigger behaviour change (Lambe et al., 2020; Jürisoo et al., 2018).

The framework includes the COM-B model, which is a model to describe behaviours centred around three key components: Capability, opportunity and motivation. The model posits that "a particular behaviour will occur when the person concerned has the capability and opportunity to engage in the behaviour and is more motivated to enact that behaviour than any other behaviours" (West and Michie, 2020). The COM-B model also hypothesize that motivation is influenced by Capability and opportunity, which makes motivation the central mediator of the model. This also implies that capability and opportunity can affect behaviour both directly and indirectly (Timlin et al., 2021). The COM-B components can be influenced using behaviour change techniques (BCTs), which can be understood as active parts of interventions designed to change behaviour (Atkins and Michie, 2013).

The Lambe et al. (2020) framework presents a way to map the drivers of capability, opportunity and motivation in relation to a certain behaviour and from there, to design BCTs that could enable long-lasting behaviour change. This approach is useful for mapping consumer journeys prior to the introduction of a behaviour intervention, to better understand key factors of capability, opportunity and motivation for actors at different points in the journey and for pinpointing how and when BCTs might be useful for triggering a behaviour change. The framework includes six consecutive and highly iterative steps: (i) problem co-definition, (ii) experience-based problem diagnosis, (iii) systems mapping, (iv) rapid prototyping, (v) design and (vi) testing. In this paper, we focus on the first three steps of the framework—the problem co-definition, experience-based problem diagnosis and systems mapping—since we are interested in identifying the potential BCTs and how they might be sequenced to enable a shift in behaviour change, rather than the design and testing of a specific intervention.

This methodological approach allows for the identification of BCTs, together with sequencing and mapping of such BCTs to recognise when and where they are most important for influencing consumer decision- making in regard to food shopping.

3. Methods

The behaviour of interest for this study is *Choice of food products for environmental sustainability*. Based on the COM-B model, we focus on consumers' capability, opportunity and motivation to engage in this behaviour. Capability is defined as an individual's physical and psychological capacity to engage in the concerned activity and can be, for example knowledge and skills (Michie et al., 2011); opportunity includes all factors that lie outside of the individual that makes the behaviour possible or prompt it (West and Michie, 2020), such as physical access and social norms; and motivation is understood as the thought process that energise and direct behaviour, not just goals and conscious decision-making (Michie et al., 2011, 2015), but also beliefs about consequences, values and emotions.

In Table 2, the key concepts of COM-B are mapped against the mechanisms of action (MoAs), factors that mediate the effect of interventions on behaviour change (Johnston et al., 2021). The mapping is done via the Theoretical Domains Framework, an extension of the COM-B Model (Cane et al., 2012), an approach by Connell et al. (2016). Based on the established link between MoAs and BCTs presented in the study by Johnston et al. (2021), Table 2 also identifies where information could play a role in triggering behaviour change as part of a BCT or intervention. Important to note is that the COM-B components are interlinked (Timlin et al., 2021). Thus, an MOA can link to more than one COM-B component even though they are associated with one of the three in Table 2, which is also illustrated in the study by Connell et al. (2016), where behavioural regulation was identified to link to

Table 2
Key concepts of the COM-B model, MoAs and the corresponding role of information in regard to behaviour change via BCTs. Developed based on the Theory and Techniques tool (Johnston et al., 2021 and the Theoretical Domains framework (Cane et al., 2012).

COM-B component[a]	MoAs	BCTs	Role of information
Capability	Knowledge	Information about social and environmental consequences	Direct through knowledge/education
	Skills		
	Memory, attention and decision-processes	Prompts, cues	Direct via reminders in store (signage), reminders in apps
	Behavioural regulation	Self-monitoring of behaviour; conserving mental resources	Indirect through feedback on consumption behaviour, accessible information on product labels
Opportunity	Social influences	Social support (unspecified and practical); social comparison; information about others' approval	Indirect via peer-to-peer influence (Social support); Indirect via increased knowledge and awareness about influential actors and their choices
	Environmental context and resources	Prompts/cues; restructuring the physical environment; adding objects to the environment	Direct via in-store information (signage), information stands and in store expertise.
Motivation	Motivation	Goal setting; feedback on behaviour	Indirect through feedback on consumption behaviour;
	Social/professional role and identity	Social Comparison*; credible source*	Indirect through comparing with others consumption behaviour (Social comparison); Direct through films/public service information or public authority (credible source)
	Beliefs about capabilities	Instruction on how to perform the behaviour; demonstration of the behaviour	Direct through instructions on how to perform the behaviour, Direct through films/public service information or public authority
	Optimism		
	Beliefs about consequences	Comparative imagining of future outcomes; information about environmental consequences; anticipated regret; salience of consequences	Indirect via information about environmental consequences of the behaviour
	Intentions	Self-identity*	
	Goals		
	Reinforcement	Social reward	Indirect through peer to peer social affirmation about sustainable consumption behaviour
	Emotion		
	Norms	Social comparison; information about others' approval	Indirect via increased knowledge and awareness about influential actors and their choices
	Subjective norms	Social comparison; information about others' approval; feedback on outcomes of behaviour*; information about social and environmental consequences*	Indirect through feedback on consumption behaviour and via increased knowledge and awareness about influential actors and their choices
	Attitude towards the behaviour	Information about social and environmental consequences; credible source;	Indirect through knowledge/education about positive aspects and consequences of sustainable shopping, for example films/public service information or public authority (credible source)
	Self-image	Identification of self as role-model	Indirect via peer to peer information sharing that affirms a peer as a role-model in regard to the behaviour (e.g. support groups and sharing of relevant information in a social sphere)
	Needs		
	Values		
	Feedback processes	Feedback on behaviour; self-monitoring of behaviour; feedback on outcomes of behaviour; social comparison	Indirect through feedback about collective /individual consumption
	Social learning/imitation	Demonstration of the behaviour; credible source*	Direct through films/public service information or public authority
	Behavioural cuing	Prompts, cues	Direct via in-store information (signage), information stands and in store expertise.
	General attitudes/beliefs	Credible source	Indirect through films/public service information or public authority (credible source) about sustainable shopping behaviour.
	Perceived susceptibility/vulnerability	Salience about consequences	Indirect via information about environmental consequences

[a] The mapping of MoAs against COM-B components is based on the theoretical domains framework. The MoAs identified in the study by Johnston et al. (2021) that do not correspond to a theoretical domains framework domain, or a COM-B element, are listed separately in the table.
* Inconclusive link between the Moa and BCT.

both capability and opportunity. Empty cells indicate that no link was found between the MoA and information, as defined in this study.

3.1. Methods for data collection

A multi-method approach to data collection is applied in this study, combining quantitative and qualitative methods, and using a consumer survey and semi-structured interviews. The survey was designed to collect data on factors that influence the capability, opportunity and motivation involved in consumer food decision-making and consumer interaction with information, preferred means of communication, and reflections on behaviour connected to information. The semi-structured interviews provided an opportunity for a more in-depth understanding of capabilities, opportunities and motivations to current behaviours, as well as opportunities for behaviour change and the consumer-information interaction.

3.1.1. Consumer survey

We developed a web-based survey (see Supplementary Information (SI) A), consisting of 21 multiple-choice questions with 2 optional questions where respondents could fill in additional comments to a question they just answered. It took approximately 5 min to fill out. Most questions were set up to have ordinal answers, varying between "never" and "always" on a 5-point Likert scale. The survey included questions on socio-demographic information considering the following parameters: geography, household size, number of household inhabitants under 18, primary occupation, household income, education, gender and age.

The survey was sent to a panel, Norstat, originally recruited via a random selection and by telephone, consisting of 67,000 respondents nationwide in Sweden. The survey was sent out via a consultant firm, Enkätfabriken. We received 1010 responses, which we have checked to be representative of the Swedish national demographic pattern in terms of gender, age and geography (see SI B, Table 1-3). For participating in the survey, respondents were offered points that represented a small amount of money that they were free to donate to charity. Thus, no direct monetary compensation was given out to survey respondents.

3.1.2. Consumer interviews

In addition to the survey, we conducted 31 qualitative semi-structured interviews with consumers nationwide to gain a more in-depth perspective to the decision-making landscape of food consumers and how, when, and why they interact with and trust information (see SI C for interview guide). Interviews were carried out simultaneously to the survey and the first interview guide was organised around the same types of categories as the questions in the survey (see SI A). After 15 interviews, we revisited the interview guide and adjusted it in light of our findings. This further narrowed the scope of the interview study by emphasising a focus on information and trust in relation to consumer choices and behaviour (see SI D for the adapted interview guide).

Interviewees were recruited via an aggregator of web panels, Cint, where interviewees sign up for partaking in surveys or interviews. The interviewees were selected to be representative in comparison to the national demographic pattern considering age, gender, and geography (see SI B, Tables 4–6). The interviews took approximately 40 min and were conducted via phone or a digital video-call tool. As a token of gratitude for participating, interviewees received an open gift certificate of 11.6 USD that could be spent in 150 different stores.

3.2. Data analysis

The overarching research questions for the study are: (i) What key capabilities, opportunities and motivations influence the purchase of food products for environmental sustainability? (ii) How can information support behaviour change towards more environmentally sustainable food consumption? To analyse and categorise the interview and survey data according to the COM-B concepts we also used the following guiding questions::

- **Capability**: Are consumers aware of the link between their food shopping behaviour and environmental impact? If not, can information contribute? How
- **Opportunity**: Do consumers have the opportunity to perform the behaviour? How can information create opportunity?
- **Motivation**: Are consumers motivated to perform the behaviour? How can information play a role?

Table 3
Socio-demographic variables.

Variable	Number of categories	Category description
Age	5	0–25, 26–40, 41–55, 56–70, >71
Income	3	0–40,000 SEK, 40000–80000SEK, >80,000 SEK
Education	3	Primary school or lower education, gymnasium or high school and higher education
Household size	5	0, 1, 2, 3 or >4 household members below age 18

3.2.1. Analysis of survey data

The survey was developed based on the COM-B and the data is therefore analysed and presented in regard to the three COM-B components. How the survey questions relate to COM-B is also further outlined in SI A.

We conducted a statistical analysis of the survey data to see if there was any group of questions that were dependent on how respondents answered other questions. We used Chi-square tests to test for dependence between socio-demographic variables and general shopping behaviour and such that concern consumer behaviour change (SI A, questions 8–12 and 14), consumer preference on information sources (SI, A, question 5–7 and 13) and socio-demographic data. Some of the variables are categorised as shown in Table 3. A significance level of 5% was used for all tests.

3.2.2. Analysis of the interviews

To analyse the 31 interviews, three researchers coded and clustered the interviews according to; i) the COM-B concepts: capability opportunity and motivation, ii) aspects of the consumer journey of a food shopping event, including behaviours involved in preparations, carrying out the shopping and after the shopping.

At each stage, data were first coded and clustered separately by each researcher, and then differences in coding decisions were discussed, resulting in some recoding. The coding was done by coding the transcribed interviews and developing clusters based on the COM-B concepts, and aspects of the consumer journey. These activities were first carried out after 15 interviews had been conducted, and the interview guide was amended in accordance with the findings up to that point. In the following 16 interviews, there was an increased focus on trust, reliability of information channels, and design of consumer information. The second set of interviews were coded and clustered in the same manner as the first set after completion of the consumer interviews. Coded and clustered interviews were digitally documented in a workshop with the participating researchers.

3.2.2.1. COM-B coding and clustering. To analyse the interviews we performed a theoretical thematic analysis (Braun and Clarke, 2006) and clustered interviews according to themes based on Table 2 and the guiding questions outlined above (see SI C where the COM-B categories are related to the interview guide). This approach was chosen as we wanted to analyse the interviews in regard to the theoretical framing and also in regard to the behaviour of interest. Thus, a theoretical rather than inductive thematic analysis was chosen (Braun and Clarke, 2006).

A scoring exercise was also carried out on identified key motivating factors in order to be able to analyse them in regard to their relative importance for interviewees. The qualitative interview data were provided with a relative score and the exercise was carried out in Excel (see SI E). For this analysis, two researchers discussed and verified that they agreed on the allocated score. Motivating factors were given a score ranging from 1 to 5 according to their stated importance in the interview.

3.2.2.2. Developing a generic consumer journey. For coding and clustering data in regard to aspects of the consumer journey, the data were clustered in phases of consumer food shopping events and emerging themes of planning, shopping experience, reflection, and other environmental behaviours that interviewees engaged in, in order to develop consumer journeys, (see e.g. Lambe et al., 2020; Jürisoo et al., 2018). Data were then clustered and mapped into a consumer journey for each interviewee. All consumer journeys were analysed together in a workshop, and by all three researchers, in order to develop a generic consumer journey that included the main findings about the consumer journey of food shopping for all interviews. This step also included survey data collected for the phases of a food shopping consumer journey (See SI A).

Finally, the generic consumer journey was analysed to identify potential entry points where information could act as a BCT to stimulate behaviour change. In this step, survey data on how consumers interact with information and what type of information channels they prefer was also consulted.

4. Results

4.1. Consumer survey

In Table 4, results from the consumer survey are summarised according to the categories of the COM-B concepts and findings for each concept are further outlined below. In the following sections we describe the analysis of the survey for the COM-B concepts, including statistical analysis. A table of the statistical testing can be found in SI F, Table 1.

4.1.1. Capability

To capture consumers' capacity to engage in choosing food products that are more sustainable, we first asked if they think that information about the environmental impact of food is difficult to understand and grasp. Almost 40% of respondents answered that they do think so to some degree. In addition, almost 50% stated that they think that the provided information about environmental impact and food is inadequate.

We also asked consumers if they experience that they know what choices to make in their food shopping in order to shop more sustainably. More than 50% said that they do know, to some degree, what changes to make and almost 40% experience that these changes are relatively easy to make.

Based on these answers we can detect that there is a general awareness about that food shopping choices are connected to environmental consequences and that survey respondents are generally aware of this connection to some degree. Consumer awareness about environmental consequences of food can also be identified by looking at the question asking if knowledge and information about environmental consequences of food products has changed their behaviour. We see, for example, that more than half of the respondents had changed a decision about a food purchase based on the assumption that their first choice had a negative environmental impact.

4.1.2. Opportunity

To identify the role that information can play to create an opportunity for consumer behaviour at the point of purchase, we first focused on the question ($n = 1006$): "How often do you use the following type of information when food shopping?". Seven possible answers between 'never' and 'always' were recorded for the following categories: price, discount, brand, allergy information, nutrition, origin of food, CO_2 emissions, animal welfare and other environmental impacts.

Table 4
Summary of insights from the survey on the capability opportunity and motivation involved in choosing more environmentally sustainable food products.

Capability	Opportunity	Motivation
Level of awareness	*Current use of information*	*Belief about consequences of behaviour*
Consumers have a general awareness about that - food and food shopping has some environmental impact	Consumers primarily use information for price (including price campaigns and/or discounted sales) and to get to know where the food is produced in store	Gender: Women are more likely to state that they believe that their decision-making can have a positive impact compared to men. They are also more likely to change their decision in comparison to men
More than half of the respondents reported changing a decision about a food purchase based on the assumption that their initial choice had a negative environmental impact	Information about associated CO_2-emissions, other environmental impacts, and allergy information were used the least by consumers at the moment of purchase	Age: A higher degree of older people state that they do not think their decision-making will have a positive effect, and younger people are more likely to change their decision than older people
Capability to make use of available information	*Preferred information channels*	Income: People with high incomes tend to change their decision more often than people with lower incomes
Almost 40% of respondents answered that information about environmental impact of food is difficult to understand	Most appreciated channels (in order of preference): printed signage in stores, store webpages, e-newsletters, digital signage in stores, store apps for smartphones, information from newspapers and magazines.	
50% stated that they think that the provided information is inadequate	Least popular channels: social media channels and digital advertising (e.g. banners, embedded video commercials) and information from peers and family	
	Social norms	*Self-perception and identity*
	70% state that they do not care about what other people think about the content of their shopping chart and almost 60% said that they never make a food shopping decision based on what other people think of them	47% of respondents stated that they feel good to some degree when they buy only or mostly organic or sustainable food
	60% said that they do not agree that their food purchasing decision are made based on what they hear that friends and family are buying	More than a fifth said that they feel proud to some degree when they talk about their food shopping with friends and family
	45% said that what they read or hear on the news and reporting on research affect their food purchases to some degree	

Results indicate that consumers primarily use information for price (including price campaigns and/or discounted sales) and to get to know about the origin of food items. Respondents said they used information regarding price (43%) and origin of food (37%) very often. Information about associated CO_2-emissions, other environmental impacts, and allergy information were used the least by consumers at the moment of purchase. Information on CO_2-emissions was reported to be used "very often" by only 6% of consumers, while 14% stated they used information about other environmental impacts "very often" when purchasing food.

Younger people tend to notice information about price, X^2 (24, N = 1006) = 59.72, p_value <0.001, and price campaigns, X^2 (24, N = 1006) = 59.80, p_value <0.001, more than the rest of the population. The results also indicate that information about CO2 emissions are more important for the younger age group; however, this cannot be statistically verified, X^2 (24, N = 1006) = 36.24, p_value = 0.052.

To further understand how information could be used to trigger consumer behaviour change, we also looked at preferred communication channels among survey respondents. Respondents were asked to rank different information channels between 1 and 10; Fig. 1 illustrates the relative distribution between top (rank 1–3), middle (rank 4–6) and bottom (rank 7–10) preference of communication channels among survey respondents. Printed signage in stores and store webpages were the channels of communication ranked the highest for consumers, followed by e-newsletters, digital signage in stores, store apps for smartphones and information from newspapers and magazines. Consumers' least popular choices of communication channels were social media channels and digital advertising (e.g. banners, embedded video commercials) and information from peers and family. However, information from peers and family was one of the top middle-ranked options by consumers, which indicates that it might not be the most important communication channel but that it is still an important source of information.

As a preferred communication channel, e-newsletters from stores showed a significant difference depending on age. These were identified as an important source of information, ranked between 1 and 3 by 464 out of 1008 respondents. However, the preference for store e-newsletter was dependent on age, X^2 (4, N = 1008) = 13.71, p_value = 0.008. Consumers of higher age preferred store e-newsletters as a channel for information while younger consumers preferred other types of communication channels, for example in-store printed and digital signage.

We also asked questions regarding the self-reported influence of social norms. For example, if they care about what others think when they look into their shopping chart or if they, sometimes, make food shopping decisions based on others perception of them. However, 67% state that they do not care about what other people think about their shopping chart and 59% that they never make a food shopping decision based on what other people think of them. Respectively, 11% state that they do care greatly what others think of their food selection in store and 7% that they have made a food shopping decision based on other people's perception of them.

When asked if they agree with the statement that their food purchasing decision are made based on what they hear that friends and family are buying, almost 60% said that they do not agree with this statement but close to a fifth or respondents said that they agree with this statement to some degree. We could also see that 45% said that what they read or hear on the news and reporting on research affect their food purchases to some degree.

4.1.3. Motivation

To capture the motivation involved in consumers' food shopping behaviour, the second part of the survey focused on if consumers had changed a food-shopping decision to reduce negative environmental impact, if they believed changing decision would have a positive impact and generally if they believe their decision making can contribute to a positive change in regard to living more sustainably.

In regard to motivation and belief about consequences of behaviour, our results show that women are more likely to state that they believe that their decision-making can have a positive impact compared to men, X^2 (6, N = 1009) = 46.57, p_value < 0.001. In addition, age proves to have an opposite effect; a higher degree of older people state that they do not think their decision-making will have a positive effect, X^2 (24, N = 1009) = 43.23, p_value < 0.0094. We also found that people of higher income, X^2 (24, N = 826) = 34.52, p_value < 0.001 and education, X^2 (24, N = 1005) = 20.82, p_value = 0.053, are more likely to believe in positive impact as a result of individual decision-making, however only income proved to be a significant variable.

To further investigate beliefs and behaviour, we also asked the following question to the respondents (n = 1004): "Have you, during the past 12 months, changed a decision to purchase a particular food item, based on the assumption that the purchase would have a negative environmental impact?"

Out of 1004 respondents, more than half stated that they had changed a decision based on such assumption over the past 12 months.

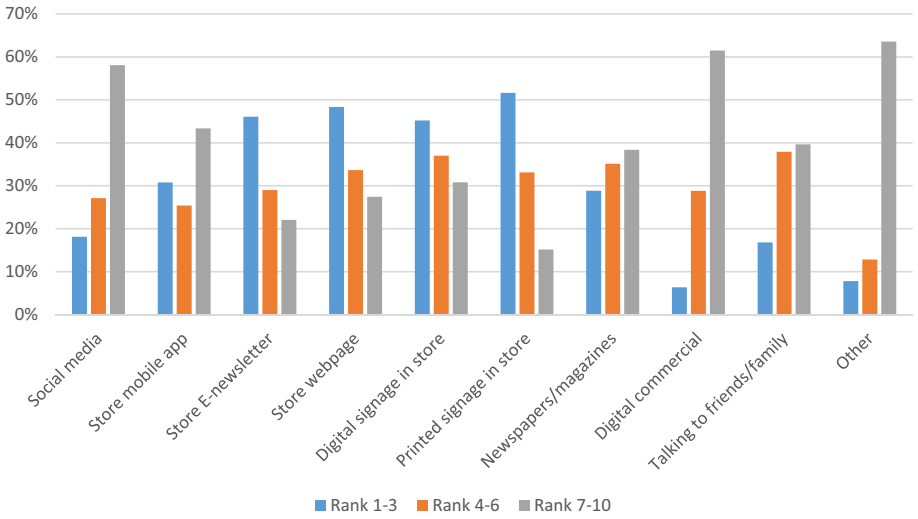

Fig. 1. Percentage of respondents ranking each communication channel between 1 and 3, 4 and 6, and 7 and 10.

Results show a significant difference for three variables of those who said they had changed their decision: gender, X^2 (1, $N = 1004$) = 10.24, p_value 0.0014, where women are more likely to change their decision than men; age, X^2 (4, N = 1004) = 12.41, p_value = 0.0015, where younger people are more likely to change their decision than older people; education, X^2 (2, $N = 1000$) = 23.72, p_value < 0.001, where more highly educated people are more inclined to change their decision. Income also shows a tendency to matter. We also found a relationship to income, X^2 (2, $N = 823$) = 5.44, p_value = 0.0066, where people with high incomes tend to change their decision more often than people with lower incomes but this result is not statistically significant.

We also asked the respondents who did state that they had changed their behaviour if they believed that the shift in decision contributes to a positive impact. Our findings in terms of belief and decision-making show that more than one variable is involved in determining such behaviour. No independence was found, for example, between men and women regarding believing that their recent shift in behaviour would have an actual impact. However, it should be noted from our Chi-square tests for independence between categorical variables that dependencies were found between disaggregated gender and age groups, gender and income groups and age and education groups.

Thus, women between 26 and 40 years old are most likely to believe that their change in a decision will have a positive impact on the environment, X^2 (4, $N = 302$) = 11.33, p_value = 0.023. Interestingly, for elderly people, the previous difference observed between men and women fades away, and older men surpass older women in stating to change their decision to contribute to positive impact (however, this tendency is not statistically significant). We also see that women with higher income tend be believe in a positive impact as a result of their decision-making to a higher degree than men with lower income, X^2 (2, $N = 247$) = 6.71, p_value = 0.035.

Younger people that stated they had changed a decision based on believing they could reduce negative environmental impact with a high income, X^2 (8, N = 247) = 49.58, p_value < 0.001 and lower education, X^2 (8, $N = 300$) = 18.72, p-value = .016, also had a stronger belief that changing their decisions can make a positive impact towards sustainability. However, people with lower education were much more unlikely to change their decision than people with higher education.

Notably, throughout the statistical analysis, we did not find any statistical relationships to regions for any of the variables.

We also asked questions about self-perception and identity in regard to food shopping behaviour. For example, 47% of respondents stated that they feel good to some degree when they buy only or mostly organic or sustainable food and more than a fifth stated that they feel proud to some degree when they talk about their food shopping with friends and family.

4.2. Consumer interviews

The interview data identified a large variation and complexity behind consumer food shopping behaviour and decision-making. Table 5 summarises key findings of the interviews in regard to the COM-B concepts of capability, opportunity and motivation. These are further explained and outlined below.

4.2.1. Capability

As outlined in Table 2, most interviewees had some level of awareness about the link between food consumption and environmental impact. In this regard, several mention following the food labels to inform their decision. However, the most commonly mentioned link of environmental impact to food was to the use of plastic bags, packaging of food and recycling, mentioned by 35% of interviewees, as well as if the food had been transported over long distances and not the key environmental impacts actually associated with food production and consumption.[1] Therefore, despite a relatively high level of awareness of a connection to environmental impact, we found that most consumers still lack psychological capability to make more precise linkages between their food shopping behaviour and sustainable food choices. In addition, most consumers primarily linked locally produced and even ecological food to healthier eating and higher quality product, not environmental impact.

Some interviewees mentioned that their lack of knowledge in respect of environmental impact associated with food consumption hinders them from making choices differently. Here, respondents reported that information is often confusing, too complicated or even contradictory which raises the possibility that information could create an opportunity for consumers to engage in a behaviour, a point further elaborated below. In regard to physical capacity, 6 mentioned the price and their financial situation as a constraining factor to their capacity to factor in environmental concern in their food shopping behaviour:

> I have to restrict ecological, I cannot afford it.

4.2.2. Opportunity

When it comes to creating opportunity to engage in the behaviour of choosing more environmentally sustainable food products, interviewees mentioned a number of social and physical opportunities that were important to them in regard to food shopping. For example, some interviewees said that they were influenced by a partner, a family member or a colleague. Others also stated that they don't feel easily influenced and are strong minded.

> I go on what I see and know myself. It would take a lot of work to convince me.

Several interviewees reported being influenced by the news, and having changed their behaviour after having watching a documentary about a specific food related scandal. Many interviewees also mention that the changing social norms have been influencing them in their food choices.

There was also a large diversity in interviewees responses regarding the type of physical opportunities that were identified as important; some interviewees were very open to in-store information, such as labels, offers and campaigns and liked to have a plan that they could deviate from based on, for example, a campaign or an in-store taste demonstration. Others stated that they never deviated from the plan and rather avoid influences and distracting factors in the store when food shopping.

When asked about whether they use labelling when food shopping, over 80% of respondents mentioned that they do use labels:

> If there is a label and the price does not differ too much, then we take the labelled product. We are happy to pay an extra Swedish crown for that.

However, respondents also reported some level of confusion around labels. About 80% said they find it difficult to interpret the labels, to understand which ones are the most trustworthy, and to differentiate between them:

> Labels are good but not always so useful. There are many different labels… It's hard to differentiate them.

Hence, we see that the majority of consumer do use labels while also finding them confusing. This connects with our findings that overall, about 80% are the interviewees mention being interested in getting more information about the food they shop. 25% explicitly mention

[1] For example, emissions from transport of food and feed only constitute 6% of the total greenhouse gas emissions associated with food, calculated from a life-cycle perspective (Poore and Nemecek, 2018).

Table 5
Key insights from the coding and clustering of interviews against the COM-B framework.

Capability	Opportunity	Motivation
Level of awareness	*Recurring social opportunities*	*Recurring motivating factors*
Most people have some level of awareness of the link between food shopping behaviour and environmental impact	Influence of evolving social norms	Quality
		Health
	Influence of advertisement of trusted brands	Locally produced
		Animal welfare
In regard to the connection between food shopping and environmental impact, most people mention of at least one of these aspects:		Convenience
	Influence of media such as news and documentaries	Other mentioned motivating factors of importance but not recurring were:
	Influence of family	Trying out new things
		Environment
• locally produced is better due to less distance travelled and local production norms	Some stated that they don't feel easily influenced	
• less distance travelled is better	*Recurring physical opportunities (or lack of) linked to information*	*Recurring emotional responses*
• ecological is better		Doing "your part", and believing in consumer power
• in season is better	Presence of clear information such as labels.	
• less packaging / recyclable packaging is better		Feeling proud, responsible
• less (red) meat is better	Confusion and/or scepticism regarding labels and environmental information prevents some people from choosing more sustainable products.	Feeling concerned about the environment
Some people do not make correct connections between food shopping and its environmental impact (E.g. referring to using a fabric bag when shopping or driving less)		Feeling anxious, frightened about the future
	Most people wish there was more trustworthy, accessible, simple information available to support their decision-making (and many would like to have this information in-store)	Most believe that individual actions can have an effect if everyone undertakes them.
Information and knowledge	*Recurring physical opportunities (or lack of) linked to price and availability*	*Information and knowledge*
Most people use labels as a way to inform decisions in this regard		Some people are actively seeking information to inform and motivate their choices, while others are more passive or not interested.
	Availability of more environmental friendly alternatives.	
Some people feel that they lack necessary knowledge to make better choices in this regard (e.g. it is very difficult to know which is the right decision, or it is hard to understand and balance different labels)	The higher price of ecological alternatives is a recurring barrier to people choosing them and limits the physical opportunity to engage in the behaviour	Trust for companies and labels plays an important role in which information is considered by an individual to inform and motivate their choices (for example, many report higher level of trust for local/Swedish companies than big MNCs). Some people have high level of mistrust for companies, with concerns of green-washing
		Several respondents expressed a desire to know how their individual choices and actions contributed to higher level climate and environment goals
Factors limiting capability		*Constraints*
Price[a] is a main constraining factor for capacity to engage in the behaviour for some consumers		Price: the motivation brought by price often overrides other motivating factors
		Time: being too busy to engage

[a] Note that price in this study is a factor of capability, opportunity and motivation. It can be a motivating factor, for example, as a campaign but also a constraint to physical capacity (as it is defined in Cornish et al. (2019)) or a lack of/a way to prompt physical opportunity when defined as a factors outside of the individual that enable or prompt the behaviour (West and Michie, 2020).

wanting more detailed and trustworthy information about environment in connection to their food shopping.

4.2.3. Motivation

The scoring of the key motivating factors showed that the most important motivators of food product choice mentioned by interviewees were, in order of importance: quality, health, locally produced, animal welfare and convenience. However, these motivating factors were often deeply interconnected, and respondents found it difficult to describe them in isolation. The question on what drives choice of food product was open ended, and over 60% of interviewees initially responded that quality and taste (that the product tastes good) are key factors motivating their choices when shopping for food.

The concept of "locally produced" is also understood and defined in different ways; for some respondents it means Swedish, and produced within the country's borders, whereas for others it refers to products that are produced close to where they live, with possibilities to purchase directly from the producer:

> We try to shop more locally produced to support local farmers in the area and also for the environment. We want to help people that live around here, as well as the environment. It's a global problem but if you can buy potatoes from the farmer 3 km away it's probably better.

This exemplifies a behaviour that is informed by a conscious linking of behaviour and belief about consequence of that behaviour, which act as a motivating factor to engage in it.

When we further asked interviewees why locally produced food and/or quality was identified as important to them, about 20% of respondents mentioned health as a reason to choose locally produced food, for example referring to locally produced meat being less likely to be produced with excessive use of antibiotics. Where animal welfare was mentioned as a factor influencing decision-making, upon further probing, we found that the underlying concern was almost always human health, as opposed to a concern for the treatment of farm animals, or a combination of both concerns (in eight out of nine cases where the interviewee scored high on animal welfare). About 30% of interviewees mentioned choosing locally produced food to support the local economy.

Convenience was a motivating factor that was identified to limit or change people's choices of food products. It was only identified as a key motivating factor for one interviewee; however, convenience comes across as a motivator to some degree for 70% of interviewees. It is also noticeable that convenience is an important consideration for families in particular.

We identified constraints to motivation in terms of both money and time; about 10% of respondents mentioned being too busy to stop and read about or compare products while standing in the supermarket, so trade-offs are sometimes made, and core drivers are typically

overridden in favour of a quicker or easier alternative. As one respondent said:

> It takes time to understand what is best, for example between red meat and other meat, or no meat.

Even if quality, taste and origin are important motivating factors for how consumers behave when food shopping, over 80% of respondents indicated that there are financial constraints to what they can afford, or what they are willing to pay extra for certain attributes. This trade-off between quality and price is clearly seen in how one respondent explained weighing up these factors:

> The eggs from the local farmer are more expensive but it's worth it—they are much better quality. I'm a bit picky, but this is what we live for—that the family has good food. Quality is the most important factor not price. But if something is too expensive then it's a problem. We try to find a balance, somewhere in between.

Concern for the environment or climate was rarely mentioned by respondents as a key factor motivating decision-making. However, when asked directly about whether they are concerned about the environment, more than 80% acknowledged some level of concern, particularly those who have children. When asked whether their concern affected their choice of food products when shopping, almost a quarter described there being a disconnect between knowledge and action. As one respondent explained:

> Like everyone else, I say one thing and then do another. I am worried about it [climate change] but I don't buy super expensive stuff. I suppose I'm pretty price sensitive.

Here we also see that the barrier of a higher price of more environmentally sustainable products overrides the motivating factor that is the concern for the environment. For some respondents, the negative impacts of climate change are described as being distant, either in that they will be felt far in the future, or that Sweden is unlikely to feel the worst impacts compared with other parts of the world. For some respondents, there was uncertainty about these impacts, when they would be felt and how their own actions and choices could make a difference. As one interviewee noted:

> I would be prepared to change if I knew that my behaviour would affect the Earth in 10 to 50 years. But we don't have the information!

For some respondents, the primary motivating factors of quality, health and locally produced goods are associated with positive impacts for the natural environment, even if concern for the environment is not a key factor influencing decision-making. Indeed, several respondents seemed to equate environment with health, providing responses related to healthy eating or good health when asked about environmental concerns:

> Health is very important to me, but health and the environment go hand in hand I suppose.

Over 30% of respondents reported that they perceive a disconnect between individual behaviour and the large-scale effect of such behaviour, posing a constraint to motivating them to engage in the behaviour as they lack a belief in that it will have the desired consequence. In response to the question on whether one believes that one's actions can have a positive effect on the environment and climate change, 60% responded that individual actions can only have an impact if most people carry them out. Linked to this, several respondents expressed a desire to know how their individual choices and actions contributed to higher level climate and environment goals:

> You could see it like a drop in the ocean, but look at recycling, more and more are doing it now. You try to do your bit and hope that more people do the same.

> We hope it makes a difference, but we don't know exactly.

Having this feedback on one's own actions would allow people to keep track of their own progress over time in terms of sustainable food shopping and could encourage additional effort to choose more sustainably to meet individual goals. Several respondents mentioned the importance of feeling “we are all in this together”.

Many respondents also mentioned looking for information before or after a shopping event. Looking for recipes was often mentioned but several interviewees also stated that they looked for all sorts of information. Around 30% of respondents reported actively seeking information themselves that is related to their behaviour and decision-making, for example “Googling” certain companies to find more information about their production process:

> I read about the products on the brand's website to know about the production for example. I want to see pictures and explanations about the product. They speak a lot about environment, but they should explain in more detail what they do themselves.

Around 35% of interviewees expressed doubt towards certain labels, wondering whether they have more to do with trends or marketing rather than trustworthy information. This feeling sometimes connected to the potential price difference of more sustainable products:

> I've read about the ecological label: it's only about certain types of fertilizers, but it's not that they are not using any fertilizers. I don't trust the ecological label. I don't understand the price difference: what is more expensive about not using something?

In other cases, respondents said they trust labels but find it too difficult and time consuming to engage with them to understand which product is the better choice. Generally, respondents want more information in the store, for more clarity, as well as more trustworthy information sources:

> I think information is missing. I'd like something going into more detail and easier to engage with to be able to compare brands.

Interviewees expressed a high trust in “Swedish” products, stating that they are of good quality, for example mentioning higher animal welfare standards and less use of antibiotics. More generally, there is a high level of trust for local producers and/or Swedish brands and about 40% of interviewees expressed that they actively chose locally produced foods. This was also verified in the survey data where the products´ origin was identified as a key motivation factor of food choice for consumers. However, a few interviewees mentioned that their trust in larger brands is eroding due to scandals revealed in the news or through documentaries, resulting in the feeling that it can be difficult to know if the companies are still producing “Swedish-made” foods and what their production standards really are.

4.3. Consumer journey

As is clear from the results so far, the decision that is made at the moment of purchase is influenced by factors outside of the store. To generate a dynamic overview of the decision making landscape around food purchasing behaviour, we organised the survey and interview data into consumer journeys, that is, the key phases and actions that consumers engage in when they are food shopping. In addition, we looked at what type of information is considered in relation to food shopping at different points in the shopping journey to identify BCTs that could potentially stimulate a change in behaviour (See Fig. 2).

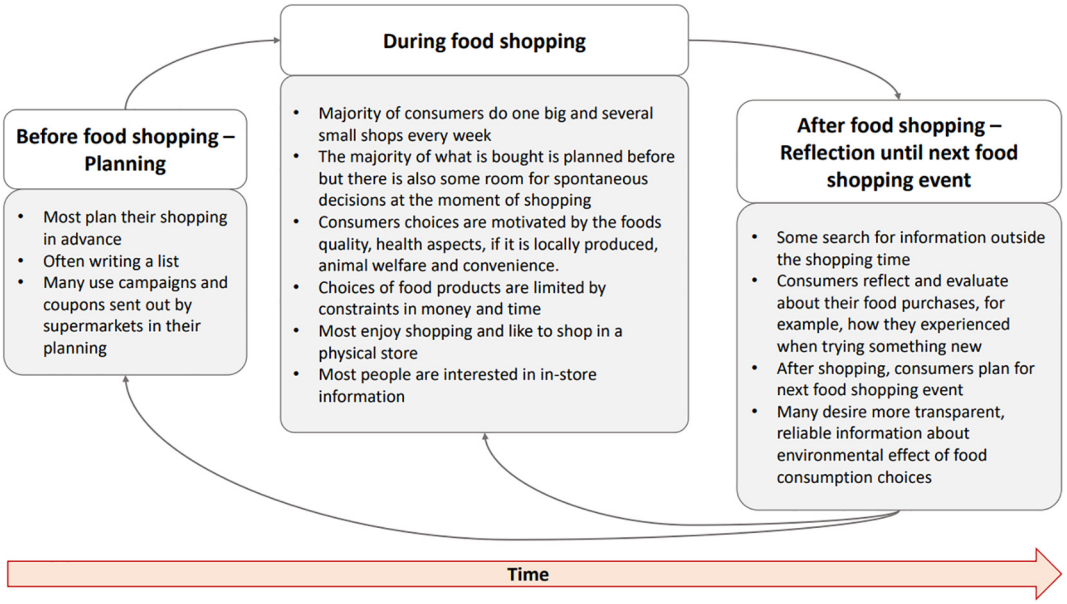

Fig. 2. Consumer journey for food shopping.

The consumer journey highlights the three phases involved in food shopping that were identified as being common to all or most of the respondents; i) before – planning of the food shopping, ii) during food shopping and iii) after shopping – reflecting and moving ahead and planning towards the next food shopping event.

Most consumers plan their shopping in advance, and about 80% of the interviewees and survey respondents stated that they write a list that they bring to the store. Almost a third of survey respondents stated that they plan their shopping on a daily basis and 16% reported that they do not plan their food shopping in advance. Most interviewees indicated that there were elements of shopping that were spontaneous; however, the amount varied largely between different interviewees, although the common pattern was that the majority of shopping was planned before going to the store.

All interviewees used some information to support their food shopping, but how and when they interact with information differs widely.

About two-thirds of respondents reported using the advertisement sent by post and email by grocery stores every week for special deals, as well as planning and inspiration. Furthermore, the majority of respondents have loyalty cards for the grocery store brands they visit most often.

Many food consumers in our interviews mentioned a desire for better and more comprehensible environmental information for food in store. Results from both the interviewees and survey, however, show that food consumers are primarily interested in information about price and the origin of food products at the point of purchase. Information about other motivating drivers, for example, health but also environmental impact of food, was primarily preferred and consumed before or after the shopping event.

Over 60% of respondents stated that they are not using any digital tools while doing their food shopping, but many used smartphone apps for other purposes and even other types of shopping. When asked whether they would be interested in a digital tool such as a smartphone app that could simplify finding environmental information about a product, about 60% of the respondents say they would be interested if it would be a very simple, clear and quick tool to use. Others say they do not wish, need or have time to get more information.

Some consumers said they are actively seeking information before, during and after shopping. For others, information was described a source of confusion that was hindering them from engaging in a specific behaviour rather than triggering them. Many mentioned that trust, or lack of trust, in labels and brands influenced the way they reasoned when food shopping. Some interviewees stated that they actively avoid certain information that they felt were influencing their choices. They would rather select when to consume information and what type of information to consume than be confronted with information that they thought was misleading or outside of their interests.

4.3.1. Behaviour change techniques focusing on information

Our results indicate a large variety of points in time, and information channels, in which consumers use and interact with information in their food shopping decision-making. Based on our findings, Fig. 3 illustrates examples of how and when information can be used as a behaviour change technique to trigger a behaviour to choose food products due to their environmental sustainability.

To increase the capability of food consumers to engage in the behaviour of choosing food products based on their environmental sustainability, information about the environmental impacts of food can be directly provided to consumers. As illustrated in Fig. 3, information could be used as a BCT to support more sustainable food shopping at different points during the consumer food shopping journey in order to increase capability through, for example, the news, in-store labels, or connected to recipes. For example, there is an opportunity to provide information on the environmental impact of products in the weekly campaign brochures that many interviewees reported using to plan their shopping.

Social influence and norms also influences decision making at different times throughout the food shopping journey but seems more important before and after the food shopping event than during (as illustrated in Fig. 3). The majority of survey respondents, for example, stated that they are not easily influenced in the store by what other people think about their food purchases. Many interviewees, however, mentioned that their food shopping and eating behaviour had been influenced by a family member, a colleague or the public debate about climate. Talking to friends and family was also ranked as a rather important channel for information by survey respondents. BCT such as information about others' approval of the behaviour, social comparison, social support and social reward could all contribute to increase consumers' opportunity to engage in the behaviour. Information could be used in, for example, social support groups for consumers that want to shop more sustainable food and peer to peer sharing of climate-friendly recipes. Based on our findings, however, the link between social influence and norms with information BCTs does not appear to be very

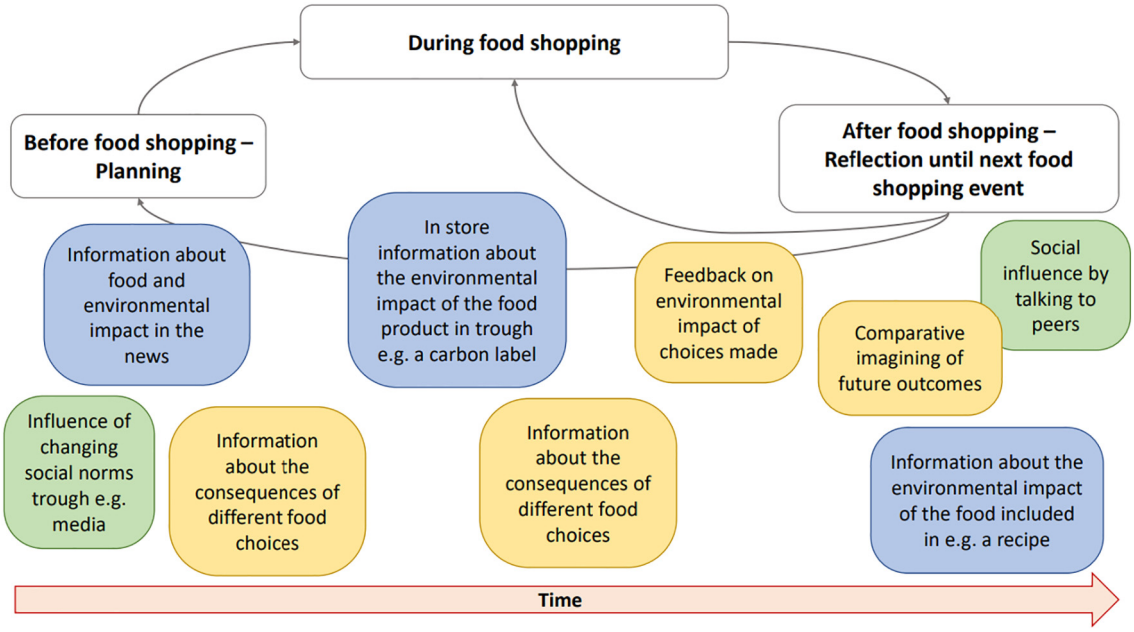

Fig. 3. Consumer journey and interaction with information. Blue boxes represent BCTs primarily relating to capability, green boxes represent BCTs primarily relating to opportunity, yellow boxes represent BCTs primarily relating to motivation.

strong and it is difficult to establish as any link is self-reported. This is in accordance with other studies, for example, a systematic literature review by Abrahamse and Steg (2013) that identifies smaller effect for social influence methods such as provisioning of group feedback, socially comparative feedback and the use of social norms in information and feedback provisioning.

To motivate consumers to engage in a specific behaviour, information could be used to increase the knowledge about the consequence of the behaviour under study and, thus, increase motivation to engage in the behaviour. This could be as a comparison of what happens if consumers choose products that are more environmentally sustainable in comparison to not engaging in this behaviour. For example, feedback could be provided to consumers about their own food shopping behaviour at regular intervals to allow for comparison of their environmental impact over time. Customers could also be informed about the collective environmental impact of all customers at the store where they regularly shop, to communicate the power of collective action.

5. Discussion

In the following section, we discuss our finding on the key influences on peoples' capability, opportunity and motivation to engage in more sustainable food shopping in light of the literature on sustainable food purchasing behaviour and the potential role of information as a behaviour change technique.

5.1. Capability, opportunity and motivation of food shopping behaviour

Our results show that the most important factors motivation food shopping decision-making were quality, health, origin of food, animal welfare and convenience. These findings are in line with previous literature on key motivating factors for consumer decision-making (e.g. Comber et al. (2013) and Clear et al. (2015)), and also confirmed that these differ largely between consumers.

We found that younger women are most likely to hold the belief that their food shopping decisions can have an actual impact on the environmental impact of food, and that this belief decreases over time. In older age groups, there is no difference between men and women in the feeling that their own actions can make a difference in society. However, with age, the situation eventually switches, with older men more likely than older women to report that their actions can have an impact. Highly educated younger people are also more likely to hold the belief that their decisions would have an effect when compared with older people of all education levels.

Other studies have identified that younger people are more likely to believe that a change in their behaviour can generate a positive impact (e.g. Joshi et al., 2019; Kadic-Maglajlic et al., 2019; Awuni and Du, 2016). In multiple studies (e.g. Bloodhart and Swim, 2020; García-González et al., 2020; Azzurra et al., 2019), women have been found to be more prone to choose environmentally friendly products. However, we have not identified a study that has looked at the perceived effect of a behaviour change as has been done in this study.

From our qualitative interviews, we found that underlying motivations, beliefs and values are often overridden at the moment of decision-making by quick and unconscious decision-making, for example due to lack of capability or opportunity to perform the behaviour. We saw reflective thinking, for example, interviewees stating that they try to shop more locally to support local farmers or for health reasons. However, plans are often overridden if the individual feels incapable or unmotivated to perform the behaviour due to constraining factors such as lack of time, confusion over labelling, or lack of financial resources. Plans overridden by financial constraints can also imply that opportunity to engage in more sustainable food choices is missing. Our findings show that consumers experience that ecological or sustainable food alternatives are often more expensive, limiting the opportunity for consumers to engage in the behaviour.

As with other recent studies, (Grundy et al., 2021; Abrahamse, 2020), the environmental impact of food did not emerge as a strong motivating factor for consumers in their decision-making processes. For example, our findings showed that health rather than environment is a more significant motivating factor to buy more ecological food. Similarly, the care for animal welfare when choosing food products was more often connected to a health concern than a concern for the environment.

5.2. Information in behaviour change techniques to trigger behaviour change

By understanding the food shopping journey as dynamic, with multiple decision points and potential levers for change occurring outside of the grocery store and in the context of everyday life, the complexity behind food shopping behaviour is captured (Clear et al., 2015), as well as concrete opportunities for BCTs. To consider food shopping in this wider context, we mapped the consumers' food shopping journey to better understand the decision-making landscape connected to food shopping and to identify when and where BCTs including information could be usefully applied to support behaviour change.

We know from past studies that the immediate context of consumers can be shaped in various ways, for example through information interventions such as nudges (e.g. Brandon et al., 2017; Bucher et al., 2016) and monetary and non-monetary incentives (e.g. Fesenfeld et al., 2020).

It is now well established that providing information alone is insufficient to shift behaviour (e.g. Grilli and Curtis, 2021) Studies on how information can shift behaviour are increasingly focusing on the use of information in combination with other behaviour change techniques. A recent study indicated that policy options, including information interventions, have a relatively weak effect on their own and should be launched in bundles of interventions to become more successful (Röös et al., 2020). Few studies, however, focus on the effect of multiple behaviour change methods applied simultaneously and over time (e.g. Fesenfeld et al., 2020; Röös et al., 2020; Brandon et al., 2017).

Results from this study verify findings from previous research about the vague effect and confusion around labelling of environmental impact (e.g. Röös and Tjärnemo, 2011; Grunert et al., 2014). Röös and Tjärnemo (2011) identify the lack of marketing and information to be one of the reasons consumers are not purchasing organic goods to a greater extent. Lawo et al. (2021) found that consumers have a need for both easy and comprehensive information as well as more in-depth understanding of underlying mechanisms of, for example environmental impacts, for them to consider changing their behaviour.

As recent literature reviews have previously noted, tapping into prior beliefs of consumers —when developing, for example, an information campaign— seems more successful than communicating messages that have no link to consumer beliefs and attitudes (Abrahamse, 2020; Carfora et al., 2019), for example a carbon label. Thus, if we aim to influence consumers to purchase more sustainably, information to create motivation and opportunity for consumers to change behaviour should target their pre-existing ideas about sustainability, for example health, packaging and locally produced food based on findings from this study.

This targeting, however, calls for information campaigns and messages to be tailored to different consumer types, each with their own beliefs and attitudes. If health is, for example, a key driver for some consumer groups, this does not imply that it is a message that would be effective for all (Veul, 2018).

Findings from this study also further verifies findings by Funk et al. (2021), that highlights the importance of considering different consumer segments, in regard to environmental friendly behaviour, separately and specifically when it comes to intervention design.

Our findings indicate that consumers need information in different formats, from different sources, via different channels and at different and preferably multiple points in time; before, during and after a food shopping event. However, from our data it is clear that to be an effective BCT, information must be clear, transparent and it must be provided by a trusted and objective actor without a subjective or political agenda. Most respondents considered public authorities to be trustworthy sources of such information.

We found that most consumers would like to receive feedback on their own actions to enable them to keep track of their progress over time in terms of sustainable food shopping. This could encourage additional effort to choose more sustainably to meet individual goals and provide motivation for consumers to change their behaviour. Consumers also state that they would be prepared to change behaviour if they could grasp or visualise the consequence of their behaviour change. Several respondents mentioned the importance of feeling part of a collective effort and where societal consequences are shared. However, as the intention-behaviour gap states (e.g. Gisslevik, 2018; Liobikienė et al., 2016), there is also a difference between stating an intention to change behaviour if, for example, clear and comprehensive information about the environmental impact of food choices is available, and actually changing behaviour. Thus, further research is needed to understand the effect of introducing information in different formats at several points along the food shopping journey.

5.3. Study limitation and future research

Our sample of interviews is relatively small, and additional interviews would strengthen the results of this study and allow for further investigation of the relationship between consumers and information with a specific focus on identifying consumer archetypes, which we could not identify through our data. Nevertheless, we found indications that consumer archetypes exist, and other studies identify consumer archetypes (e.g. Colombo et al., 2020). To complement findings from this study future research should look in more detail at correlations between specific behaviours and consumer-type parameters. Focus group discussions, additional interviews and experiments would be needed to establish archetypes and to identify the most promising information-based BCTs to support behaviour change within these groups. Longitudinal studies would be needed to measure the long term effect of applying information based BCTs.

Finally, the interviewees were recruited via a panel relying on self-recruitment. Such panels have lower credibility than a randomly selected panel, which was used for the survey. However, qualitative interviews typically require a commitment in terms of time and effort from the subject as they are more time demanding than online surveys. The sample was compared to the Swedish demographic factors such as geographic region, gender and age to increase the reliability of the selection.

6. Conclusions

In this study, we used the COM-B model of behaviour change to understand the decision-making landscape around food shopping in Sweden by identifying how peoples' capability, opportunity, and motivation to engage in sustainable shopping are influenced. We then mapped a typical consumer journey to investigate how information could be applied as a technique for supporting behaviour change towards more sustainable food shopping choices. The study contributes to a growing boding of work on how interventions to change consumer behaviour interact and how behaviour change theory can inform intervention design. The novel combination of the COM-B model with an established approach to mapping user experiences allows for insights that are both theoretically driven and practical.

We found that the key factors motivating peoples' choice of food products are quality, health, locally produced food, animal welfare and convenience. The perceived high price of sustainable food products, as well as time constraints are the main factors limiting people from making more sustainable choices. We observed a strong desire among respondents to know the environmental impact of their food consumption behaviour. We therefore suggest that there is an unexploited opportunity to enhance motivation by providing consumers with information about their food shopping behaviour so that they can associate their actions with impacts on the environment.

Our findings show that consumers interact with information at several spatial and temporal points before, during and after food shopping. It is well established that information provided at the point of purchase, as a standalone intervention, is unlikely to shift behaviour. However, this does not mean that we should give up on food labelling. Our

findings suggest that in-store information like carbon labelling on food packages, can be an effective behaviour change technique if designed in accordance with the behaviour of consumers before, during and after food shopping events. Designing information based BCTs to change food consumption behaviour requires a systems perspective, acknowledging the interconnectedness of the different phases of the consumer journey, and accepting that feedbacks will occur given that food shopping is a regular, repeated activity.

We suggest that it would be useful for intervention designers and policy makers who are considering information as a BCT to map and understand the decision-making landscape of consumers to ensure precision in how proposed interventions are applied.

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.

Acknowledgements

The authors acknowledge the support from the Swedish Research Council for Sustainable Development, Grant No: 2019-02274, within the Carbon Neutral Digestive Initiative – Enhancing Systems (CANDIES) project. We also acknowledge the support on the statistical analysis and earlier versions of the manuscript from statistician and senior lecturer Claudia Von Brömssen.

Open Access funding enabled and organised by the CANDIES project.

Appendix A. Supplementary information

Supplementary information to this article can be found online at https://doi.org/10.1016/j.spc.2022.03.026.

References

Abrahamse, W., 2020. How to effectively encourage sustainable food choices: a mini-review of available evidence. Front. Psychol. 11, 3134. https://doi.org/10.3389/fpsyg.2020.589674.

Abrahamse, W., Steg, L., 2013. Social influence approaches to encourage resource conservation: a meta-analysis. Glob. Environ. Chang. 23 (6), 1773–1785. https://doi.org/10.1016/j.gloenvcha.2013.07.029.

Adams, D.C., Salois, M.J., 2010. Local versus organic: a turn in consumer preferences and willingness-to-pay. Renewable Agric. Food Syst. 25 (4), 331–341. https://doi.org/10.1017/S1742170510000219.

Atkins, L., Michie, S., 2013. Changing eating behaviour: what can we learn about behavioural science. Nutr. Bull. 38 (1), 30–35.

Awuni, J.A., Du, J., 2016. Sustainable consumption in chinese cities: green purchasing intentions of young adults based on the theory of consumption values. Sust. Dev. 24 (2), 124–135. https://doi.org/10.1002/sd.1613.

Azzurra, A., Massimiliano, A., Angela, M., 2019. Measuring sustainable food consumption: a case study on organic food. Sust. Prod. Consum. 17 (January), 95–107. https://doi.org/10.1016/j.spc.2018.09.007.

Bloodhart, B., Swim, Janet K., 2020. Sustainability and consumption: what's gender got to do with it? J. Soc. Issues 76 (1), 101–113. https://doi.org/10.1111/josi.12370.

Brandon, A., Ferraro, P., List, J., Metcalfe, R., Price, M., Rundhammer, F., 2017. Do The Effects of Social Nudges Persist? Theory and Evidence from 38 Natural Field Experiments. w23277. National Bureau of Economic Research, Cambridge, MA https://doi.org/10.3386/w23277.

Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qual. Res. Psychol. 3, 77–101.

Bucher, T., Collins, C., Rollo, M.E., McCaffrey, T.A., De Vlieger, N., Van der Bend, D., Truby, H., Perez-Cueto, F.J.A., 2016. Nudging consumers towards healthier choices: a systematic review of positional influences on food choice. Br. J. Nutr. 115 (12), 2252–2263. https://doi.org/10.1017/S0007114516001653.

Camilleri, A.R., Larrick, R.P., Hossain, S., Patino-Echeverri, D., 2019. Consumers underestimate the emissions associated with food but are aided by labels. Nat. Clim. Chang. 9 (1), 53–58. https://doi.org/10.1038/s41558-018-0354-z.

Cane, J., O'Connor, D., Michie, S., 2012. Validation of the theoretical domains framework for use in behaviour change and implementation research. Implement. Sci. 7, 37. https://doi.org/10.1186/1748-5908-7-37.

Carfora, V., Catellani, P., Caso, D., Conner, M., 2019. How to reduce red and processed meat consumption by daily text messages targeting environment or health benefits. J. Environ. Psychol. 65 (July), 101319. https://doi.org/10.1016/j.jenvp.2019.101319.

Clear, A.K., Friday, A., Rouncefield, M., Chamberlain, A., 2015. Supporting sustainable food shopping. IEEE Pervasive Comput. 14 (4), 28–36. https://doi.org/10.1109/MPRV.2015.78.

Colombo, P.E., Carlsson Kanyama, A., Schäfer Elinder, L., 2020. En undersökning av svenskarnas benägenhet att välja vegetarisk mat under åren 2016-2019. Mistra Sustainable Consumption Rapport 15. KTH, Stockholm.

Comber, R., Hoonhout, J., van Halteren, A., Moynihan, P., Olivier, P., 2013. Food practices as situated action: exploring and designing for everyday food practices with households. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. Association for Computing Machinery, New York, NY, USA, pp. 2457–2466 https://doi.org/10.1145/2470654.2481340.

Connell, L.A., McMahon, N.E., Tyson, S.F., Watkins, C.L., Eng, J.J., 2016. Mechanisms of action of an implementation intervention in stroke rehabilitation: a qualitative interview study. BMC Health Serv. Res. 16 (2016), 534. https://doi.org/10.1186/s12913-016-1793-8.

Cornish, A., Jamieson, J., Raubenheimer, D., McGreevy, P., 2019. Applying the behavioural change wheel to encourage higher welfare food choices. Animals 9 (8), 524. https://doi.org/10.3390/ani9080524.

Denver, S., Dejgaard Jensen, J., 2014. Consumer preferences for organically and locally produced apples. Food Qual. Prefer. 31 (January), 129–134. https://doi.org/10.1016/j.foodqual.2013.08.014.

Edenbrandt, A., Lagerkvist, C.J., Nordström, J., 2020. Interested, Indifferent or Active in-Formation Avoider of Climate Labels: Cognitive Dissonance and Ascription of Responsibility as Motivating Factors. AgriFood Economics Centre, pp. pp1–pp30 AgriFood-WP; No 2020:1.

Edvardsson, B., Kristensson, P., Magnusson, P., Sundström, E., 2012. Customer integration within service development-429t – a review of methods and an analysis of insitu and exsitu contribution. Technovation 32 (7–8), 419.

Emberger-Klein, A., Menrad, K., 2018. The effect of information provision on supermarket consumers' use of and preferences for carbon labels in Germany. J. Clean. Prod. 172 (January), 253–263. https://doi.org/10.1016/j.jclepro.2017.10.105.

FAO, 2018. Transforming food and agriculture to achieve the SDGs. 20 interconnected actions to guide decision-makers. FAO Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/3/i9900en/i9900en.pdf.

FAO, 2019. The state of the world´s biodiversity for food and agriculture. FAO Food and Agriculture Organization of the United Nations. FAO commission on genetic resources for food and agriculture, Rome. http://www.fao.org/3/CA3129EN/CA3129EN.pdf.

Fesenfeld, L., Wicki, M., Sun, Y., Bernauer, T., 2020. Policy packaging can make food system transformation feasible. Nat. Food 1 (3), 173–182. https://doi.org/10.1038/s43016-020-0047-4.

Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M., Mueller, N.D., et al., 2011. Solutions for a cultivated planet. Nature 478 (7369), 337–342. https://doi.org/10.1038/nature10452.

Fuentes, C., 2019. Smart consumers come undone: breakdowns in the process of digital ageing. J. Mark. Manag. 35 (15–16), 1542–1562.

Fuentes, C., Sörum, N., 2019. Agening ethical consumers: smartphone apps and the socio-material reconfiguration of everyday life. Consum. Mark. Cult. 22 (2), 131–156.

Fuentes, C., Cegrell, O., Vesterinen, J., 2021. Digitally enabling sustainable food shopping: app glitches, practice conflicts, and digital failure. J. Retail. Consum. Serv. 61 (July), 102546. https://doi.org/10.1016/j.jretconser.2021.102546.

Funk, A., Sütterlin, B., Siegrist, M., 2021. Consumer segmentation based on stated environmental-friendly behavior in the food domain. Sust. Prod. Consum. 25, 173–186.

García-González, A., Achón, M., Carretero Krug, A., Varela-Moreiras, G., Alonso-Aperte, E., 2020. Food sustainability knowledge and attitudes in the spanish adult population: a cross-sectional study. Nutrients 12 (10), 3154. https://doi.org/10.3390/nu12103154.

Gisslevik, E., 2018. Education for Sustainable Food Consumption in Home and Consumer Studies. Gothenburg Studies in Educational Sciences. 411. Acta universitatis Gothoburgensis, Gothenburg.

Gracia, A., De Magistris, T., 2007. Organic food product purchase behaviour: a pilot study for urban consumers in the south of Italy. Span. J. Agric. Res. 5 (4), 439. https://doi.org/10.5424/sjar/2007054-5356.

Grilli, G., Curtis, J., 2021. Encouraging pro-environmental behaviours: a review of methods and approaches. Renew. Sust. Energ. Rev. 135 (January), 110039. https://doi.org/10.1016/j.rser.2020.110039.

Grundy, E.A.C., Slattery, P., Saeri, A.K., Watkins, K., Houlden, T., Farr, N., Askin, H., 2021. Interventions That Influence Animal-Product Consumption: A Meta-Review. OSF Preprints https://doi.org/10.31219/osf.io/mcdsq.

Grunert, K.G., Hieke, S., Wills, J., 2014. Sustainability labels on food products: consumer motivation, understanding and use. Food Policy 44 (February), 177–189. https://doi.org/10.1016/j.foodpol.2013.12.001.

Hartmann, C., Siegrist, M., 2017. Consumer perception and behaviour regarding sustainable protein consumption: a systematic review. Trends Food Sci. Technol. 61 (March), 11–25. https://doi.org/10.1016/j.tifs.2016.12.006.

Hedin, B., Katzeff, C., Eriksson, E., Pargman, D., 2019. A systematic review of digital behaviour change interventions for more sustainable food consumption. Sustainability 11 (9), 2638. https://doi.org/10.3390/su11092638.

Hoek, A.C., Malekpour, S., Raven, R., Court, E., Byrne, E., 2021. Towards environmentally sustainable food systems: decision-making factors in sustainable food production and consumption. Sust. Prod. Consum. 26 (April), 610–626. https://doi.org/10.1016/j.spc.2020.12.009.

Hoekstra, A.Y., 2017. Water footprint assessment in supply chains. In: Bouchery, Yann, Corbett, Charles J., Fransoo, Jan C., Tan, Tarkan (Eds.), Sustainable Supply Chains. Springer Series in Supply Chain Management4. Springer International Publishing, Cham, pp. 65–85. https://doi.org/10.1007/978-3-319-29791-0_4.

Johnston, M., Carey, R.N., Connel Bohlen, L.E., Johnston, D.W., Rothman, A.J., de Bruin, M., Kelly, M.P., Groarke, H., Michie, S., 2021. Development of an online tool for linking behaviour change techniques and mechanisms of action based on triangulation of findings from literature synthesis and expert consensus. Transl. Behav. Med. 11 (5), 1049–1065.

Joshi, Y., Sangroya, D., Srivastava, A.P., Yadav, M., 2019. Modelling the predictors of young consumers' sustainable consumption intention. Int. J. Nonprofit Volunt. Sect. Mark. 24 (4), e1663. https://doi.org/10.1002/nvsm.1663.

Jürisoo, M., Lambe, F., Osborne, M., 2018. Beyond buying: the application of service design methodology to understand adoption of clean cookstoves in Kenya and Zambia. Energy Res. Soc. Sci. 39 (May), 164–176. https://doi.org/10.1016/j.erss.2017.11.023.

Kadic-Maglajlic, S., Arslanagic-Kalajdzic, M., Micevski, M., Dlacic, J., Zabkar, V., 2019. Being engaged is a good thing: understanding sustainable consumption behavior among young adults. J. Bus. Res. 104 (November), 644–654. https://doi.org/10.1016/j.jbusres.2019.02.040.

Kahan, D.M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L.L., Braman, D., Mandel, G.N., 2012. The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks. SSRN Scholarly Paper ID 2193133. Social Science Research Network, Rochester, NY. https://papers.ssrn.com/abstract=2193133.

Kahneman, D., 2011. Thinking, fast and slow. https://us.macmillan.com/books/9780374533557/thinkingfastandslow.

Kortenkamp, K.V., Moore, C.F., 2006. Time, uncertainty, and individual differences in decisions to cooperate in resource dilemmas. Personal. Soc. Psychol. Bull. 32 (5), 603–616. https://doi.org/10.1177/0146167205284006.

Kotler, P.G., Wong, A.V., Saunders, J., 2008. Principles of Marketing. Fifth European Edition. Prentice Hall, Harlow.

Lambe, F., Ran, Y., Jürisoo, M., Holmlid, S., Muhoza, C., Johnson, O., Osborne, M., 2020. Embracing complexity: a transdisciplinary conceptual framework for understanding behavior change in the context of development-focused interventions. World Dev. 126 (February), 104703. https://doi.org/10.1016/j.worlddev.2019.104703.

Lawo, D., Neifer, T., Esau, M., Vonholdt, S., Stevens, G., 2021. From farms to fridges: a consumer-oriented design approach to sustainable food traceability. Sust. Prod. Consum. 16.

Lindahl, T., Jonell, M., 2020. Underlagsrapport 2020:4 Metoder för att ändra kostvanor. Konsumentverket. https://www.konsumentverket.se/globalassets/publikationer/hallbarhet-och-miljo/underlagsrapport-2020-4-metoder-for-att-andra-kostvanor.pdf.

Liobikienė, G., Mandravickaitė, J., Bernatonienė, J., 2016. Theory of planned behavior approach to understand the green purchasing behavior in the EU: a cross-cultural study. Ecol. Econ. 125 (May), 38–46. https://doi.org/10.1016/j.ecolecon.2016.02.008.

Michie, S., van Stralen, M.M., West, R., 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement. Sci. 6 (1), 42. https://doi.org/10.1186/1748-5908-6-42.

Michie, S., Wood, C.E., Johnston, M., Abraham, C., Francis, J.J., Hardeman, W., 2015. Behaviour change techniques: the development and evaluation of a taxonomic method for reporting and describing behaviour change interventions (a suite of five studies involving consensus methods, randomised controlled trials and analysis of qualitative data). Health Technol. Assess. 19 (99), 1–188. https://doi.org/10.3310/hta19990.

Naturvårdsverket, 2018. Konsumtionsbaserade utsläpp av växthusgaser per område. Naturvårdsverket, Stockholm.

Nyström, M., Jouffray, J.-B., Norström, A.V., Crona, B., Søgaard Jørgensen, P., Carpenter, S.R., Bodin, Ö., Galaz, V., Folke, C., 2019. Anatomy and resilience of the global production ecosystem. Nature 575 (7781), 98–108. https://doi.org/10.1038/s41586-019-1712-3.

Ofstad, S., Westly, L., Bratelli, T., 1994. Symposium on Sustainable Consumption. Ministry of Environment, Oslo, Norway.

Poore, J., Nemecek, T., 2018. Reducing Food's environmental impacts through producers and consumers. Science 360 (6392), 987–992. https://doi.org/10.1126/science.aaq0216.

Reisch, L.A., Sunstein, C.R., Andor, M.A., Doebbe, F.C., Meier, J., Haddaway, N.R., 2021. Mitigating climate change via food consumption and food waste: a systematic map of behavioral interventions. J. Clean. Prod. 279 (January), 123717. https://doi.org/10.1016/j.jclepro.2020.123717.

Röös, E., Tjärnemo, H., 2011. Challenges of carbon labelling of food products: a consumer research perspective. Br. Food J. 113 (8), 982–996. https://doi.org/10.1108/00070701111153742.

Röös, E., Larsson, J., Resare Sahlin, K., Jonell, M., Lindahl, T., André, E., Säll, S., Harring, N., Persson, M., 2020. Policy Options for Sustainable Food Consumption – Review and Recommendations for Sweden. Mistra Sustainable Consumption report 1:10. Chalmers University of Technology.

Roy, M., 2021. Chapter 3 - greening behavior toward sustainable development. In: Roy, M. (Ed.), Sustainable Development Strategies. Butterworth-Heinemann, pp. 53–90 https://doi.org/10.1016/B978-0-12-818920-7.00001-3.

Sajn, N., 2020. Sustainable Consumption Helping Consumers Make Eco-Friendly Choices. EPRS | European Parliamentary Research Service.

Stanton, J., Wirth, F.F., Dao, Y., 2018. An analysis of consumers' preferences between locally grown/processed food and organic food. Curr. Investig. Agric. Curr. Ress 4 (1), 1–11. https://doi.org/10.32474/CIACR.2018.04.000180.

Stoknes, P.E., 2014. Rethinking climate communications and the "psychological climate paradox". Energy Res. Soc. Sci. 1, 161–170. https://doi.org/10.1016/j.erss.2014.03.007.

Tanner, C., Kast, S.W., 2003. Promoting sustainable consumption: determinants of green purchases by Swiss consumers. Psychol. Mark. 20 (10), 883–902. https://doi.org/10.1002/mar.10101.

Temme, E.H.M., Vellinga, R.E., de Ruiter, H., Kugelberg, S., van de Kamp, M., Milford, A., Alessandrini, R., Bartolini, F., Sanz-Cobena, A., Leip, A., 2020. Demand-side food policies for public and planetary health. Sustainability 12 (15), 5924. https://doi.org/10.3390/su12155924.

Thøgersen, J., Nielsen, K.S., 2016. A better carbon footprint label. J. Clean. Prod. 125 (July), 86–94. https://doi.org/10.1016/j.jclepro.2016.03.098.

Timlin, D., McCormack, J., Simpson, E., 2021. Using the COM-B model to identify barriers and facilitators towards adoption of a diet associated with cognitive function (MIND diet). Public Health Nutr. 24 (7), 1657–1670. https://doi.org/10.1017/S1368980020001445.

UN, 2015. Transforming Our World: The 2030 Agenda for Sustainable Development. United Nations.

Veul, J., 2018. Interventions to reduce meat consumption in OECD countries: an understanding in differences in success. https://theses.ubn.ru.nl/handle/123456789/6391.

Weimer, K., 2019. Behaviour Change Towards a Sustainable Lifestyle – Effects of Interventions and Psychological Factors on Pro-environmental Behaviours. Faculty of Human Sciences, Department of Psychology and Social Work. Mid Sweden University, Östersund, p. 296 Doctoral thesis in Psychology. Mid Sweden University doctoral thesis.

Weimer, K., Richard, A., Lisspers, J., Lipsanen, J., 2017. Values, attitudes, moral judgement competence locus of control and sense of coherence as determinants of pro-environmental behaviours and behavioural intentions. J. Multidiscip. Eng. Sci. Technol. 4 (5), 2568–2583.

West, R., Michie, S., 2020. A brief introduction to the COM-B model of behaviour and the PRIME theory of motivation [v1]. Qeios https://doi.org/10.32388/WW04E6.

White, K., Habib, R., Hardisty, D.J., 2019. How to SHIFT consumer behaviors to be more sustainable: a literature review and guiding framework. J. Mark. 83 (3), 22–49. https://doi.org/10.1177/0022242919825649.

Young, W., Hwang, K., McDonald, S., Oates, C.J., 2009. Sustainable consumption: green consumer behaviour when purchasing products. Sust. Dev. https://doi.org/10.1002/sd.394 n/a-n/a.