VALUMICS
Food Systems Dynamics

Putting solutions on the table

A review of successful interventions to support more sustainable food consumption behaviours

Imprint

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Executive Summary

Goals

The transition towards more sustainable food systems in Europe has put a key question on the table: how can we halve the consumption of high impact foods in Europe in the next decades, thereby also cutting by half their negative sustainability impacts? This report aims at contributing to this discussion, by **analysing and showcasing the latest and most compelling pieces of evidence about behaviourally-informed interventions** that support a shift towards more sustainable and healthier diets in real-life contexts.

Target audience

This report is particularly targeted at **policymakers and food industry** actors. It aims to provide a range of evidence-based approaches to drive more sustainable food purchasing and consumption behaviours in Europe. For this purpose, each behavioural change discussed is accompanied by reflections on opportunities for policymakers and the food industry to replicate, tailor or scale up the consequences involved.

Key discussion points

Behaviourally-informed strategies seen as an opportunity for sustainable food consumption strategies – not as the one and only answer. "'Softer' interventions, although they offer an easier solution, can be counterproductive if they diminish the political appetite for stronger policy" [1]. This is not an either/or question; it is about behaviourally-informed policies as a helpful complement to more classical policy approaches, with the potential to foster enjoyment, innovation and public acceptance on the way to more sustainable eating behaviours.

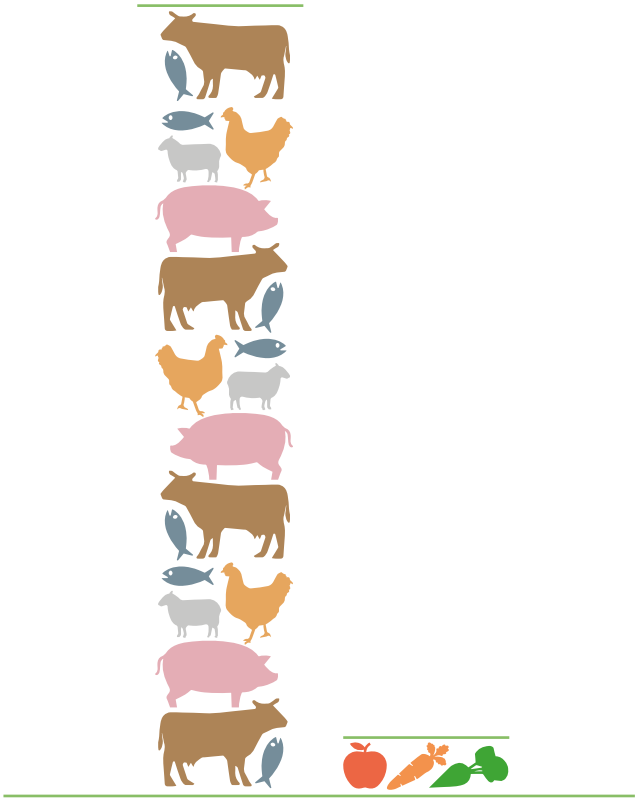
Need for robust evaluation and documentation of behaviourally-informed interventions. If it is crucial to inform sustainable food consumption strategies and interventions with behavioural insights, it is equally important to measure and evaluate the results of such interventions. Only by doing so can one understand what works and what probably will not work. From the literature reviewed for this report, it became clear that there is a real need for further documentation, and above all for measurement and evaluation of the results of behaviour-change interventions.

The right moment is now. There is great momentum at the present juncture in history for change in food consumption behaviours. On the one hand, there are urgent sustainability and carbon targets, to which eating behaviours are a major contributor; on the other hand, the latest innovations in the food industry, think tanks and CSOs have opened the horizon on a new world of opportunities for more sustainable food consumption.

Introduction

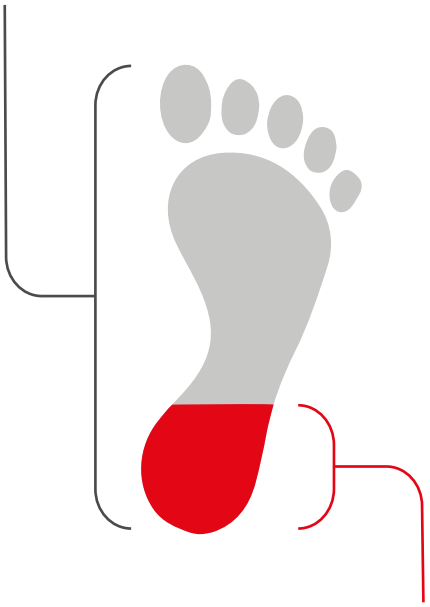
Food production and consumption have major sustainability impacts. Food consumption accounts for at least 25% of the average material footprint of a European person, which is about three times more than the estimated sustainability level [2]. From a carbon emission perspective, current European eating patterns are based on highly carbon intensive behaviours [3], such as daily consumption of animal-derived products that can cause as much as 20 times more carbon emissions than their plant-based counterparts per gram of protein [4]. Hence the scientific community has been calling for significant global dietary shifts, requiring the reduction of specific high impact foods consumption by more than 50% by 2050, on the risk of failing to meet UN Sustainable Development Goals (SDGs) as well as the Paris Agreement [5].

In this context, how can we halve the consumption of high impact foods in Europe in the next decades, thereby also (roughly) cutting by half their negative sustainability impacts? Putting this issue literally 'on the table' has opened up a contested and even emotional terrain. Food purchase and consumption is perceived as a highly personal activity, often associated with one's culture and identity [6]. For this reason, classical policy interventions to limit or hinder the presumed free consumption of food may face low public acceptance.



"Animal-derived products [...] cause as much as 20 times more carbon emissions than their plant-based counterparts per gram of protein."

Material footprint of a European person



Food consumption accounts for at least 25% of the average material footprint of a European person

On the other hand, food consumption is largely habitual and relatively unreflected, which makes it open to behaviourally-informed strategies towards greater sustainability [7]. Such strategies are characterised by keeping all consumption options available, while making it easier, normal and more appealing to take the more sustainable road [1]. Behaviourally-informed policies such as changes to default choice settings have been increasingly endorsed if developed in a transparent and ethical manner [8].

Moreover, they are particularly interesting as embedding experimentation and rigorous scientific method in regulatory design [9]. Overall, behaviourally-informed strategies also have the potential to function as a complementary approach to other types of policy, with the ability to foster enjoyment, innovation and acceptance as we transition to more sustainable eating behaviours.

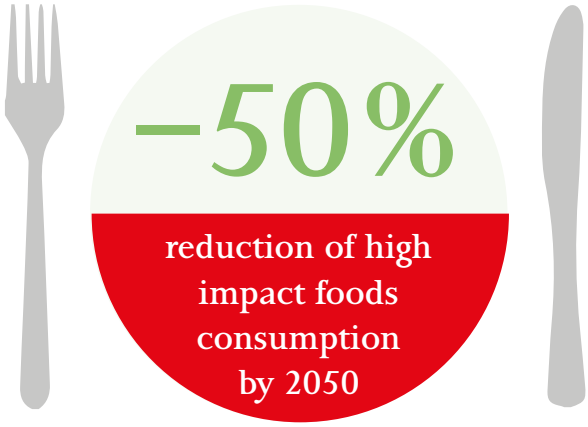
This report will contribute to this discussion by analysing and showcasing the latest and most compelling pieces of evidence about behaviourally-informed interventions that have supported a shift towards more sustainable and healthier diets in real-life contexts.

To this end, the report is particularly targeted at policy makers and food industry and distribution actors ("food industry actors"), especially retailers and restaurants, in order to provide them with a range of evidence-based approaches to drive more sustainable food[1] purchasing and consumption. The actual implementation of such approaches is documented in interventions supporting more sustainable food consumption behaviours, including reducing meat consumption, increasing consumption of vegetables, fruits, organic products and local food, reducing food waste, generally promoting products with better sustainability performance, and promoting heathy eating.

Having said this, it is important to emphasise that more systemic and probably also more radical policy changes such as redirecting agricultural subsidies or applying sustainability tax charges for meat consumption [10] are not included in the scope of this report. This is so because, based on behavioural knowledge and insights, the report focuses on less conventional and more creative solutions to food consumption issues that are often overlooked in the design of sustainable food consumption and production strategies.

1 "Food" would also include certain vegetable- or milk-based drinks.

The goal:



Methodology

The literature review conducted as a basis for this report focused on sources that documented actual behaviour-change interventions, i.e. experiments addressing specific behaviours directed towards more sustainable food consumption. Hence studies focused on consumer perception, attitudes and intentions around the topic, or based purely on theoretical discussions, were avoided as far as possible.

Two main kinds of secondary data were reviewed:

- Scientific papers published in English mostly between 2004-2019, retrieved from different platforms and databases covering various disciplines and keywords. From the hundreds of papers filtered, 84 were short-listed, based on their summaries, and finally 30 were assessed against the above-mentioned criteria. Of these, 22 documented primary data from field experiments and 8 were experiment reviews. Further information on the review of scientific literature is documented in the technical report delivered to the European Commission and can be provided on request.
- Besides scientific articles and databases, the collection of secondary data included grey literature – factsheets, website articles and reports – documenting behaviour-change interventions conducted by other stakeholder groups, such as international organisations, Civil Society Organisations (CSOs), NGOs, think tanks, cities and business. Nearly 20 behaviourally informed interventions were additionally identified through the review of grey literature based on the above-mentioned criteria.

The most compelling interventions identified, i.e. those with promising and positive results, are featured in the main text of this report. The full list of identified interventions can be found in the Annex. The interventions are presented in this report according to the approach or tool they implement in real-life contexts, highlighting the type of behaviour they address and the opportunities at stake for policymakers and the food industry.

Content of this report

Chapters 1-3 set the scene by introducing what behavioural insights are, why they are useful in supporting solutions towards more sustainable behaviours, particularly with regard to food consumption, and who has the opportunity to apply such insights in practice. Chapter 4 is the main part of the report and presents successful behaviourally informed interventions for sustainable food consumption. These are presented according to the approach they implement in real-life contexts, highlighting the type of behaviour they address and the opportunities they raise. Chapter 5 discusses knowledge gaps, challenges and opportunities on the way forward.

About Valumics

VALUMICS
Food Systems Dynamics

The overall goal of the VALUMICS project is to provide European decision makers with a comprehensive suite of approaches and tools to evaluate the impact of policies and strategies for enhancing the resilience, integrity and sustainability of food value chains in Europe.

Contributing to the project goal, this report is the second in a series of VALUMICS outputs especially dedicated to food consumption analysis, preceded by a baseline report on understanding the drivers of food consumption behaviours in European consumers and the various challenges and opportunities faced in this regard. Next in this series of outputs will be the documentation of a pilot behaviour-change intervention in a retail store in Europe; a report with multi-stakeholder recommendations; and a report containing the main outcomes of the consumer analysis workshops facilitated by VALUMICS.

Chapter 1

What are behavioural insights?

Behavioural insights: learning about human behaviour and decision-making patterns.

Socioeconomic, political and ecological systems are both defined by and condition human behaviour. A prime example is the food market, where individuals act as representatives and shapers of market demand. Various scientific fields, including the social sciences, economics and psychology, as well as the cognitive and neuro-sciences have generated a growing body of thematically diverse empirical evidence grounding insights into human behaviour and its socioeconomic manifestations.

Manifold application of behavioural insights, from understanding and protecting consumer decisions to developing sustainable development strategies.

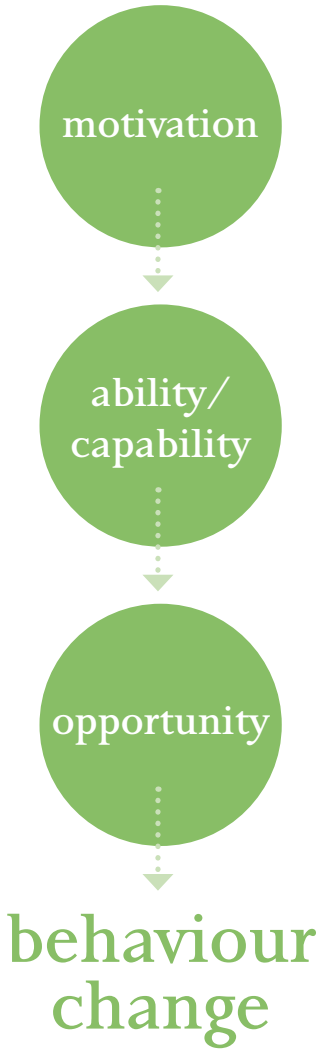
Such insights have been initially used to understand and protect consumer decision making in all areas of life and work, including food consumption [11]. However, over the years, with increasing awareness of our societies' unsustainable development patterns, behavioural insights have been recognized and utilized as an important aspect of mitigation and prevention strategies in all areas (including food) and on various levels (top-down/ bottom-up).

Challenging the longstanding premise of humans as purely rational decision makers, behavioural insights suggest people possess limited rationality.

Behavioural insights stem from discourses which move away from an understanding of humans and their decision-making processes as perfectly rational, calculative and optimizing. Such theories have long been the central premise of policy-making and market operation processes that target people in their roles as citizens and consumers. Within such views, an individual is depicted as 'homo oeconomicus', a rational being motivated by information, deliberation and choice of those actions that maximise utility and minimise cost [11, 12, 13]. Deeming such notions and depictions of human behaviour incomplete, new streams of economic thinking such as behavioural economics strive to achieve a more realistic view of human behaviour, complementing a rationality-based understanding with insights from other sciences [13, 14]. Behavioural economics, to stay with this example, sees people, as subjects of limited rationality, incapable of perfectly understanding all the elements and implications of a given situation. To ensure non-interrupted functioning, people rely on simple cognitive heuristics, mental shortcuts and satisfying strategies, which in turn cause them to make predictable errors [14]. In this light, both science and practice communities have shifted their attention from 'homo oeconomicus' to 'homo sociologicus', an understanding that takes account of limited rationality, errors and biases [15].

Behavioural insights support understanding of consumer food purchasing patterns.

In the food market, and particularly in retail stores, consumers have access to a large variety of goods and services. When making food purchasing choices, consumers must take in a lot of information ranging from the price, nutritional value, taste and origin of the product to its sustainability performance. Nonetheless, consumer studies show that, due to information overload and the inability to process all this information at once, consumers opt for easier decision-making processes that might take in only a few criteria, such as price, appearance and taste [16, 17]. In turn, this might lead to food choices that in the long-term might not be in the best interests either of the consumer or of a sustainable development trajectory.



The attitude-action gap.

In terms of sustainable food consumption, behavioural insights also speak about an important behavioural phenomenon, namely, the attitude-action gap [16]. This reflects people's failure to purchase more sustainable food products even though they endorse positive attitudes and intentions towards sustainability. The discrepancy may have a variety of reasons, for example, other priorities, such as economic constraints or health concerns, or the inability to process the increasing number of criteria and labels indicating product performance [18, 19]. Putting the challenge into a broader context, more recent behavioural models such as the Behaviour Change Wheel [20] or BJ Fogg's B-MAT acknowledge that behaviour-change is shaped by three main components: motivation, ability/capability, and opportunity. When one of these factors is missing, change will likely be impossible.

In the context of sustainable food consumption, behavioural insights shed light on the drivers and behavioural determinants of people's food purchasing patterns and how awareness of these can be applied to support more sustainable food consumption behaviours [16].

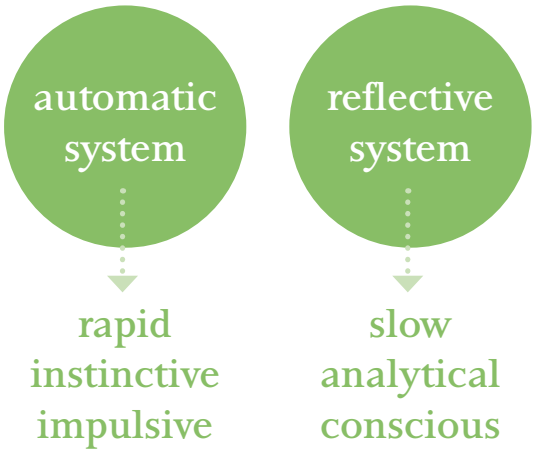
Chapter 2

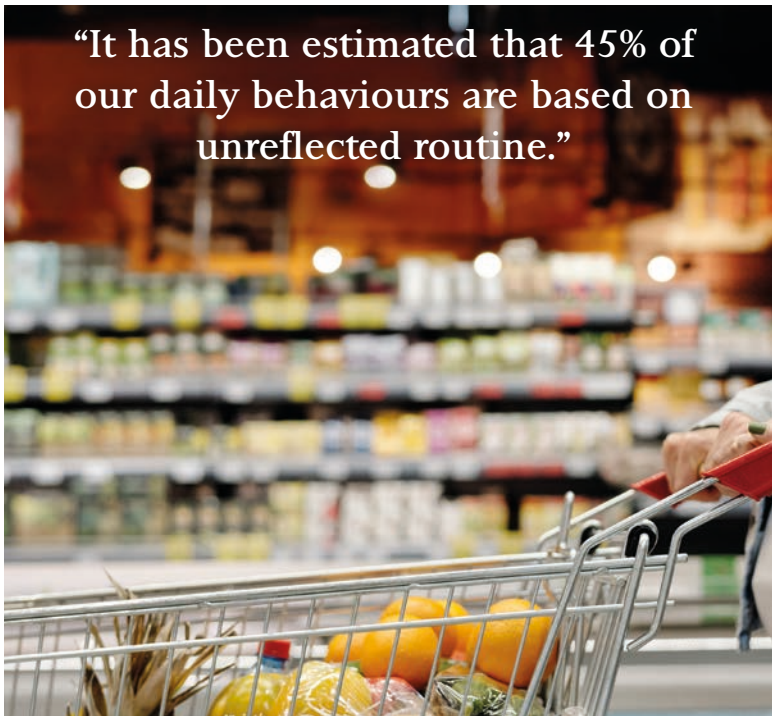
Why are behavioural insights so helpful?

Behavioural insights are important because they provide an alternative, more realistic and evidence-based knowledge or perspective on people's actual behaviours [11]. Understanding their behaviours and decision-making patterns is pivotal for the success and effectiveness of policies, business innovations and other interventions.

Behaviourally-informed strategies have greater potential in fostering sustainable behaviours than those focusing on information provision and awareness raising.

Behavioural insights (including behavioural economics and sciences) tell us that human behaviour and decision-making processes employ two systems of thinking, the automatic (system 1) and the reflective (system 2). The automatic comprises the rapid, instinctive and/or impulsive approach to forming a thought which, as a next step, may materialize in a behaviour [15]. During this process, the individual does not employ much cognitive effort. The behaviour can be seen as an automatic reaction to the setting. The reflective system, on the other hand, is slow, deliberative, analytical and conscious. The individual invests more cognitive effort in the decision-making process, consciously makes use of all information and reflects on potential implications [12].





Being aware of this distinction is important because we rely on the automatic system more often than we imagine. It has been estimated that 45% of our daily behaviours are based on unreflected routine [21]. In the attempt to operate successfully in the dynamic complexity of human living, people tend to accept processes as they come, without employing much cognitive effort to reflect on outcomes or alternatives [14]. Hence successful attempts to influence behaviours in a desired direction, in this case to make them more sustainable, should go beyond strategies targeting knowledge and awareness, and focus on easing the adoption of intrinsically sustainable behaviour. This is particularly true when it comes to food consumption, which is largely habituative and unreflected, and therefore prone to behaviourally-informed strategies [7].

Behavioural insights support the design, implementation and evaluation of more effective policies.

Behavioural insights can support the design of effective policies by providing a more accurate picture of the behavioural factors on which success is based, and at the same time enabling policymakers to become aware of their own biases [12]. They can also be used to improve and evaluate existing policies and regulations, thus further enhancing the learning curve [11].

Behavioural insights are especially helpful when targeting behaviours with long-term impacts.

Individuals have more difficulty deciding on a course of action when the timeframe involved is too long [14]: short-term effects generally have a higher profile than long-term ones. People engage in behaviours that provide immediate (e.g. sensory) gratification more readily than in those whose benefit is located in the future [14, 7]. This is known as psychological discounting. In the context of this report, taking up a plant-based diet now in view of the risk of resource depletion and climate change in a few decades is, therefore, challenging [22].

Behavioural insights are especially helpful in overcoming unwarranted optimism.

Over confidence is another cognitive bias that impedes long-term thinking. Many people fail to engage in preventive behaviour because they think the chances of their suffering bad consequences are relatively low [14]. Instead of increasing general information and knowledge provision, interventions promoting sustainable food consumption should focus on making the impact of dietary patterns more tangible by connecting them with a particular demographic group — e.g. people anxious about coronary health should avoid high cholesterol foods. For greater impact, this could take place at the point of purchase.

Behavioural insights are especially helpful in addressing people's tendency to think they are already doing their best.

Another bias is 'illusionary superiority': the tendency to overestimate one's good qualities when comparing oneself to others [23]. In the context of sustainable behaviours in all lifestyle areas, this means that people may fail to act because they believe they are already doing their best and need not revisit their behaviours. Or conversely, they have a poor perception of self-efficacy as a driver of significant change [24, 25]. Reference to social norms (i.e. the behaviour of other people) may, therefore, enhance the effectiveness of policies and other interventions promoting more sustainable food consumption.

The importance of understanding your target audience.

Understanding the explicit as well as implicit motivations and attitudes of the target group is crucial when planning measures for behavioural change. It is easy to resort to false assumptions. Barriers to, and opportunities for, change must be properly researched at both qualitative and quantitative levels [26].

Chapter 3

Who can benefit from behavioural insights?

Behavioural insights can be utilized by actors and institutions that target and work with citizens and consumers. By supporting a better-informed decision-making process about how to most effectively intervene in the food system [27], behavioural insights can support policymakers, the food industry and Civil Society Organisations (CSOs) in effectively designing, implementing and evaluating interventions that promote heathier and more sustainable short-term and, most importantly, long-term food consumption [11]. Citizens and consumers can also benefit from this research, by identifying and addressing their own biases and engaging in the discussion that shapes the future of food policy.

The use of behavioural insights to influence and guide consumer behaviour has raised ethical concerns about whether this curbs people's autonomy and freedom of choice, especially when behavioural insights are used for public policymaking [28, 29, 30, 31]. Evidence from an international citizen survey shows the importance of developing policies transparently and openly, giving citizens the opportunity to engage in dialogue and to express their concerns [8]. This is essential in order to establish trust in behaviourally-informed policies and interventions. Research also suggests the importance of ensuring that behaviourally-informed policies are effective [8] and used in the best interest of citizens [11, 32].

Food industry actors

Producers, processors, retailers and restaurants hold a unique position in supporting sustainable food consumption [1] and, as Chapter 4 will show, businesses are already experimenting with new and more sustainable ways of operating in the market. There is potential to take such initiatives to the next level and turn them into mainstream business. In this innovation process, marketing and advertising intelligence is a particularly useful asset.

Policymakers and governments

In the context of sustainable food consumption, public authorities are increasingly expected to take responsibility and show leadership in effectively developing and implementing preventive and rectifying strategies [1]. So far, most policy efforts have focused on increasing consumer information and raising awareness through communication campaigns and food labelling [33]. Although beneficial, such actions have not been notably successful in enabling consumers to change their behaviour [34]. Hence policymakers are increasingly using behaviourally-informed policies for this purpose, generating momentum for their application on a more regular basis [8]. In this way, behavioural insights can support policymakers and public bodies in designing anthropocentric strategies – e.g. national food plans and agendas – that will gain the endorsement and engagement of the public and thus come closer to realising their targets [11, 1, 12].

Civil society organisations (CSOs)

CSOs undoubtedly play an important role in the sustainability agenda by acting as gatekeepers and balancing the interest of citizens, policymakers, businesses and other stakeholders. Behavioural insights can support CSOs in better understanding these stakeholders and their behavioural drivers and thus ensuring their participation and collaboration. CSOs also have the opportunity to design and implement sustainable food consumption interventions themselves (e.g. behaviour-change pilots) as well as to evaluate and suggest improvements in existing policies [26, 9].

Citizens

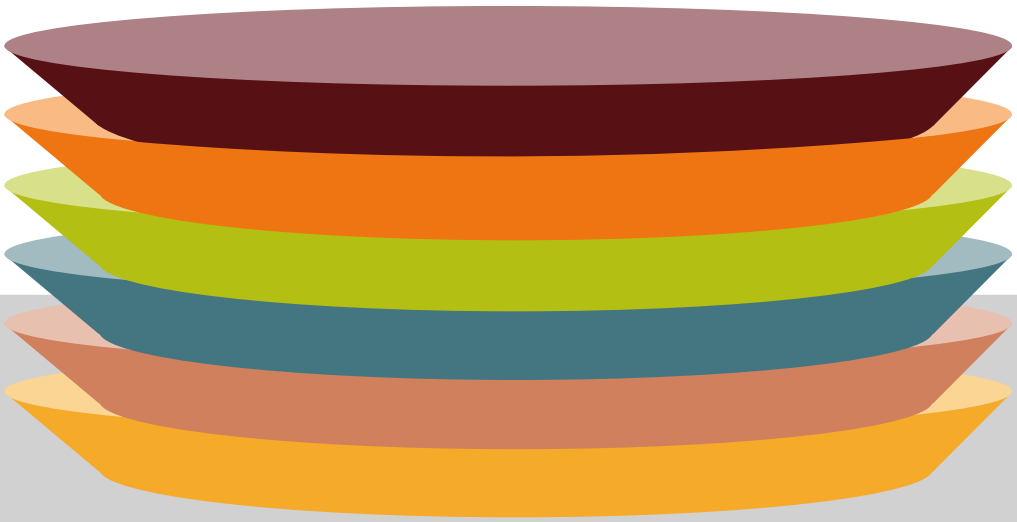
Behavioural insights also benefit citizens. Awareness of such insights, and of related decision-making biases and errors, encourages citizens to engage in the development of behaviourally-informed policies and strategies, and increases their endorsement of and consequent demand for sustainability-related strategies and actions [1, 35].

The following chapter will focus on the opportunities and takeaways offered by behaviourally-informed food consumption strategies for policymakers and the food industry, as the main target audiences of this report.

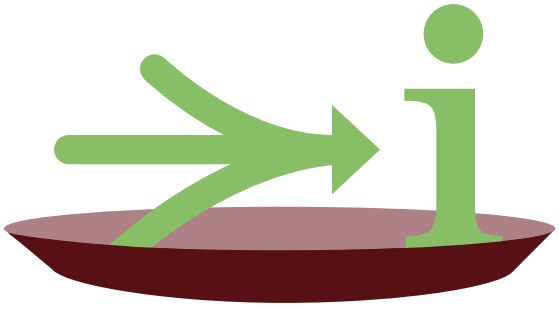
Chapter 4

Sucessful interventions for sustainable food consumption behaviour

After clarifying the value of behavioural insights for sustainable food consumption strategies, we now turn to how this happens in practice. This section focuses on recent evidence on behaviourally-informed interventions that have supported a shift towards more sustainable and healthier diets in real-life contexts. In order to be more specific about points of intervention in the food consumption eco-system, interventions are presented below according to the behaviour-change approaches they implement and illustrate. The specific behaviours they address are also highlighted. The presentation of approaches and interventions is followed by reflection on the opportunities they represent for policymakers and the food industry to invest in bolder and more effective sustainable food consumption strategies.



4.1 Simplifying information



Grocery shoppers tend to base their buying choices in retail stores on only a few factors. Hence simplified, salient information (e.g. labels and tags) tailored to concrete contexts increases the likelihood of influencing consumer behaviour [7]. Empirical evidence has shown the effectiveness of symbol (e.g. traffic-light) labelling of meat products in Germany to rate animal welfare [36]. Similar symbols could also be used to facilitate comparison of product sustainability. Simplified information of this sort – rather than rating individual products separately – seems most effective when applied to a range of products within the same category placed alongside each other [1]. However, among so many food labels in the market, the effective design of eco-labelling requires further research [1].

Illustrative real-life interventions

Interventions	Addressed behaviours
Burgers in Sweden: The Swedish burger chain Max introduced carbon labels on all of their burgers and witnessed a 16% increase in sales of those burgers with a lower than average carbon footprint [7].	*Reducing meat consumption*
Healthier choices: A review has shown that, in 30-60% of studies, labelling stimulates significantly healthier choices, and symbol labelling has a much greater impact than information-rich signs such as nutrition and calorie labels [37].	*Increasing healthy food consumption*
Visualizing the invisible: A digital intervention provided a web page for consumers to visualise their organic vs. total food purchases in a year, including suggestions to exchange the five products with greatest impact. The result was a 23% increase in organic food purchases. This was especially effective with consumers who underestimated the share of organic products they bought [38].	*Increasing healthy food consumption*

What's in it for ...

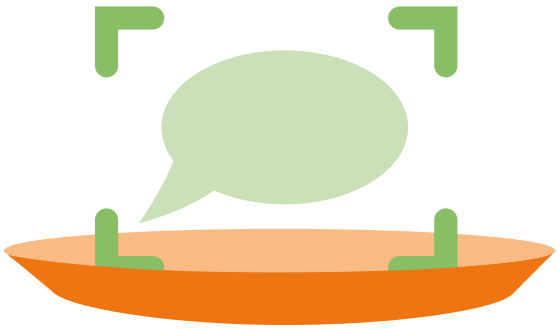
Policymakers

- Policymakers can review the number of labels and improve the use of selected ones on food, fostering simplification and requiring horizontal implementation across all products within a specific product category to allow comparison – e.g. of meat burger patties with meat alternative burger patties.
- Another step within this approach, expected to yield even greater results, would be to develop and test food sustainability performance ratings at the level of the retail store, in order to single out stores and chains with leading sustainability performance. This way, instead of having to choose product by product, consumers would be directed towards supermarkets with a "better" performance overall [1]. A similar approach is already being taken with regard to food waste avoidance strategies discussed around national roundtables and dialogue forums [39]. These may provide a useful blueprint for addressing other food-related behaviours.

Food industry actors

- Food producers can use food labels to highlight relevant messages about product and sustainability performance. This will bring them closer to both existing and potential consumers.
- The food industry, particularly retailers and restaurants, can improve the market position and performance of their product range with regard to more sustainable food consumption. Voluntary action and agreements in this direction will give the industry the opportunity to drive innovation across food supply chains, e.g. by reducing animal-based product content and developing new plant-based alternatives, while ensuring products remain tasty and appealing. Additionally, the industry will be able to anticipate changes in market demand by helping to test and shape future policies.

4.2 Framing the language



An important premise of behavioural approaches is that communication matters and ways of communicating a message or problem will have an impact on the final outcome [14]. Given that people rely more on the automatic system of thinking, as discussed earlier, choosing the right communication frame can enhance the acceptance and implementation of a suggested behaviour. In this sense, wording such as "vegan", "vegetarian" or "healthy" may sound unattractive for those that don't consider themselves part of this consumer group.

Illustrative real-life interventions

Interventions	Addressed behaviours
'Comforting' and 'field grown' food: The World Resource Institute (WRI) tested the impact of different language on meat-eaters' tendency to order a vegetarian dish. Experiential and indulgent language, such as 'mild and sweet' or 'comforting', as well as terms highlighting food provenance ('field grown', 'garden') led to an increase in sales by up to 70%, while terms such as 'meat-free' were consistently unpopular [42].	 *Reducing meat consumption, increasing vegetables and fruits consumption*
Focus on flavour: in a Stanford study, flavour-focused labels (called "indulgent") such as "slow-roasted caramelized zucchini bites" were chosen by diners 41% more often than identically prepared vegetables with "healthy-restrictive" descriptions and 25% more often than those with "basic" descriptions. Researchers were particularly excited about the results considering it was a low-cost intervention that could easily be tailored to other cafeterias, restaurants, and products [43].	 *Reducing meat consumption, increasing vegetables and fruits consumption*
Selling the imperfect: In the supermarket chain Asda, in the UK, carrots with cosmetic defects increased their shelf share from 10 to 40% between 2015 and 2017, when they became known as "wonky carrots". In this period, more than 1,000 tonnes of wonky carrots were saved from going to waste [44].	 *Increasing vegetables and fruits consumption*

In 2017, the WRI looked into 15.4 million posts across Twitter, Instagram, blogs and forums from Britain and the United States that included references to plant-based, vegan and vegetarian food. The term "vegan" rather than "plant-based" was more than twice as likely to be used in negative contexts [40]. In this sense, emphasizing enjoyment and pleasure in food consumption is key to supporting more sustainable alternatives.

The intervention conducted on behalf of the European Commission Consumers, Health, Agriculture and Food Executive Agency (CHAFEA), where authentic and persuasive messages were used to increase the purchase of imperfect fruits and vegetables and address food waste, is a good practice example of using appealing language. Evidence has also shown that highlighting the provenance of food also supports its consumption [41].

Linked to language framing, gamification approaches to food consumption may help create a fun atmosphere around the desired behaviour, as exemplified by existing interactive apps or informative platforms such as CSCP's Taste the Change [41]. Box 2 below provides additional examples of how language framing can support more sustainable behaviours.

What's in it for ...

Policymakers

- Policymakers can use language and imagery for sustainable food products that appeals to people and resonates with their values and cultures. Ensuring e.g. that plant-based products can still be called burgers, steaks and sausage in the EU, instead of 'discs' or 'tubes', is a way to keep them recognisable and attractive to consumers.
- A promising step within this approach is to engage public information channels and media outlets in the development of new narratives for sustainable food consumption. From public health and safety recommendations to public campaigns and education curricula, such channels can convey narratives that reinforce sustainable ways of eating, thereby fostering more sustainable world views and business innovation policies.

Food industry actors

- The food industry can boost its sustainable portfolio by reframing the meat-free language of menus, packaging and advertising. As shown by the examples above, exploring language that connects people to the food's provenance, to enjoyment and to free time has greater appeal than green- and health-related claims, which may be perceived as negative and appeal only to a limited group of consumers.
- The food industry has predominantly invested in making its supply chain (upstream) more sustainable, e.g. by improving resource efficiency, input sources of and working conditions. This supply chain knowledge can also be framed to improve downstream communication about product attributes for a more exciting consumer experience and overall sustainable eating behaviours.

4.3. Changing the physical environment

The design of the physical space and disposition of food options where food consumption takes place matters. Evidence has shown that the greater the availability and prominence of more sustainable and healthier food options, the greater their potential uptake by consumers [1]. This is due to consumers' correlation of quantity and availability with the preferences of other consumers (popularity of a product).

In other instances, research has found a positive link between the location of a product on the menu and its purchase. For example, products placed at the top of the menu seem more popular than those in the middle [45].

Illustrative real-life interventions

Interventions	Addressed behaviours
Convenient vegetables alongside minced meat: By placing a healthy addition next to a possible and easy dinner option, the sales of pre-cut vegetables increased by 61,3%. However, the sales of minced meat also rose by 32% per customer [11].	*Increasing vegetables and fruits consumption*
Designed for healthy choices: Changing buffet design from full sized brownies in front and whole apples at the back, to sliced apples in front and half sized brownies at the back, led to an 84% increase in apple consumption and a 30% decrease in brownie consumption on average [46].	*Increasing healthy food consumption*
The conscious plate: Reducing plate size by 20% among the restaurants that belong to the Ecobeneficios network led to a reduction of food waste by 50% [47].	*Reducing food waste*

The size of portions and plates also plays an important role [7], both in motivating increased consumption of more sustainable food, e.g. with salads as main dish instead of small side dishes, and in supporting the reduction of unsustainable consumption practices, e.g. by decreasing portion size of meat dishes or reducing the size of plates to avoid food waste.

What's in it for ...

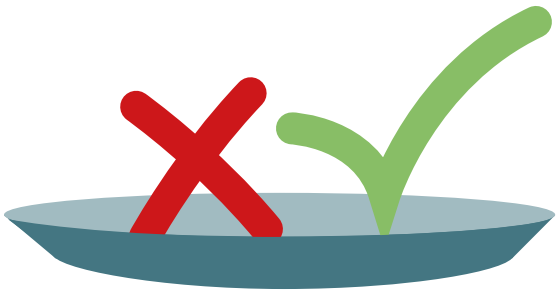
Policymakers

- Very controlled environments, such as canteens in schools, universities and public administration buildings, restaurants in trains, or events catering are fruitful spaces for policymaking to support greater availability and visibility of more sustainable food options and to reduce the visibility and size of less sustainable options.

Food industry actors

- Within the food industry, retail stores, restaurants and hotel chains are particularly well positioned to implement change in their physical environments fostering more sustainable food consumption.
- Reshaping the physical environment of retail stores and shops enables the industry to better profile and feature their sustainable products, fostering public acceptance and curiosity and thus supporting transition to a more sustainable product portfolio.

4.4 Changing the default option



Default options are preset courses of action that take effect if nothing is specified by the decision maker [14]. If a choice has been marked as default by the choice setter, people will generally accept it as such and not engage in changing it [14], because the individual tends to conform to the status quo and perform daily activities without paying much attention to them [14, 48]. Moreover, consumers tend to perceive default options as the optimum available because they are effectively marked as the choice of the provider [14, 48].

Default choices can, therefore, serve as worthwhile nudges, and making more sustainable food products and services the default options in food consumption contexts will likely increase their consumption share. Empirical evidence was obtained by Hansen et al. [48] in an event catering context where the vegetarian dish was made the default option on the registration form for conferences. This significantly increased consumption of the vegetarian dish [48].

Illustrative real-life interventions

Interventions	Addressed behaviours
Successful vegetarian default: Offering a vegetarian option as default increased the probability that undergraduate students in the U.S. would choose a meat-free meal [49].	*Reducing meat consumption*
Danish conferences go vegetarian: Changing the lunch-default to a vegetarian option is an effective, generic, easy to scale and well-accepted nudge to promote healthy and sustainable food choices at conferences [48].	*Reducing meat consumption*
Takeaway bags: In a pizzeria, by making takeaway bags of unfinished food (aka. 'doggy bags') the default option, customer demand for the service increased by 44% two weeks into the experiment [50].	*Reducing food waste*

While changing the default option still leaves the final (purchasing) decision to consumers, the concept of 'choice editing' sees governments and businesses re-setting the portfolio of (default) options by editing out choices that are less sustainable while ensuring that better performing options are the norm.

What's in it for ...

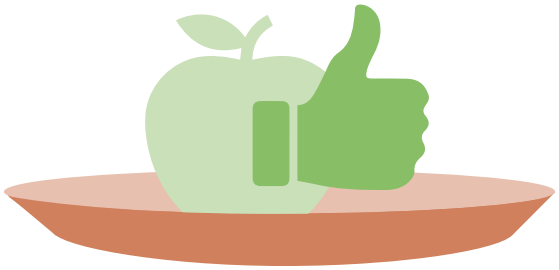
Policymakers

- Public procurement, e.g. for canteens and event catering, presents a particularly interesting opportunity for policymakers to make more sustainable food default options.
- Policymakers can also steer change of default option among food industry actors by looking into spaces where consumers have a limited choice and are often directed towards less sustainable options for food, such as on trains and flights.

Food industry actors

- Opportunities here lie in reaching out to new and expanding food markets and niches as a way to diversify portfolios while preserving markets and reducing the sustainability impact of food sales.

4.5 Making it normal



People are strongly influenced by what others do, in various ways: a) non-invasively through sharing and exchanging knowledge, information and/or ideas, thus pursuing and adding to an unconsciously adopted learning process [14]; b) through unconsciously copying the behaviours of people we socialize with, a process known as behavioural mimicry [51]; c) through peer pressure, adapting behaviour to people's expectations (self-evaluated or indicated by others) either to avoid social conflict and disapproval, or to continue being part of the social group, and/or for other conformity reasons [14].

Illustrative real-life interventions

Interventions	Addressed behaviours
Descriptive vs. dynamic messaging: A recent study done in a U.S. university canteen showed that people exposed to dynamic normative messaging such as "over the last 5 years, 30% of Americans have started to make an effort to limit their meat consumption" were more likely to order a meatless lunch (34%) than participants exposed to descriptive norm messaging such as "30% of Americans make an effort to limit their meat consumption" (17%). It showed that dynamic norms motivated change despite prevailing static norms, doubling meatless orders [53].	*Reducing meat consumption*
Welcome back again: In Norway, placing a sign on the table of various hotel restaurants saying "Welcome back! Again! And again!" fostered the feeling that it was fine and acceptable to visit the menu table several times, thereby helping reduce food waste by 20.5% [7].	*Reducing food waste*
Integrating instead of segregating: a study conducted by the WRI found that meat eaters are 56% less likely to order a plant-based dish if it's encapsulated within a "vegetarian" box or section of a restaurant menu [55]. Sales of plant-based dishes doubled when spread throughout the menu. Similarly, putting vegetarian sandwich fillings next to meat options roughly doubled sales compared to having them in a separate 'vegetarian' section of the shop [1].	*Reducing meat consumption*

In this context, social norms are the behavioural expectations or rules within a society or group. They can be explicitly stated or implicitly realised in what we see others doing. In short, they are perceived as the right thing to do [52]. In a world full of information and complex decisions, copying what others do is a good way to feel part of the group while avoiding the effort of thought.

What's in it for ...

Policymakers

- Also here, public procurement is a straightforward entry point for governments and policymakers to lead by example and prioritise more sustainable foods in school canteens and hospitals and at public events. This reinforces the perception that sustainable food consumption is normal and helps establish a new norm [1].
- Policymakers can also tap into low-cost approaches to desired food consumption behaviours, for example through messaging, while still leaving options open for consumers to decide. Here are some questions to start with, guided by Nyborg et al. [52]: Is the behaviour observable? Does it involve coordination benefits? Are tastes likely to be shaped by behaviours, e.g. people preferring foods they are already used to? Is the alternative behaviour low cost? If answers are negative, other types of policy may be used to change them. If answers are positive, the next step would be to explore alternatives to self-fulfilling expectations, by giving reasons for people to believe that others will take up less damaging behaviours [52]. As social norms are directly connected to cultures, making sustainable choices the new norm may increase their chances of cultural consolidation.

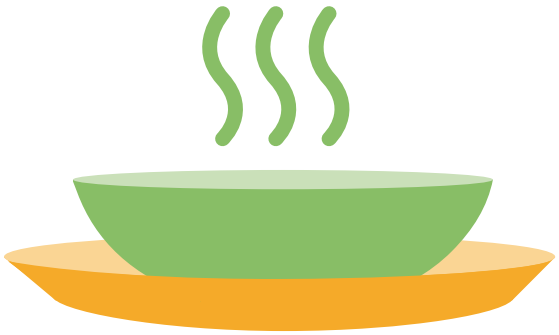
Food industry actors

- Integrating more sustainable food options in menus and supermarket aisles represents an opportunity for restaurants and retailers to explore new solutions with their suppliers to mainstream sustainable food products, while increasing demand for them.
- Integrating and normalising more sustainable food options may also enhance customer experience by providing a greater variety of options and reducing the stress of sustainable consumption. People will feel this is normal and acceptable.

Accordingly, interventions based on social norms can readily replace unsustainable living and consumption patterns with more sustainable and beneficial practices [35]. This can be done, for example, through powerful normative messaging that communicates the normality of the desired behaviour ("Most people do X" or "80% of people do X") or shows the dynamic towards the desired norm, the shifting trend ("More and more people are doing X"). Another way is to lead by example, exploiting the visibility and model role played by governments and recognised people in society. Finally, integrating desired choices (such as plant-based products) into people's habitual context of food purchasing and eating highlights the normality of the practice. On the other hand, segregating vegan products in specific supermarket aisles, or vegetarian dishes in dedicated restaurant menu sections is something to be avoided **[1]**.

Nyborg, K. et al. **[52]** explain that dietary variation across countries seems to be co-shaped by social norms – e.g. the ritual of eating together – as it cannot be fully explained by price, income, or nutrition content: If people tend to prefer the foods they are used to, sticking to the most common diet is convenient [...]. Hence, if a less meat-intensive diet became the norm, individuals might conform partly owing to social pressure or a wish to be environmentally friendly; but a primary motive may simply be to enjoy pleasant and convenient joint meals **[52]**.

4.6 Using favourable external stimuli (Priming)



Priming captures people's tendency to react and perform in response to external stimuli. A contextual detail, regardless of importance, can prompt a specific behaviour or choice [14]. This correlates with previous research according to which reactions to an environment are the result of the emotional state the environment induces in the individual [56]. For a long time now, such insights have been used by retailers (and other business actors) to improve their store ambience and drive consumption of particular products [55]. This effect can also be used to support sustainable food consumption and related behaviours, for example, by placing (visual, audio or olfactory) cues to remind people of the impact the purchase of sustainable products may have on the environment and/or other members of society.

Illustrative real-life interventions

Interventions	Addressed behaviours
Men and sound: Spendrup et al. [55] found out that exposing retail consumers to nature sounds (i.e. birdsong) had a (moderately) positive impact on their willingness to buy organic food products – participants were men with relatively low intention of buying such products [55].	*Increasing organic food consumption*
Unhealthy music? Biswas et al. [56] found that low (vs. high or no) volume music/noise leads to increased sales of healthy foods due to induced relaxation. In contrast, high volume music/noise tends to enhance excitement levels, which in turn leads to unhealthy food choices [56].	*Increasing healthy food consumption*
Smell and taste: A study with bread and cucumber smells found that these improved the mood of participants, but no effect was found on their subsequent lunch choice, contributing to the conclusion that smell can play a role but requires further research and testing in the sustainable food consumption realm. Sampling of food, on the other hand, is a frequently applied in-store intervention also for more sustainable food choices; it is considered especially useful for increasing the familiarity of novel sustainable products, such as tofu and soya milk [57].	*Increasing consumption of fruits and vegetables, increasing familiarity with more sustainable food products*

Chapter 5

Discussion and way forward

Some discussion points, challenges and opportunities derived from this report are as follows:

Behaviourally-informed strategies as an opportunity to advance sustainable food consumption strategies, not as the one and only answer:

As the Behavioural Insights Team put it: "Softer interventions, though they offer an easier solution, can be counterproductive if they diminish the political appetite for stronger policy" [1]. This is not an 'either/or' question: behaviourally-informed policies should be conceived as a complementary approach to classic policies, with the potential to foster enjoyment, innovation and public acceptance in the transition to more sustainable eating behaviours.

Testing the same approach to address different behaviours:

A certain behaviour change approach can be tailored to address various food consumption behaviours. There is, for example, little empirical evidence of the power of social norms to support organic food consumption. Likewise, framing language in an appealing way, as in the WRI language experiments with meat-free dishes [40], could be applied with positive results to other desired food consumption behaviours.

There are no silver bullets:

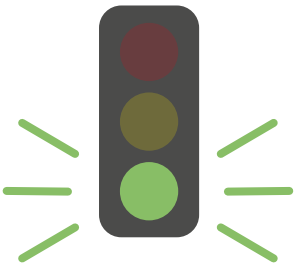
Having said the above, it is still important to keep in mind that behaviour change approaches work differently in different contexts and in view of different behaviours. For example, spreading vegetarian dishes throughout restaurant menus, rather than segregating them in special menus or parts of the menu, increased the purchase of such dishes [54], while segregating healthy menu options (fruits, vegetables) and clustering unhealthy menu options (cookies and candies) increased the relative purchase of healthy options [7]. It is crucial to understand the targeted behaviour, barriers and opportunities of the specific audience.

The noise out there.

The effectiveness of behaviourally-informed interventions is often hindered by the high level of 'noise' in real-life contexts, meaning other initiatives, marketing actions, habits and needs that compete for attention [7]. Hence the importance of a reality check before implementing an intervention. A controlled environment with few counteracting effects, where a single authority can design the intervention, may work better as the test-bed for certain behaviour-change approaches than other, less controlled environments [7].

Need for robust evaluation and documentation of behaviourally-informed interventions.

Measurement and evaluation of the results of interventions is crucially important. Only in this way is it possible to understand what works and what might not work, and also to account for potential side-effects. From the literature reviewed for this report, it became clear that there is a real need for further documentation and, above all, evaluation of the results of behaviour-change interventions.



The right moment is now.

In view of the urgent need to meet sustainability and carbon targets, to which eating behaviours are a major contributor, there is great momentum today for change in food consumption behaviours. And the latest sustainable innovations from the food industry, think tanks and CSOs reveal a new world of untapped opportunities for more sustainable food consumption.

ANNEX: Full list of identified interventions

From academic papers

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Bauer & Reisch [58]	Study review	• Changing the default option • Simplifying information • Making it normal • Changing the physical environment • Using favourable external stimuli (priming)	• Increasing healthy food consumption	Diverse	Calorific information and food choice: there appears to be a consensus that the mere provision of calorific information is unlikely to have strong effects on individual food choices. Studies substantially differed in quality and setting, which limited the ability to draw clear conclusions regarding what works where and why.
Biswas et al. [56]	Field experiment	• Using favourable external stimuli (priming)	• Increasing healthy food consumption	Stores, restaurants	Unhealthy music? Biswas et al. (2019) found that low (vs. high or no) volume music/noise leads to increased sales of healthy foods due to induced relaxation. In contrast, high volume music/noise tends to enhance excitement levels, which in turn leads to unhealthy food choices.
Bucher et al. [59]	Study review	• Changing the physical environment	• Increasing healthy food consumption	Army, university and hospital cafeteria, university offices, conference venue	Far or close: This review has identified that manipulation of food product order or proximity can influence food choice mostly in a positive direction.
Burger et al. [60]	Field experiment	• Making it normal	• Increasing healthy food consumption	University psychology lab	Women and salient descriptive norm information: When undergraduate women were led to believe that earlier participants typically had chosen either a healthy or an unhealthy snack bar, participants tended to select a snack consistent with what they believed others had chosen.
Cadario & Chandon [61]	Study review	• Changing the default option • Simplifying information • Framing the language • Changing the physical environment • Using favourable external stimuli (priming)	• Increasing healthy food consumption	Onsite cafeterias, offsite eateries, and grocery stores	Review what matters: Interventions are more effective at reducing unhealthy eating than increasing healthy eating or reducing total eating. Effect sizes of interventions are larger in the U.S. than in other countries; in restaurants or cafeterias than in grocery stores; and in studies including a control group. Effect sizes are similar for food selection vs. consumption, for children vs. adults, and are independent of study duration.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Cambell-Arvai et al. [49]	Field experiment	• Changing the default option • Simplifying information • Framing the language	• Reducing meat consumption	University dining hall	Successful vegetarian default: Offering a vegetarian option as default increased the probability that undergraduate students in the U.S. would choose a meat-free meal.
Coucke et al. [45]	Field experiment	• Changing the physical environment	• Reducing meat consumption • Increasing familiarity with more sustainable food products	Butchery in supermarket	Display area and amount: Increasing the size of display area and the amount of (poultry) products displayed created a shift in consumers' meat purchase behaviour towards the more sustainable option (poultry). However, other meat sales did not decrease and when the nudge was removed, the sales of poultry decreased again significantly.
Devaney & Davies [62]	Field experiment	• Making it normal	• Reducing food waste	Households	Less food waste plus spill-over effects: Over the course of the experimental period, including a set of diverse interventions, participating households reduced their overall food waste generation by 28%, with additional shifts towards more sustainable purchasing, storage, preparation and waste recovery practices also identified.
Filimonau et al. [63]	Field experiment	• Simplifying information • Framing the language	• Increasing healthy food consumption • Increasing familiarity with more sustainable food products	Casual dining restaurant	Menu design when dining out: Nutritional values of foodstuffs alongside the provenance of ingredients represent determinants of consumer choice when dining out. Displaying food carbon intensity values as information blocks on a menu enables more socially- and environmentally-beneficial food choices and was well perceived by the public.
Frank & Brock [64]	Field experiment	• Simplifying information • Framing the language	• Increasing organic food consumption	Retail store	Enhancing organic purchases: focusing on personal health and environmental claims was more effective than claims made about animal welfare.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Gilliland et al. [65]	Field experiment	• Simplifying information • Framing the language	• Increasing healthy food consumption • Increasing local food consumption	Mobile phone application, farmers market	Using Apps to increase awareness: SmartAPPetite was effective at creating a sense of improved awareness and consumption of healthy foods, as well as drawing people to local food vendors with greater frequency. The more participants were engaged with the app, the more positive changes in healthy food consumption were experienced.
Godfrey & Feng [66]	Field experiment	• Simplifying information • Framing the language	• Increasing familiarity with more sustainable food products	University dining hall	Making the message visible: Considering the perceived inconvenience of reading and internalizing a poster and its message, in this case the use of the water footprint of the dishes in a menu was important for designing successful interventions. Contextual limitations such as time constraints or limited meal options placed on students in the dining hall should be considered.
Hansen et al. [48]	Field experiment	• Changing the default option	• Reducing meat consumption • Increasing healthy food consumption • Increasing vegetables and fruits consumption	Conference	Danish conferences go vegetarian: Changing the lunch-default to a vegetarian option was an effective, generic, easy to scale and well-accepted nudge to promote healthy and sustainable food choices at conferences
Hans & Böhm [67]	Field experiment	• Simplifying information • Framing the language	• Increasing local food consumption • Increasing organic food consumption • Increasing familiarity with more sustainable food products	Online intervention, virtual store	Increasing awareness of consequences: Informing consumers about major environmental problems, their contribution to the causes of these problems, and the consequences for humans, strengthened consumers' intentions to purchase domestic, seasonal, and certified ecological products.
Hedin et al. [38]	Study review	• Simplifying information • Framing the language	• Reducing food waste (12) • Increasing organic food consumption (1)	Households (14), university canteen (1)	Visualising the invisible: A digital intervention used a web page to let consumers visualise their organic vs. total food purchase data in a year, including suggestions to exchange five products with greatest impact. The results were a 23% increase in organic food purchases, which was especially effective in consumers that underestimated the share of organic products they bought.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Higgs et al. [68]	Field experiment	• Making it normal	• Increasing vegetables and fruits consumption	Workplace restaurant	'Most people here choose to eat vegetables with their lunch': A poster displaying the social norm message was associated with an increase in the purchase of meals containing vegetables in three British workplace restaurants.
Kallbekken & Sælen [69]	Field experiment	• Changing the physical environment • Making it normal	• Reducing food waste	Breakfast hotel restaurant	"Welcome back!" Reducing plate size and providing social cues ("Welcome back! Again! And again! Visit our buffet many times. That's better than taking a lot once") reduced the amount of food waste in hotel restaurants by around 20%.
Karevold et al. [37]	Study review	• Changing the physical environment • Simplifying information	• Increasing healthy food consumption	Grocery stores and supermarkets, restaurants and schools	Healthier choices: A review has shown that labelling stimulated significantly healthier choices in 30-60% of studies, and symbol labelling had a much greater impact than information-rich signs such as nutrition and calorie labels. Placing seemed to have the most consistent effect, and stimulated consumers to choose significantly healthier choices in 60-100% of the studies. Price levels and price changes significantly affected what consumers chose in 50-70% of the studies, and the effects were different for healthy versus unhealthy options. Portioning stimulated consumers to eat significantly less or healthier food in 70% of studies.
Liberato et al. [70]	Study review	• Simplifying information • Framing the language • Changing the physical environment	• Increasing healthy food consumption	Stores, supermarkets, vending machines, online supermarket	Monetary incentives: The evidence of this review indicates that monetary incentives offered to customers for a short-term period seem to increase purchases of healthier food options when the intervention was applied by itself in stores or supermarkets.
Lombardini & Lankoski [71]	Field experiment	• Changing the default option	• Reducing meat consumption	Campus dining hall	Veggie per default: On vegetarian days there was a decrease in the participation in school lunches and in the amount of food taken to the plate, and an increase in plate waste (in the short term) and a decrease in the amount of food taken to the plate (in the medium term).

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Lorenz & Langen [72]	Study review	• Changing the physical environment • Changing the default option • Making it normal • Simplifying information • Framing the language • Using favourable external stimuli (priming)	• Increasing healthy food consumption • Increasing vegetables and fruits consumption	Out of home	Influencing consumers in out-of-home-setting: In many instances this has been applied to improve the nutritional intake of individuals, but could also be applied to enhance aspects of sustainability in this sector. Increasing the choice of food options with lower carbon footprints (Pulkkinen et al., 2016) and higher shares of plant-based nutrients (Westhoek et al., 2014), or improving their consumption rates, are potential ways forward.
Loy et al. [73]	Field experiment	• Simplifying information • Framing the language	• Reducing meat consumption	University campus	Intention and behaviour: Adding self-regulation through mental contrasting with implementation intentions (MCII) to information interventions helped participants in Germany to achieve their intended meat consumption reduction.
De Magistris et al. [74]	Field experiment	• Simplifying information • Framing the language	• Increasing familiarity with more sustainable food products	Lab	Labelled tuna: Willingness to pay for tuna fish with two CSR labels was higher than willingness to pay without certification. However, the information provided on CSR (rather than other) certification did not change willingness to pay.
Meadowcroft [75]	Field experiment	• Changing the physical environment	• Increasing healthy food consumption	University campus and local park	Which apple to choose? Participants prefer to choose apples from a disorganised display but with ideal looking apples, while fewer of them choose from an ordered display with mixed ideal looking and blemished apples, and just a few tend to take the last apple from a display.
Monroe et al. [76]	Field experiment	• Simplifying information • Framing the language	• Increasing organic food consumption • Increasing local food consumption • Reducing meat consumption • Reducing food waste	University	Combining information with commitment: Basic information displayed as text, pictures, video clips and through interactive Q&A, combined with commitment (towards a chosen behaviour change goal) can effectively increase green eating behaviours: i.e. eating locally grown foods, limiting amounts of processed/fast foods, eating meatless meals at least one day per week, choosing organic foods where possible, and only taking what you intend to eat.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Mont et al. [7]	Study review	• Simplifying information • Framing the language • Changing the physical environment • Changing the default option • Making it normal	• Increasing healthy food consumption • Reducing meat consumption • Increasing familiarity with more sustainable food products • Reducing food waste • Increasing organic food consumption • Increasing local food consumption	Diverse	Burgers in Sweden: The Swedish burger chain Max introduced carbon labels on all burgers and witnessed a 16% increase in sales of those burgers with lower than average carbon footprint Welcome back again: In Norway, placing a sign on the table of various hotel restaurants saying "Welcome back! Again! And again!" fostered the feeling that it was fine and acceptable to visit the menu table several times, thereby helping reduce food waste by 20.5% Other interventions were reviewed by this study, with varying levels of success.
Penz et al. [77]	Field experiment	• Simplifying information • Framing the language	• Increasing familiarity with more sustainable food products	Online	Spill-over effect of sustainable behaviours: Participants who would go to an organic restaurant rather than to a conventional restaurant, also show a higher tendency to engage with other sustainable behaviours, like using public transport or going to an organic food store.
INHERIT [78]	Field experiment	• Making it normal • Simplifying information • Framing the language	• Increasing familiarity with more sustainable food products	Supermarket	Labelling seafood: The expected change towards more sustainable choices was generally not found. Overall, an increase in the purchase of seafood (both sustainably labelled and unlabelled) was noted during the intervention. In Norway, the choice of sustainable seafood increased in the prompt-only condition, but the effect was neutralised when social norm information was added. In Germany, social norm messages led to a decline in sustainable choices compared to baseline, a boomerang effect.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Sparkman & Walton [53]	Field experiment	• Making it normal	• Reducing meat consumption	Campus cafe	Descriptive vs. dynamic messaging: A recent study done in a U.S. university canteen showed that people exposed to dynamic normative messaging such as "over the last 5 years, 30% of Americans have started to make an effort to limit their meat consumption") were more likely to order a meatless lunch (34%) than participants exposed to descriptive norm messaging such as "30% of Americans make an effort to limit their meat consumption" (17%). It showed that dynamic norms motivate change despite prevailing static norms, doubling meatless orders.
Spendrup et al. [55]	Field experiment	• Using favourable external stimuli (priming)	• Increasing organic food consumption	Supermarket	Men and sound: Spendrup et al. (2016) found that exposing retail consumers to nature sounds (e.g. birdsong) had a positive impact, to a medium degree, on willingness to buy organic food products by men who had relatively low intention levels to buy such products.
Turnwald et al. [43]	Field experiment	• Framing the language	• Reducing meat consumption • increasing vegetables and fruits consumption	University cafeteria	Focus on flavour: in a Stanford study, flavour-focused labels (called "indulgent") such as "Slow-roasted caramelized zucchini bites" were chosen by diners 41% more often over identically prepared vegetables with "healthy-restrictive" descriptions and 25% more often than those with "basic" descriptions
Vandenbroele et al. [57]	Review study	• Using favourable external stimuli (priming)	• increasing vegetables and fruits consumption • increasing familiarity with more sustainable food products	Restaurant, retail	Smell and taste: A study with bread and cucumber smells was found to improve mood among participants, but no effect was found on their subsequent lunch choice, contributing to the conclusion that aroma can play a role but requires further research and testing in the sustainable food consumption realm. Sampling of food, on the other hand, is a frequently applied in-store intervention also for more sustainable food choices, considered especially useful for increasing the familiarity of novel sustainable products, such as tofu and soya milk.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
Wise & Vennard [40]	Field experiment	• Framing the language	• Reducing meat consumption, increasing vegetables and fruits consumption	Retail cafe	'Comforting' and 'field-grown' food: The World Resource Institute (WRI) tested the impact of different language on meat-eaters' tendency to order vegetarian dishes. Experiential and indulgent language, such as 'mild and sweet' or 'comforting', as well as terms highlighting food provenance ('field-grown', 'garden') led to an increase in sales by up to 70%, while terms such as 'meat-free' were consistently unpopular.

From grey literature

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
BIT [1]	Study report	• Making it normal	• Reducing meat consumption	Restaurant, supermarket	*Integration in restaurants and supermarkets*: a study conducted by the WRI found that meat eaters are 56% less likely to order a plant-based dish if it's contained within a "vegetarian" box or section of a restaurant menu (Bacon et al., 2019). In other words, sales of plant-based dishes doubled when spread throughout the menu. Similarly, putting vegetarian sandwich fillings near meat options roughly doubled sales compared to having them in a separate 'vegetarian' section of the shop
Ecobeneficios [47]	Field experiment	• Changing the physical environment	• Reducing food waste	Restaurants	*The conscious plate*: Reducing plate size by 20% in Ecobeneficios network restaurants led to a reduction of food waste by 50%
Gilbert, H. [44]	Field experiment	• Framing the language	• Increasing vegetables and fruits consumption	Supermarket	*Selling the imperfect:* In the supermarket chain Asda, in the UK, carrots with cosmetic defects increased shelf share from 10 to 40% between 2015 and 2017 when known as 'wonky carrots'. In this period, more than 1,000 tonnes of wonky carrots were saved from going to waste.
OECD (pg. 137) [11]	Field experiment	• Simplifying information • Framing the language	• Increasing familiarity with more sustainable food products	Milan Expo 2015 Supermarket of the future	*Price and quality versus sustainability information*: Price, nutritional value and origin of raw materials were more important to consumers than sustainability information.
OECD (pg. 141) [11]	Field experiment	• Simplifying information • Framing the language	• Reducing food waste	Lab, Milan Expo 2015	*Connecting best-before date and food waste:* Before the 'best–before' date the product is perceived as of higher quality and safety. After the 'best-before' date, the product will sell better without a printed date.
OECD (pg. 144) [11]	Field experiment	• Simplifying information • Framing the language	• Reducing food waste	Lab, Milan Expo 2015	*Playing with price and messages to sell the imperfect*: In practice, a moderate price reduction with a promotional message frame motivates consumers best to purchase imperfect foods. The higher the price reduction, the more willing consumers are to buy imperfect foods. However, if an authenticity message is provided more respondents (40%) will buy the imperfect foods with an only moderate price reduction, while 51% will do so with any 'anti-food-waste' message.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
OECD (pg. 240) [11]	Field experiment	• Changing the physical environment	• Increasing vegetables and fruits consumption	Supermarkets	*Convenient vegetables alongside minced meat:* By placing a healthy addition next to an easy dinner meat option, the sales of pre-cut vegetables increased by 61,3%. However, the sales of minced meat also rose by 32% per customer
OECD (pg. 243) [11]	Field experiment	• Changing the physical environment	• Increasing healthy food consumption	Airforce base Canteen	*Fruit at first sight*: Nudging techniques like displaying fruit at eye-level and having less healthy choices in a less prominent position were successful in increasing the frequency of healthy choices, with employees opting for water over soft drinks, for example, and fruit over cakes.
Strube & Nicolau [26]	Field experiment	• Making it normal • Changing the physical environment	• Reducing meat consumption	University canteens	*Quality and social norms*: The introduction of dynamic normative messaging and nudges led to an initial increase in sales of vegetarian dishes, but this decreased after some weeks. However, better-quality vegetarian choices increased sales of vegetarian dishes.
INHERIT [79]	Field experiment	• Changing the physical environment • Simplifying information • Framing the language	• Reducing meat consumption	Food stores	*Mix it*: A combination of colourful footsteps on the floor, leading to the more sustainable choice, product replacement of carrots/beans adjacent to minced meat refrigerator/taco shelf and information signs in the decision-making environment saying: "supplement your spaghetti Bolognese/tacos with carrots/beans and your food will last for more people – better for your health, animals and the planet" significantly increased the consumption of carrots and beans in 26 Swedish food stores.
Hansen et al. [80]	Field experiment	• Changing the physical environment	• Reducing food waste	Danish Opera House Canteen	*Smaller plates – less waste*: Reducing plate size at a buffet lunch in the Danish Opera House led to 25.8% less food being wasted
Dayan & Bar-Hillel [81]	Field experiment	• Changing the physical environment	• Increasing healthy food consumption	Lab at University	*Designing menus for change*: Items placed at the beginning or the end of the list of their category options were up to twice as popular as when they were placed in the centre of the list
TEN [46]	Field experiment	• Changing the physical environment	• Increasing healthy food consumption	Danish Opera House Canteen	*Designed for healthy choices*: Changing buffet design from full sized brownies in front and whole apples at the back, to sliced apples in front and half sized brownies at the back, led to an 84% average increase in apple consumption and a 30% decrease in brownie consumption.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
TEN [82]	Field experiment	• Framing the language • Changing the physical environment • Making it normal	• Increasing familiarity with more sustainable food products	University canteen	*Make it sound and look attractive*: Adding an attractive adjective in the (environmentally sound) dish description on the menu, increasing its visual attractiveness in the display; mentioning its limited availability increased the share of the environmentally best scoring dish in the canteen by 5.5 percentage points (13.5% - 19%) compared to the control.
TEN [83]	Field experiment	• Changing the physical environment • Using favourable external stimuli (priming) • Simplifying information • Framing the language	• Increasing vegetables and fruits consumption	Supermarkets	*Placing for seasonality*: Placing seasonal vegetables and fruits together on the central shelves and adding shape mimicry posters and signs increased cabbage sales by 25% and chicory and parsnip sales by 29%, and resulted in a 19% increase in apple sales. Additionally, meal suggestion signs increased the sales of celeriac by 27%. Consumers did not buy more vegetables and fruits, but shifted towards more seasonal products.
TEN [50]	Field experiment	• Changing the default option	• Reducing food waste	Restaurant	*Takeaway bags:* In a pizzeria, by making 'doggy bags' for unfinished food the default option, customer demand for this service increased by 44% two weeks into the experiment.
TEN [84]	Field experiment	• Changing the physical environment	• Reducing meat consumption	Supermarket	*Placing for side effects*: By placing the vegetarian alternative (e.g. chicken curry spread vs. curry spread) on the left of and right next to the meat-based counterpart at eye level on the shelf nearly doubled sales of vegetarian products. However, an increase in sales of the meat-based products could also be observed (+30%). This increase could be derived from the better positioning of the product or the general rise in attention for the product (be it meat or vegetarian) after tasting.
TEN [85]	Field experiment	• Changing the physical environment • Using favourable external stimuli (priming) • Framing the language	• Increasing familiarity with more sustainable food products	Company canteen	*Combining tools to increase sales of the environmentally sound dish in a Belgian canteen*: Framing the printed menu (making it sound attractive), increasing the visual attractiveness (displayed on a wooden plate beside a bottle of oil and fresh ingredients), applying the scarcity principle ('limited availability', 'new taste') increased the share of the environmentally best scoring dish in the canteen by 5% (from 29% to 34%) of compared to the control.

Source	Type of publication	Tool / approach applied	Targeted behaviour	Place / context	Impacts achieved / Findings
TEN [86]	Field experiment	• Changing the physical environment	• Reducing meat consumption	Supermarket	*Decreasing packaging sizes to reduce meat consumption*: Making smaller portions (e.g. singe sausages) available in a retail store is highly effective in stimulating healthier and more sustainable food choices. While the number of sausages sold remained the same, 18% less meat (in grams) was sold.

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