Envirofy your Shop: Development of a Real-time Tool to Support Eco-friendly Food Purchases Online

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ABSTRACT

A third of global greenhouse gas (GHG) emissions are attributable to the food sector, however dietary change could reduce this by 49%. Many people intend to make eco-friendly food choices, but fail to do so at the point-of-purchase. Educating consumers on the environmental impact of their choices during their shop may be a powerful approach to tackling climate change. This paper presents the theory- and evidence-based development of Envirofy: the first eco-friendly e-commerce grocery tool for real shoppers. We share how we used the Behaviour Change Wheel (BCW) and multidisciplinary evidence to maximise the likely effectiveness of Envirofy. We conclude with a discussion of how the HCI community can help to develop and evaluate real-time tools to close intention-behaviour gaps and ultimately reduce GHG emissions.

CCS CONCEPTS

• **Human-centered computing → Web-based interaction**; **Interface design prototyping**; **Collaborative and social computing devices**.

KEYWORDS

Sustainable HCI; grocery e-commerce; traffic light feedback; eco-friendly; browser extension; digital intervention; Behaviour Change Wheel;

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1 INTRODUCTION

The number one thing individuals can do to substantially lower greenhouse gas (GHG) emissions is to change their diet [62]. Consumers' food choices are responsible for 1/3 of a household's total environmental impact [16], yet the consumption of sustainable food remains low [67]. Some of the least sustainable food choices are even expected to increase. Meat consumption is predicted to have risen by 72% from 2000s to 2030 [55], and dairy production has more than doubled over the past 50 years to meet increasing consumer demands [66]. The eco-friendliness of foods also depends on their transportation method (with airfreight having the greatest environmental impact) [64], as well as the amount of plastic packaging required and extent to which it is recyclable [17]. If we continue to consume food (and drive production) in the same way we do now, the food sector could be responsible for up to 50% of all global emissions by 2050 [78].

Interestingly, many people do intend to buy environmentally friendly food [92]. Yet, when it comes to the point-of-purchase, their behaviour often does not align with these intentions (known as the "intention behaviour gap" [93]). Even when motivated to make sustainable food choices, the items in shoppers' basket amount to a much higher CO_2 value than what is feasible for the planet long-term [62].

Eco-feedback is a promising means of providing education tailored to users' own context and choices [23, 69, 79]. HCI researchers have largely focused on providing eco-feedback on household energy [40, 60, 99] and water use [24]. When applied to food consumption, these have addressed only one dimension of their environmental impact (e.g. food waste [47], or organic foods [101]) and not the complexity of a food product's overall environmental impact. Further, such interventions have yet to take advantage of real-time delivery in context. Zapico *et al.* [101] for example, developed an eco-feedback dashboard on organic food consumption, for use after products had already been purchased, using receipts as data sources. "Just-in-time" [81], "point-of-purchase" [48], and context-based interventions when food shopping [5] can boost the chances of the shopper performing the desired behaviour when it matters most, but have so far been limited to nutrition. Such approaches may be key to addressing the intention behaviour gap in purchasing low impact foods.

Our research focuses on the design space at the point-of-purchase; when food shopping online. Online shopping is increasing rapidly [13, 90]. Although more environmentally friendly than in-person (due to low transport) [18], there are opportunities to make this increasingly-used medium even more sustainable. Supermarket websites can support real-time interventions; however it is essential that these are theory- and evidence-based to maximise the likelihood they will be effective [11]. Of the few behavioural interventions that have been designed and developed to support sustainable food choices to date, most have lacked a basis in behaviour change theory [34].

This paper outlines the multidisciplinary development of Envirofy, the first real-time web-based tool targeting sustainable food shopping behaviour. We describe how Envirofy was developed

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using both behaviour change theory (Behaviour Change Wheel, BCW) [53] and multidisciplinary evidence. By reporting how specific behaviour change techniques (BCTs) were translated and "operationalised" within Envirofy's algorithm and interface, we contribute concrete examples that HCI researchers can draw upon to ensure much-needed future developments in this area are theory-based and likely to be effective. "Early and often" sharing is crucial to promote agile and responsive research [36] that keeps pace with, and takes advantage of, the latest technology [35].

2 THEORETICAL DEVELOPMENT USING THE BEHAVIOUR CHANGE WHEEL

2.1 Steps 1-3. Defining, Selecting, and Specifying the Problem Behaviour

The first steps of the BCW focus on understanding the problem; in this case environmentally damaging food consumption. Stating the problem in behavioural terms helps to define the target of the intervention [53]. This involves considering first all relevant behaviours by relevant groups (step 1); selecting from these to identify a single target behaviour (step 2); and specifying that behaviour as thoroughly and precisely as possible, using pre-specified prompts provided by the BCW (step 3). The final behaviour is specified in Table 1.

BCW question	Specification
Who needs to perform the behaviour?	Individuals who purchase food from supermarkets online.
What do they need to do differently?	Select and purchase the most sustainable option from a range of available food products.
When do they need to do it?	When they are choosing food items, at the point-of-purchase.
Where do they need to do it?	On supermarket websites, using their device, in locations with internet access.
How often do they need to do it?	Every time they visit the online supermarket website.
With whom do they need to do it?	Alone or with members of the same household.

Table 1: Specification of the behaviour targeted by Envirofy

2.2 Step 4. What Needs to Change: Why are People Not Making Environmentally Friendly Food Choices?

A core step of the BCW is to identify barriers that are currently stopping individuals from doing the specified behaviour. This helps to understand what problems the intervention should solve and how it should work. A narrative literature review was conducted to identify various barriers to purchasing environmentally friendly foods. APEASE criteria [53] were then systematically applied to each barrier to judge whether it was likely to be Affordable; Practical; Effective/cost-effective; Acceptable to users; and Equitable, to target within an online shopping environment. The resulting barriers targeted by Envirofy are reported in Table 2, column 1. The BCW provides multiple theoretical tools to interpret and synthesise barriers: (i) COM-B was used to first understand whether, broadly, barriers related to individuals' "Capability", "Opportunity", and/or "Motivation" to engage in a Behaviour (eco-friendly food shopping) (Table 2, column 2) (ii) The Theoretical Domains Framework (TDF) [52] was then used to describe these barriers in more theoretical detail (Table 2, column 3). In summary, Envirofy targets barriers relating to individual shoppers': knowledge and skills in choosing environmentally friendly foods (i.e. psychological capability); exposure to environmentally friendly foods and opportunity to access these (i.e. physical opportunity); and beliefs relating to "perceived consumer effectiveness" i.e. whether their choices will make an environmental impact (i.e. "reflective motivation").

2.3 Steps 5-8. What Kind of Intervention?: Intervention Functions, Policy Categories, BCTs and Delivery Modes

The BCW provides theoretical links between the barriers identified, and the kinds of interventions that are likely to be effective in addressing them. Following this process, Envirofy was designed to target the barriers identified (see step 4) through Education (to improve knowledge on the environmental impact of food choices), Training (to improve skills in selecting products according to environmental labels), Environmental Re-structuring (to improve exposure to and accessibility of environmentally friendly products), and Persuasion (to target beliefs on perceived consumer effectiveness). The delivery mode (i.e. "digital") and policy ("service provision") were decided in advance. To decide which specific behaviour change techniques ("BCTs") to embed in this digital tool we again applied APEASE criteria and consulted the multidisciplinary evidence base, including HCI literature, on ways these had been operationalised. The final BCTs and related evidence are reported for each component in Section 4.

3 ALGORITHMIC DEVELOPMENT

3.1 Apparatus

One of the main advantages a browser extension provides is that users can interact with the current version of the website. This provides a realistic experience rather than directing users to a simulated website which 1) lacks the polished look and feel of the original website, 2) lacks the vast amount of content the real site provides, or 3) is an in-lab study and lacks real-world fidelity [2]. Browser extensions can be easily installed by the end-user, and content can be injected into existing websites to provide information on top of the natural environment.

Envirofy is optimised for the Chromium browser, covering 85.6% of internet users in the UK [71]. Envirofy was developed in Javascript. Data collection server was written in Python 3.8.5, and ran on an Ubuntu 18 server in the School of Computing Science at the University of Glasgow. Source code is available on Open Science Framework (Link: https://osf.io/hm9gv/).

3.2 Algorithm

Envirofy crawls the detail pages for all products on the current page and extracts *Ingredients*, *Produce Of*, and *Recycling* information (Figure 1) to calculate the total environmental impact (TEI). TEI is the function of the CO_2 costs which occurred during food production (FP), the packaging life cycle (P), and transport (T): TEI = FP + P + T (based on [98]). As a consumer's food waste cannot be

Barriers identified in literature	Broad COM-B category	Detailed theoretical description (TDF)
Limited awareness of the association between food choices and environment [46]. Limited factual knowledge about impact of specific food types [49]. Limited skills and understanding of eco labels [83, 86].	Capability (psychological)	Behavioural regulation (i.e. monitoring food choices in relation to their environmental impact) Knowledge (i.e. of the environmental impact of food groups and individual products) Cognitive and interpersonal skills (I.e. in understanding and using environmental information)
Perceived lack of time [9, 14, 59, 63, 72] to use environmental information and limited availability of eco-friendly foods [4, 56, 100].	Opportunity (physical)	Environmental Context and Resources
Belief that actions will not have an impact (Perceived Consumer Effectiveness, PCE) [31, 49, 57].	Motivation (reflective)	Beliefs about consequences Beliefs about capabilities

Table 2: Selected barriers Envirofy targets towards purchasing environmentally friendly foods

determined at the point-of-purchase, it is neglected in the equation. The TEI is calculated for 100 grams of the product.

3.2.1 Food Production (FP). The CO_2 cost of food production (e.g. environmental impact of growing food) is determined by the ingredients list. On the example of "Sharwoods Green Label Mango Chutney 227G" [82] the ingredients list reads "Sugar, Mangoes (45%), Salt, Acid (Citric Acid), Spices". The mean CO_2 value for each ingredient is extracted from [3, 62] (CO_2 is used as the measure of environmental impact as all publicly available databases provide these data, in contrast to GHG data). As the distribution of ingredients beyond the 45% mango is not clearly stated, an exponential decay function is applied to determine the composition of the remaining 55%: $y = a(1-b) * x$; x is the number of remaining items in the list, $(1-b)$ is the decay factor, and a is the remaining percentage (e.g. 55%), and y the amount it contributes to the overall product. Items leading the ingredients list contribute greater towards the final product. If no ingredients list was provided on the product page, the algorithm used the words in the title as a 100% component (e.g. mango from "Tesco Giant Mango Each").

3.2.2 Packaging (P). The P value is a function of the plastic's life cycle [17], containing plastic production, recycling, and the waste handling of the packaging [73]. If a food item's packaging consists of recyclable and a non-recyclable components, the P value represents both life cycles. If the online retailer does not specify the type of plastic (e.g. polypropylene, polystyrene), the average life cycle cost for all plastic [25] is used. The computation of the P value is based on the assumption that all recyclable plastic will be recycled.

3.2.3 Transport (T). The T value is described as: $y = d * m * w$, where d is the distance travelled, m is the mode of transportation (e.g. lorry, plane), and w is the net weight of the product. From a product's detail page, the list of origin countries is extracted. If there is a single country of origin, the distance between the user and that country's coordinates is calculated in kilometres. Country coordinates are from [12]; and participants' coordinates are retrieved from the Tesco website, as it collects location data. If multiple countries are listed including the UK, it is first checked whether the product is in season in the UK [58]; if true, the UK is assumed to be the country of origin. If however, the product is not in season in the UK or from outside the UK, the average distance from the participant's location to the other countries is calculated.

Transport mode —lorry, train, ship, plane — is determined on the distance of the product from the consumer, and whether that product is perishable (e.g. avocados). Perishable foods are transported by train or plane, and non-perishable and frozen foods are transported by sea or lorry [21]. If a product originates in Europe, non-perishable foods are on average transported to the UK via lorries, and perishable foods via train; otherwise via ship or plane [64]. Keywords such as "perfectly ripe", "frozen", and "dried" help determine the mode of transport, as well as categorisation of products into "fresh" or "cupboard". The net weight of a product is extracted from its detail page.

4 TECHNIQUES AND THEIR DESIGN WITHIN THE ENVIROFY INTERFACE

In this section we describe the main components of Envirofy, including the BCTs and intervention functions they support, and multidisciplinary evidence used to inform their design. The final designs or "operationalisations" of BCTs within Envirofy were refined using think aloud methods (n=11, 6 females, age 33.1 ± 14.5) (University of Glasgow Ethics Committee approval number 300190261).

4.1 Carbon Labelling and Traffic Light Colour Coding

BCTs: Information about social and environmental consequences; prompts/cues; conserve mental resources. *Main function:* Education.

Related Work. Carbon labelling encourages consumers towards environmentally friendly purchases [45, 95], through increasing knowledge about food product sustainability [6]. The effectiveness of carbon labelling increases if the item's environmental footprint is explained through its components (i.e. production, transport, and packaging) [28], as more information increases consumers confidence in their decision [75]. Presenting the environmental impact relative to other products, rather than stand alone, allows for comparison between products, which is preferred [32, 74]. Research has shown that the use of traffic light colours is effective in communicating a product's environmental performance [29, 88], particularly if combined with carbon labels and especially with environmentally concerned consumers [85].

Envirofy. Four traffic light colour coded labels are displayed under each product - globe (TEI), factory (Food Production), vehicle (Transport), and recycling (Packaging) (Figure 1) - allowing for high level information at a single glance [28]. The display of these four pieces of information encourage consumers to actively compare the environmental performance of products [74]. The threshold values for the traffic light colours are based on [6]. If information for a product's FP, T, or P calculations lacked, the corresponding icons

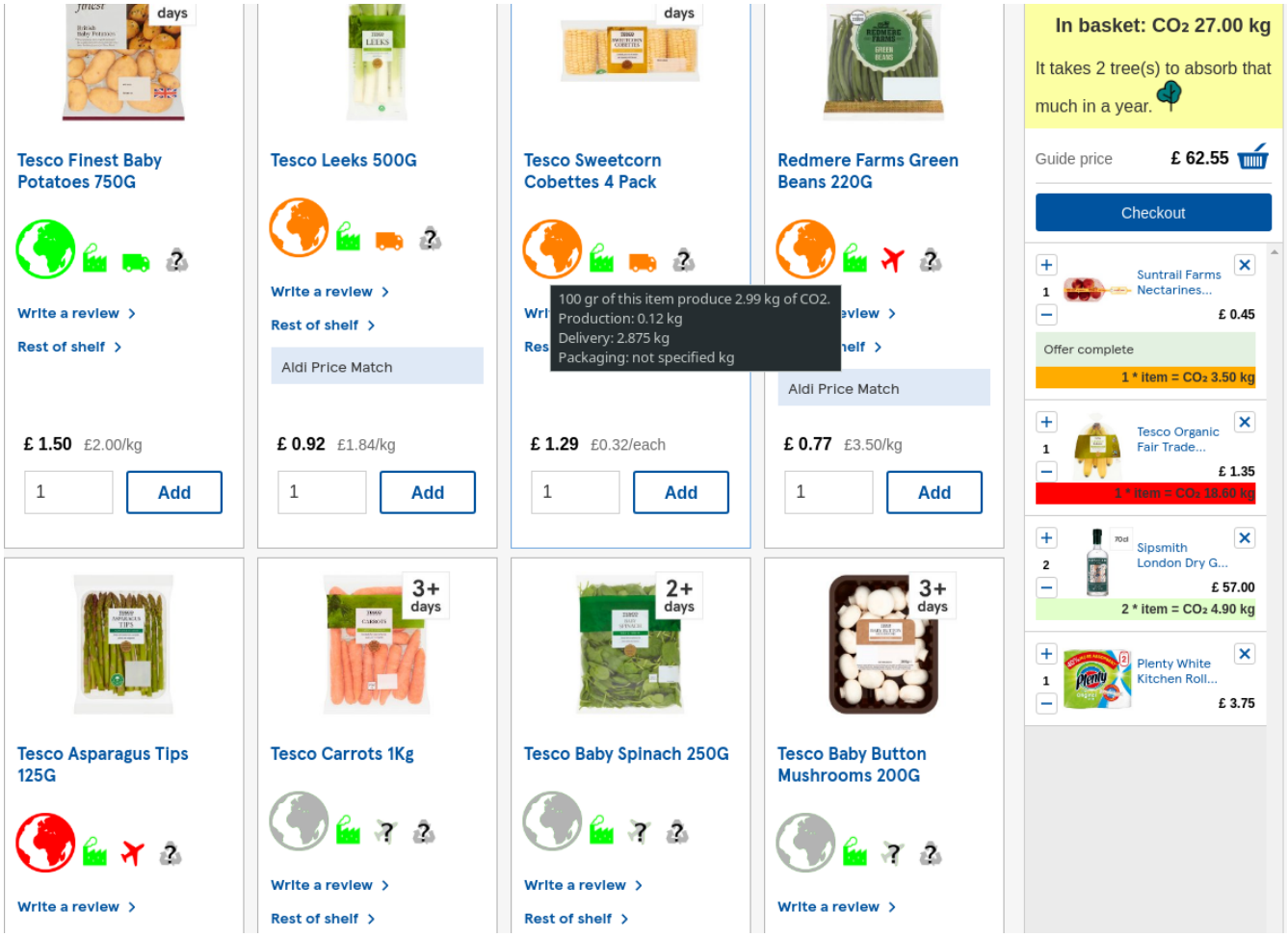

Figure 1: Envirofy's interface for Tesco PLC [65]. The query word was "fresh vegetables", date 16/07/2020.

were displayed in grey with a superposed question mark (Figure 1). If products lacked data for FP or T, their globe was coded grey. Items in the basket were coloured according to the item's total environmental performance.

4.2 Ordering Products by Environmental Impact

BCTs: Prompts/cues; restructuring physical environment; conserving mental resources. *Main function:* Environmental Restructuring.

Related Work. Consumer choices can be governed by the choice environment [45], and rearranging this environment can engage with consumer's automatic and impulse-driven decision making [15]. This approach helps consumers to make better choices without appealing to reason or forcing certain choices upon them [38]. Shelf arrangement (i.e. accessibility; target foods on higher shelves versus lower shelves) and assortment structure (i.e. availability: offering an assortment of target foods) [89] can be successful in impacting food choices [91]. The essence of such 'nudging' approaches is to change environments in such a way that the better choice becomes a more convenient, attractive, or normal choice [96].

Envirofy. The TEI of a food item determines the display order on the current web page. Items with small TEIs are presented at the top of the page (green globes), and items with increasingly higher impacts are lower on the page (orange or red globes). Items with inconclusive TEIs (grey globes) are appended to the end of the page, penalising the lack of environmental information.

4.3 Running Total and Presentation of Carbon Footprint Information

BCTs: self-monitoring of outcomes of behaviour; feedback on outcome of behaviour; information about social and environmental consequences; salience of consequences. *Main functions:* Knowledge, Training, Persuasion.

Related Work. Supplying consumers with consumption feedback in (near) real-time can change environmental behaviours [94], conditional on a person's environmental attitude [37]. Many consumers,

however, may not understand or fully appreciate raw carbon footprint information, which can impact its interpretation and application [97]. Information format can influence interpretation; presenting tree equivalents (i.e. the number of trees required to offset a CO_2 value) can help people to visualise and provide context to the abstract CO_2 value [97].

Envirofy. Real-time feedback on the overall impact of the items currently in the user's basket are displayed. This includes the CO_2 value and the number of trees that would need to be planted to offset the current shop.

4.4 Motivational Prompts and Perceived Consumer Effectiveness

BCTs: Credible source; information about social and environmental consequences; information about emotional consequences; verbal persuasion about capability; salience of consequences. *Main function:* Persuasion.

Related Work. Motivational messages, cues, and prompts can increase a consumer's perceived effectiveness, and ultimately impact their purchase of sustainable foods [39]. Motivational messages have been shown to significantly increase perceived competence, engagement, and intentions to shop greener [26, 70, 77] if consumers have knowledge on climate change already [54]. In particular, delivering motivational messages within the context that the desired behaviour could be performed (i.e. shopping) can aid the consumer in adhering to their goals [51].

Envirofy. One of six messages (Appendix A) is displayed at the beginning of each shop via a pop-up box. The aim is to improve perceived consumer effectiveness through messages explaining the impact of a shop from reputable sources (e.g. The Guardian). The messages target specific emotions tied to sustainable consumer behaviour, such as pride and guilt [70], concern [54], where possible focus on gains as opposed to a sense of loss or sacrifice [26], as well as social rather than personal impacts of climate change [77].

4.5 Partial Information and Active Search

BCTs: Information about social and environmental consequences; prompts/cues. *Main functions:* Knowledge, Training.

Related Work. Making partial environmental performance information available to consumers encourages active search for a product's details [43]. This in return increases confidence in their knowledge and decision making and has a stronger impact on consumers' willingness to buy environmentally friendly items [8, 33].

Envirofy. A box with detailed environmental information is presented when a mouse hovers above a product. This includes the TEI per 100 grams of the product, and a decomposition of this value into FP, T, and P values (Figure 1). Thus, the hover box encourages the consumer to compare the products [74] via numerical TEI values. It also provides the consumer with information in a familiar format, since nutrition values (e.g. calories, carbohydrates, protein) are also presented per 100 grams. Finally, the numerical values in the hover box encourage the consumer to actively search [43] a product's detail page (e.g. country of origin).

5 DISCUSSION

This paper presents the first real-world tool that helps online grocery shoppers to reduce their dietary carbon footprint by presenting behavioural intervention techniques at the point-of-purchase.

We used BCW "APEASE" criteria (i.e. Affordability, Practicality/Feasibility, Effectiveness, Acceptability, Safety and Equity) [53] to make design decisions, which enabled us to systematically justify and record these. However, evidence (Section 4) to support criteria other than Effectiveness, such as real-world Practicality and Acceptability, was scarce. These criteria relied instead on our own design experience. Social and cultural identity was a significant barrier identified, but not targeted (Table 2), because other barriers were considered to be more Practical and Acceptable to address at the point-of-purchase. We believe that sustainable HCI researchers have a central role in pushing the boundaries of intervention development: targeting the most challenging barriers, innovating novel BCT designs, empirically evaluating these using APEASE criteria, and sharing them to contribute to an evidence base [36] that complements and advances environmental behaviour change theory.

In addition to theory, existing evidence, and our own experience, we consulted potential users using think aloud methods. However, this was only to refine BCT operationalisations (Section 4) once most BCW stages were complete. Showing users concrete operationalisations of BCTs provided us with useful feedback to further optimise Envirofy (e.g. more meaningful visual representation of a shop's carbon footprint such as "planets used") [97] and additional BCTs it could support (e.g. contextualising CO_2 values with a target CO_2 per person, i.e. goal setting [76]). It may be more challenging to explore potential users' APEASE-related perspectives within earlier stages of the BCW (e.g. the acceptability of abstract theoretical concepts such as "self-monitoring"), however co-design methods should be employed early [68] in any intervention development work.

Beyond front-end development, further algorithmic work is required, and underway, to reduce the carbon footprint of Envirofy itself. Currently, Envirofy crawls the detail pages for each product on the current page, and as users execute on average 30 queries per shop (based on our one-month-long pilot study, n=6, 5 females, age 31.6 ± 6.7), this can result in around 4.89 kilograms of CO_2 per shop. We aim to mitigate this by crawling all data once and storing CO_2 values on our server. This will result in just 0.204 kg CO_2 per shop. Thus, when deciding which intervention techniques to design and operationalise, the environmental footprint required (e.g. to provide real-time feedback) should be considered in addition to APEASE criteria.

Envirofy delivers intervention techniques, in real-time, within the context which purchase barriers operate (i.e. the intention-behaviour gap that occurs when shopping). Envirofy is also uniquely suited to a real-world evaluation in this context, to assess whether it actually changes shoppers' purchases and associated CO_2 values (i.e. closes the intention-behaviour gap). This will involve logging this data and randomising users to receive all or no components (Section 4). To further optimise Envirofy, we will also explore *who* it works for and *how* it changes behaviour [44], by collecting demographics known to influence eco-friendly food purchases (Appendix B), and

assessing Envirofy's direct impact on the barriers identified (e.g. on Knowledge and Perceived Consumer Effectiveness, Appendix C). Such real-world evaluations will need to consider the acceptability of collecting shopping data which is perceived as very personal [1]. Overall, the intention-behaviour gap is a widespread problem across several domains of sustainability beyond food choices [19]. The methodological approach and designs reported in this paper should be explored to improve sustainable shopping for a range of online products and marketplaces.

Envirofy supports individual-level behavioural changes, while providing the user with the freedom of choice. During BCW stages 1-3, other stakeholder behaviours were considered, including those of retailers and food producers. The concept of "spillover" (i.e. selecting behaviours that may positively impact others' behaviours) [53, 87], suggested that consumers choosing more sustainable foods may drive the market for retailers and food producers to sell and produce sustainable foods. Envirofy supports this by e.g. reordering food items according to their environmental impact, which may incentivise producers to optimise their ranking. Designing for other stakeholders in this space should be explored, however targeting consumers directly may be a relatively quick route to substantially reducing carbon emissions, and buy time needed for large-scale industrial changes, transitions to greener production and supply chains [62], and more eco-friendly policies [84].

6 CONCLUSION

To alter the substantial impact of our food choices on the planet, individuals are required to purchase more environmentally friendly food. Envirofy helps to address this requirement by presenting theory- and evidence-based behavioural intervention techniques, at the point-of-purchase, when online shopping. HCI researchers have an important role in designing, developing and evaluating novel behavioural interventions that target sustainable food choices, intention-behaviour gaps in other domains, and ultimately in reducing GHG emissions.

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A APPENDIX A

Prompt	Reputable Source
Avoiding meat and dairy is the 'single biggest way' to reduce your impact on earth. The biggest analysis to date reveals the huge footprint of livestock - it provides just 18% of calories but takes up 83% of farmland.	The Guardian [7]
Choosing to eat lower on the food chain by eating less meat can significantly lower your impact on the environment. Reports suggest the amount of corn and grain needed to support 1 cow could feed 10–15 people. People are making dietary choices to reflect their feelings towards these impacts.	The Life Impact [50]
Choosing products with less plastic packaging can be even greener than recycling. Recent research suggests only 9% of plastic has ever been recycled and plastic films are very difficult to recycle.	The Guardian [22]
If you buy as much as you can that's grown or produced locally, you can save a huge amount of energy on shipping and can feel proud about the local alternatives you have picked.	Wired [10]
There could be a 49% reduction in greenhouse gas emissions from food production if we all reduced our meat intake. Research showed that a plant-based diet is the most carbon light (creating 6.4 pounds CO_2 per day), while a diet heavy in meat is also the heaviest in carbon (15.8 pounds CO_2 per day).	Oxford University Library [62]
The best meats to cut down on are from sheep and cows; the animals that produce the most atmosphere-frying methane. If every family in the UK swapped out a red meat based meal for a plant-based alternative just once a week, the environmental impact would be equivalent to taking 16 million cars off the road.	Vox [61]

Table 3: Messages presented at the beginning of every shop.

B APPENDIX B

We will collect following demographics data: age, gender, level of education, employment status, income range (below / average / above UK income level for age group), living area (rural, city, suburban), number of adults in household, whether meals are home cooked, who the main cook is, who the main grocery shopper is, whether a specific diet is followed, reasons to follow that diet, and religious preferences.

C APPENDIX C

Subjective Knowledge (Strongly Agree - 5 ... Strongly Disagree - 1)	**Source**
In general, I feel I know a great deal about environmental issues and problems.	[41]
I have a great deal of knowledge about green products ((e.g. energy-saving products, environmentally friendly foods, eco-friendly house products).	[27]
I have a great deal of knowledge about environmentally friendly foods.	[27]
I consider myself an expert on environmentally friendly foods.	[27]
I generally know less than my friends about environmentally friendly foods.	[27]
Skills (Strongly Agree - 5 ... Strongly Disagree - 1)	
When grocery shopping I know how to judge the environmental impact of food items.	[20]
When grocery shopping I think I know enough about carbon footprints to feel pretty confident when I make a purchase.	[20]
When grocery shopping I find it easy to choose environmentally friendly foods.	[27]
When grocery shopping I can identify environmentally friendly foods.	[27]
When grocery shopping I cannot distinguish between environmentally friendly and harmful food products.	[80]
When grocery shopping I can find environmentally friendly foods among other foods.	[27]
When grocery shopping I am aware of environmentally friendly foods.	[27]
When grocery shopping I do know the difference between environmentally friendly foods and standard foods.	[27]
Beliefs about Consequences (Strongly Agree - 5 ... Strongly Disagree - 1)	
I believe my actions have an influence on global warming and climate change.	[30, 42]
My green consumption behaviour can have a positive impact on the environment.	[30, 42]
It is worthwhile for the individual consumer to do something about pollution.	[27]
When I buy products, I try to consider how my use of them will affect the environment.	[27]
Since one person can have an effect on pollution, it makes a difference what I do.	[27]
Objective Knowledge (True & False)	
Milk in plastic packaging is more harmful for the environment than milk in cardboard cartons.	[80]
Less energy is used for meat production that for the equivalent amount of vegetables.	[80]
Intention (Strongly Agree - 5 ... Strongly Disagree - 1)	
I am willing to consider switching to other brands for ecological reasons.	[57]
I will consider buying environmentally friendly foods because they are less polluting.	[57]
I plan to buy environmentally friendly foods in the next month.	[57]

Table 4: Questions to assess knowledge, beliefs, and intentions. Participants will fill in this questionnaire pre and post study.