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Citizen Engagement Activities: Applying Behaviour Change Techniques in Sustainable Clothing Consumption

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Abstract: The study explores the application of Behaviour Change Techniques (BCTs) in promoting sustainable clothing consumption. The fashion industry significantly impacts the environment, and despite consumer interest in sustainable options, adoption remains low, and a green gap persists. This research aims to identify effective methods to encourage sustainable behaviours. BCTs, a theoretical framework originally used in health contexts, are applied here to sustainable clothing consumption. Four citizen engagement activities were conducted, each incorporating different BCTs. Surveys were conducted before and after the activities to measure their effectiveness. The study found that certain BCTs (providing information on social and environmental consequences, education, and instructions on how to perform behaviours), significantly correlated with participants' intentions to adopt sustainable clothing consumption behaviours. These findings suggest that interventions combining impact awareness through information with action are most effective. The study highlights the potential of BCTs to guide and evaluate interventions aimed at reducing the green gap in sustainable clothing consumption.

Introduction

The fashion industry has proven alarming impacts on the environment and climate (Niinimäki et al., 2020). While planetary boundaries are being exceeded, it is urgent to find ways to reduce production and consumption (Garcia-Ortega et al., 2023). On the consumption side, although consumers express interest in sustainable offerings, they do not necessarily adopt them. Similarly, consumption levels are not decreasing. This phenomenon is conceptually known as the green gap (ElHaffar et al., 2020) and is present in sustainable fashion consumption (Park & Lin, 2020). Research provides little insight into the levers for reducing this gap. Therefore, the following question remains open: how can behaviours be changed, and action encouraged to prompt the adoption of a more sustainable fashion consumption, aimed at extending the use of clothing as much as possible? Using the theoretical framework of behaviour change techniques, this research brings insights through an exploratory study.

Literature Review and Theoretical Framework

Behaviour Change Techniques

To categorize methods aiming to change people's behaviour, Michie et al. (2013; 2015) introduced a comprehensive list of behaviour change techniques (BCTs). Interventions that use these BCTs can be defined as “behaviour change interventions”, “a coordinated set of activities designed to change specified behaviour patterns” (Michie et al., 2011, p.1). The original purpose of the BCTs has been in the field of health, however, the BCT taxonomy can be applied in other fields (Michie et al., 2013). Examples regarding sustainable consumption behaviours explored packaging, food, or energy (Addo et al., 2018; Allison et al., 2022; Graça et al., 2019). The context of this study is behaviour change interventions to make clothing consumption more sustainable through clothing use and disposal. Table 1 lists the relevant BCTs, as well as their definition.

BCT	Definition	Source
Shaping knowledge	Instructions on how to perform a behaviour, skills training	Michie et al., 2013; 2015
Behavioural rehearsal, practice	Practice and rehearse behaviour one or more times to increase skills	Michie et al., 2013; 2015
Education	Improving awareness or comprehension related to the target behaviour	Michie et al., 2011
Enablement	Create the opportunity to perform behaviour by minimising obstacles and providing resources	Michie et al., 2011
Information about social and environmental consequences	Provision of information (e.g. written, verbal, visual) about social and environmental consequences related to the target behaviour	Michie et al., 2013; 2015
Comparison of behaviour / Modelling of behaviour	Comparing own behaviour to a sample, to others' performance, receiving information about others' approval	Michie et al., 2013; 2015
Association - Exposure	Confrontation with a stimulus to encourage response resulting in target behaviour	Michie et al., 2013; 2015

Table 1. Behaviour Change Techniques used in this Study.

These BCTs were used to categorise and evaluate different interventions about sustainable clothing consumption. We assessed their effectiveness in encouraging consumers to perform the target behaviour, i.e. to reduce the green gap.

Citizen Engagement Activities as forms of intervention

This study focuses on citizen engagement activities (CEAs) as forms of behaviour change interventions. CEAs refer to in-person workshops or community events that engage citizens to interact on aspects of sustainable consumption. Previous research has shown that providing consumers with information does not necessarily lead to a change in action as consumers need to connect information and their own behaviours (Peattie, 2010). Furthermore, regarding sustainable behaviour, research has mainly focused on building theoretical models of interventions (Davoodian et al., 2014; Falcone & Fiorentino, 2024), with only few studies testing out the interventions in practice (Betzler & Kempen, 2024; May & Fearne, 2024). This study therefore focuses CEAs that actively engage citizens in the following target behaviour: to use and dispose clothing items in a more circular and sustainable way. In doing so, this research is a form of intervention research.

Methods

Four CEAs, each incorporating different BCTs, were identified and selected. First, a "Textile fresco" workshop (CEA1), where participants, guided by a facilitator, read and organized cards containing information about the fashion industry and its impacts, before discussing the topic and their consumption habits. Next, a clothing repair workshop (CEA2), where participants, guided by a facilitator, learned four repair techniques and applied these to their own garments. Then, a swapping event (CEA3), where participants, guided by a stylist, exchanged clothes they no longer wore. Finally, a visit to a sorting and recycling centre (CEA4), where participants, guided by the centre's manager, discovered the clothing sorting process, asked questions, and engaged in discussions. These four CEAs took place in France, in the Paris region in October and November 2024. Prior to the CEAs, interviews were held with the organizers of each CEA to identify the BCTs at play. For each CEA, table 2 presents the BCTs.

In order to test the effectiveness of the different BCTs for each CEA, a survey was conducted before the activity and right after the activity (Cozby & Bates, 2024). The participants could also leave their email address for a third follow-up survey three months after the activity. The target group of the survey were the participants that signed up for the different CEAs, following a purposive sampling method. The survey was translated from English to French to ensure the participants' understanding of the questions. The questions of the first survey (pre-activity) consisted of demographic questions, followed by Likert-style questions (Eichhorn, 2022) about their awareness of the impact of the textile industry and their sustainable values.

BCTs	CEA 1	CEA 2	CEA 3	CEA 4
Education	✓	✓		✓
Information on social and environmental consequences	✓			✓
Feedback on behaviour	✓	✓		
Behavioural rehearsal/practice		✓		
Comparison of behaviour/Social Comparison/Modelling		✓	✓	
Instructions on how to perform the behaviour		✓		✓
Enablement		✓	✓	
Association – Exposure				✓

Table 2. Behaviour Change Techniques identified in each CEA.

Participants then answered multiple-choice questions about their current use and disposal behaviour of textiles. The questions of the second survey (post-activity) were focused on identifying the effectiveness of each BCT used in the respective CEA, as well as identifying the participants intention to perform the target behaviour of each CEA, through Likert-style and single-choice questions. Participants also had the opportunity to specify their answers through a comment field. Due to the timeline, the third survey has not contributed to the results of this paper.

The responses were analysed using quantitative methods, through SPSS. Descriptive statistical tests were used to get an overview of participants' knowledge and behaviour prior to the activity. To test the relation between the individual BCTs and the intention to perform the target behaviour, Spearman's rank correlation for non-parametric tests was used, due to the small sample size (Agresti, 2018).

Results

The following section presents the results of the correlation analysis (see Table 4 in the appendix), supported by descriptive results (see Table 5 in the appendix). Sociodemographic characteristics of participants of all CEAs can be found in Table 3 in the appendix.

CEA1 – Textile Fresco

Activity 1 had a total of 7 active participants, out of which 6 responded to the survey. Before the CEA, participants awareness of the textile industry's environmental impact was mainly neutral, and they were neutral or disagreed regarding considering sustainability when purchasing and disposing of clothing items.

The effectiveness of each BCT on the participants' intention to perform the target behaviour was measured using Spearman's correlation for non-parametric tests. Results show that *Education*, in this case, learning about new options of what to do with the clothes they do not wear anymore, does not correlate with the intention to perform the target behaviour (dispose or use clothing items in a more circular and sustainable way in the future). *Information* does strongly correlate with the intention to use and dispose clothing more sustainably and is statistically significant at the 0.01 level. For the BCT *Feedback on behaviour*, all participants responded that the information from the workshop offered them feedback on their current clothing disposal practices. Since there is no variation in the responses, the correlation with the intention to perform the target behaviour could not be tested. However, respondents specified their answers (open-ended question), mentioning that the workshop made them think about more circular solutions, reflect on their own consumption and what they can do as an individual, as well inspire them to create a responsible wardrobe through buying more second-hand or recycled items. These comments show a strong intention to consume more sustainably due to the feedback they received on their current consumption and disposal practices in the CEA.

CEA2 – Repair Workshop

Activity 2 had a total of 8 participants, out of which 7 responded to the survey.

Before the CEA, most participants stated that they were aware of the textile industry's environmental impact and agreed regarding considering sustainability when purchasing and disposing of clothing items. More than half of the participants stated that they have previously repaired clothes or gotten clothing repaired or altered.

Results show that *Education*, in this case, learning about new options of what to do with the clothes they do not wear anymore, correlates strongly (0,79) with the intention to perform the target behaviour, and is significant

at the 0.05 level. For *Behavioural rehearsal/practice* the correlation could not be tested, since all participants responded with "yes" to the question if practicing garment repair as part of the workshop encouraged them to repair garments, which shows their intention to perform the target behaviour in the future (see Table 5). The test of Spearman's correlation showed that the BCT *Feedback* is not significantly correlated to the intention to perform the target behaviour. *Comparison* did also not yield a statistically significant correlation with the intention to perform the target behaviour, however, 85% of respondents agreed that the provision of repair examples helped them compare their repair results with others and encouraged them to repair more in the future. A correlation between *Instructions on how to perform the behaviour* and the intention to perform it was not possible to test, since there was no variance in responses ("yes" only). This however shows that the instructions on how to perform the target behaviour were successful. *Enablement* can also not be tested for correlation, but all respondents agreed that the workshop enabled them to repair more of their clothes themselves, as well as that it helped to bring their own garments to learn how to best repair it. 85% of participants also said that they would not have repaired that garment if it was not in the context of the workshop, which shows that this workshop was successful in enabling repair behaviour (see Table 5).

CEA3 – Swapping Event

Activity 3 only had one survey that participants filled out during the event. A total of 11 people answered the survey. Participants showed previous awareness of the impact of the textile industry, while on average neither disagreeing or agreeing with considering sustainable values with buying or disposing of clothing. None of the participants had attended a similar clothing swap event previously, but all of them plan on attending one in the future.

Comparison of behaviour/social comparison/modelling in this case describes the context of the event, by comparing your own swapping behaviour to others, receiving information about others' swaps or others approval of your clothes, as well including a circular fashion stylist in the event to help style swapped items. This BCT did not show a statistically significant correlation with the intention to perform the target behaviour (see Table 4), but on average the respondents agreed that the context of the activity encouraged them to take part in more circular and sustainable clothing consumption practices in the future. *Enablement* was represented in the survey by an open question on what participants would have done with the clothes if they would not have swapped them in this event. Most of the participants would have sold the items on second-hand platforms or donated them.

CEA4 – Sorting and Recycling Centre Visit

9 participants attended the visit to the sorting and recycling centre. They already showed awareness of the textile industry's impact before the activity, while being neutral about considering sustainability when purchasing new textile items. However, they were positively considering sustainability when disposing of textile items. When asked how they usually dispose of still usable textile items, the majority mentioned giving (family, friends) or donating (charities, second-hand stores), followed by selling them. Participants were most likely to dispose their non-usable textile waste in the textile waste collection bins.

The target behaviour in this activity was to dispose or use clothing items in a circular and sustainable way. On average participants agreed that the CEA motivated them to do so in the future. The BCT *Instructions on how to perform the behaviour* was displayed by three different questions. The first focused on participants learning what to do with clothes they do not wear anymore. This question correlated strongly with the intention to perform the target behaviour with a significance at the 0.01 level. The second question was focused on learning about how to dispose unusable textile waste properly and the third on learning how to consume and dispose clothing in a more sustainable way in general. Both did not significantly correlate with the participants intention to perform the target behaviour. *Education*, in this case by learning about what happens with the disposed textiles, did not correlate with statistical significance with the intention to perform the target behaviour. Information on social and environmental consequences did not significantly correlate neither. The BCT *Association – Exposure* was an open question in the survey. Participants were asked what stuck in their head after the visit. Responses like "the % of clothing intended for export", "quantity", or "only 10% of recovered textiles goes back to second-hand stores" shows that the exposure to the sorting

process and the amount of textile waste has an impact on people, which could lead to change in actions.

Discussion

The results of this exploratory study based on four different CEA highlight that certain BCTs are particularly effective in encouraging more sustainable clothing consumption behaviours. The most effective CEAs were the repair workshop and the Textile Fresco. These small group, in-person workshops with group interactions allowed participants to learn something new in a community setting while actively taking parts in it. The BCTs that showed a significant correlation with the intention to perform the target behaviour are information on social and environmental consequences, education, and instructions on how to perform the behaviour. These results suggest that interventions are most effective when consumers can combine impact awareness with the information provided and their own actions. The importance of that combination was already pointed out in the Design for Sustainable Behaviour framework (Bhamra et al., 2011).

Applying the theory of BCTs in the context of sustainable clothing consumption shows that BCTs can have a dual role: guiding the design of interventions beforehand and evaluating them afterwards on their contribution to green gap reduction. This contributes to the literature on sustainable behaviours in general and sustainable clothing consumption in particular by introducing and testing out a specific intervention model in practice. Instead of proposing a new theoretical model of interventions, we introduce BCTs (Michie et al., 2013; 2015), a model effective regarding health behaviours and already proposed to be applied in other fields (Michie et al., 2013). Furthermore, we evaluated its efficiency regarding the green gap empirically – which most other research on the topic does not do. Finally, introducing BCTs in the context of sustainable clothing consumption also has managerial contributions, as well as for policymakers. Indeed, it offers a framework to create effective CEA as well as an evaluation tool for companies wishing to raise their consumers awareness, or in the context of national or international public campaigns.

However, this research is not without limitations. The number of participants is not sufficient to generalize the findings of this exploratory research. However, the small in-person groups CEAs encouraged interactions between participants and close connections with the facilitators, making the workshops more impactful. A third survey evaluation is also still necessary to measure the impact of the CEAS through the actions and behaviours changes of participants after a certain amount of time – currently, it is only possible to draw conclusions about their intentions to perform the target behaviour. This third survey is in progress.

Conclusions

The study introduces Behaviour Change Techniques (BCTs) to promote sustainable clothing consumption and reduce the green gap. Through an exploratory study based on citizen engagement activities and surveys before and after each activity, it highlights the efficiency of three BCTs: providing information on social and environmental consequences, education, and instructions on how to perform behaviours. The study demonstrates how BCTs can effectively help construct and assess interventions designed to close the green gap in sustainable clothing consumption.

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Appendix

Variable		CEA1 (N=6)	CEA2 (N=7)	CEA3 (N=11)	CEA4 (N=9)
Gender	Female	4 (67%)	7 (100%)	9 (82%)	8 (89%)
	Male	2 (33%)	-	2 (18%)	1 (11%)
	Other	-	-	-	-
Age	18-24	2 (33%)	4 (57%)	6 (55%)	3 (33%)
	25-34	1 (17%)	3 (43%)	4 (36%)	2 (22%)
	35-44	3 (50%)	-	-	3 (33%)
	45-54	-	-	1 (9%)	-
	55-64	-	-	-	1 (12%)
	65+	-	-	-	-
Living location	Rural area (>5.000)	-	-	-	-
	Town (5.000-50.000)	1 (17%)	-	-	3 (33%)
	City (>50.000)	5 (83%)	7 (100%)	11 (100%)	6 (67%)

Table 3. Sociodemographic characteristics of sample.

Independent variable (BCT)	CEA 1 (ρ)	p-value	CEA 2 (ρ)	p-value	CEA 3 (ρ)	p-value	CEA 4 (ρ)	p-value
Education	0.000	1	0.794	0.03	-	-	0.221	0.6
Information on social and environmental consequences	1.000	0.01	-	-	-	-	0.332	0.422
Feedback	-	-	0.227	0.63	-	-	-	-
Comparison of behaviour	-	-	-0.642	0.12	-	-	-	-
Instructions on how to perform the behaviour	-	-	-	-	-	-	0.891; 0.617; -0.034	0.003; 0.103; 0.937
Social comparison /Modelling	-	-	-	-	0.382	0.25	-	-

Table 4. Correlation analysis results of BCTs to intention to perform target behaviour.

Independent variable (BCT)	CEA1	CEA2	CEA3	CEA4
Behavioural rehearsal/practice	-	Effective	-	-
Enablement	-	Successfully implemented	Implemented	-
Association - Exposure	-	-	-	Successfully implemented

Table 5. Effectiveness of BCTs to intention to perform target behaviour (descriptive analysis).