

## Barriers to the continued usage of alternatives for single-use plastics by students in student housing

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**Keywords:** single-use plastics; sustainable behaviour; consumer perception; usage barriers.

**Abstract:** Following the ban on multiple single-use plastics approved by the European Parliament in 2019, effective alternatives will be necessary by 2021. Unfortunately, already existing alternatives are not always used in a sustainable manner. This study is a first attempt to seek answers to the following questions: (i) What thresholds prevent the (continued) usage of alternatives for single-use plastics? (ii) How do different types of ecological users perceive these thresholds, and (iii) what are the differences between these groups? (iv) What is the relation between the perceived level of behaviour change and the type of sustainable intervention in the lifecycle of these products? Several existing alternatives were discussed during three focus group sessions (n=5). Part of these products were selected from the Ubuntoo platform, which collects the newest innovative solutions against plastic pollution. This way, both common (e.g. reusable drinking bottles) and less common (e.g. refillable coffee pads) products were investigated. Participants were clustered according to their ecological lifestyle and use of reusable products into three explorative focus groups: Eco 1 (least ecological), Eco 2, and Eco 3 (most ecological). The target group consisted of Belgian students who live in student accommodations. The key result of the study indicated that the main thresholds are caused by a change of environment, the cost of the product, personal preference and the practical aspect of the use of the alternative compared to its single-use item, although it is important to note that these results are preliminary. These thresholds could be further examined in the future by testing real-life solutions in the long term, with different target groups.

### Introduction

Plastics form the main source of litter found in oceans and inland waters (Essel et al., 2015). Mass production of plastics started in the 1950s (UNEP, 2016), and in 2015, up to 322 million tons of plastic were produced worldwide (Beckman, 2015). In particular, single-use plastics are a cause for concern since they are disposed of very quickly (Moore, 2008). To tackle this problem, the European Union decided on a ban and in some cases tax on plastic bag sales (European Commission, 2018). Since the ban was put into practice, the usage has been reduced by two thirds (Zhu, 2011). Paying for plastic bags that were previously free of charge motivates customers to bring reusable bags (Muralidharan & Sheehan, 2016). In 2019, the European Parliament approved a new law banning multiple other single-use plastics such as single-use plastic cutlery, plastic plates, plastic straws, etc. (European parliament, 2019). However, based on several lifecycle assessment studies (Ayres, 1995), it is known

that a reusable cotton bag has a much higher environmental impact compared to a single-use low-density polyethylene (LDPE) bag. To compensate for this higher environmental impact, the cotton bag needs to be reused 52 times (Bisinella et al., 2018). To succeed in lowering the impact, it is not only necessary to persuade consumers to adopt sustainable alternatives for single-use plastics, but also to make them change their behaviour towards more sustainable patterns of use. Many recent studies on alternatives for single-use plastics have focussed on the adoption and purchase intention, rather than the actual (long-term) usage of the products. Studies applying the 'Theory of Planned Behaviour' (Ajzen, 1985) concluded that a positive correlation is found between intention and behaviour (Kumar & Bipul, 2012), suggesting that the intention to use an alternative for single-use plastics can be a predictor for actual usage. However, challenges arise when attempting to include habits and long-term, repeated behaviour change in explaining and predicting the

continued usage of alternatives for single-use plastics, since habit strength has a negative influence on peoples' willingness to change their behaviour (Jansson et al., 2010). The gap between environmental concern and the actual purchase and usage of sustainable products is called the 'Intention- Behaviour Gap' (Sheeran & Webb, 2016).

### *Aim of the research*

A substantial amount of research has been done on sustainable purchase and adoption of alternatives for single-use plastics and other pro-environmental products. However, the continued usage of alternatives for single-use plastics has not yet been widely investigated.

Regarding this longer-term usage and related behaviour, the following questions arise: What thresholds prevent the (continued) usage of alternatives for single-use plastics? How do different types of ecological users perceive these thresholds, and what are the differences between these groups? What is the relation between the perceived level of behaviour change and the type of sustainable intervention in the lifecycle of these products?

Students are an interesting target group to investigate within this research (Cuzdriorean et al., 2020; David Lee et al., 2016), as they are often early adopters regarding more ecological lifestyles and are less likely to be fixed by too much routine behaviour (Rogers, 2003).

### **Methods**

Three explorative focus group sessions have been conducted at the University of Antwerp to carry out formative qualitative research, as it allows open discussion between participants. By applying this method, we could gain insights into the participants' shared experiences and views on their use of alternatives for single-use plastics. Within the target group of students, the participants were limited to those who live in student accommodation during the week. Contrary to students who still live with their parents, they have more freedom to make their own decisions about their (ecological) way of living. The ages of the participants ranged between 18 and 25 years old. Posters put up on

the city campus of the University of Antwerp and social media posts were used to recruit participants for a short online questionnaire to determine their ecological mindset and current ecological behaviour. This short survey included a list of alternatives of single-use plastics. The respondents had to indicate which products they were already using. The list consisted of 7 products and there was an option to add extra products. If the respondents answered (less than) 1 item of this list, they were added to the eco 1 group. If they indicated more than 4 products, they were considered eco 3. The respondents that answered 2,3, or 4 products, were added to the eco 2 group. This division in groups is comparable to other research such as the five sustainable attitudes stages (McNeill & Moore, 2015), where stage 0 (incorporative) and 1 (impulsive) were merged into 'Eco 1', stage 2 (imperial) and 3 (interpersonal) into 'Eco 2', and stage 4 (institutional) was translated into 'Eco 3 (table 1).

Out of the 21 eligible participants of the questionnaire, three groups of five participants were selected and invited for the focus group sessions. The respondents did not necessarily need to have experience with all the products, since the focus groups were meant to explore their thoughts, empathy, and experience on and with the products. Single-use plastics were used as a reference point to discuss the alternatives. The discussions ran for 90 to 120 minutes and took place at the University of Antwerp, in November 2019 (pre-COVID19). From the participants selected for the third focus group (eco 3), two did not show up, resulting in a focus group session with only three participants. The sessions were audiotaped and transcribed afterwards. During the focus group sessions, the discussion was facilitated by a moderator. Next to the moderator, a timekeeper and notator were present. Based on the results of the different focus group sessions, a comparison could be done to answer RQ5 regarding the potential difference between different eco-lifestyles. The data was analysed mostly descriptive and coded by applying the grounded theory (Charmaz & Belgrave, 2015) to legitimize qualitative research.

<b>Eco 1</b>	Students are unfamiliar with or not motivated by the subject of ecological living and sustainable behaviour. They need concrete examples of environmental impact and they focus on impact and implications directly on themselves. Sustainable living is perceived as difficult, time-consuming, and not a priority. They believe individuals have no control over (un)sustainable production methods and that changing consumption patterns cannot have any significant impact on the environment.
<b>Eco 2</b>	Students are more familiar with and motivated by the subject of ecological living and sustainable behaviour. They can process abstract environmental concepts if presented to them. They are occasionally engaged in ecologic living and believe individuals have little control or influence on the environment by changing consumption patterns.
<b>Eco 3</b>	Students are engaged in ecologic living and try to live as sustainable as possible. They believe that the individual is responsible for transitioning from a linear to a circular economy. They do extra efforts and are willing to pay more to prevent pollution.

**Table 1. Descriptions of Eco 1, Eco 2, and Eco 3.**

### *Selection of alternatives*

To get a broad varying selection of different alternatives for single-use plastics, next to a list of common alternatives (e.g. reusable drinking bottle), the online platform 'Ubutoo' was used to collect more innovative products that are less well-known (e.g. reusable coffee pads) (Schelstraete & Kini, 2020). The Ubutoo platform was considered to be suitable as the platform is growing relatively fast and putting lots of effort into combining all products that support ending plastic pollution. Within the 821 solutions presented on the platform, only daily consumer goods were taken into consideration for this study. This focus was chosen because 64% of plastic products' end-users are households. (Giles & Bain, 2000). Since the remaining list of 42 product types was too large to discuss in detail during the focus groups, we decided to select products that are gender-neutral and within the life context of students, i.e. a menstrual cup was not selected. 17 products from the original 42 were discussed during the focus groups (table 2).

Reusable drinking bottle	Reusable take-out containers
Reusable food storage containers	Refillable coffee pods
Lunchbox	Concentrated cleaning products
Reusable shopping bags	Biodegradable take-away containers
Metal straws	Reusable cups for events
Metal tea filter	Refillable shampoo bottle
Shampoo/ soap bar	Compostable coffee pods
Bamboo toothbrush	Zero co: Eco-friendly alternatives for kitchen, laundry and bathroom
Toothpaste tablets	

**Table 2. List of selected alternatives.**

## **Results**

### *Causes of (un)successful adoption of alternatives for single-use plastics*

The first question asked in the focus groups was: What holds you back to adopt or try an alternative for single-use plastics? The answers to this question did not differ within but between focus groups. Eco 1 mentioned **practicality** as their main concern, followed by the **extra effort** needed, and the potential lack of **hygiene**. Two out of five respondents said that **cost** of alternatives is a factor that holds them back in trying alternatives as well as their **personal preference** for single-use items. Two people mentioned that they were not sure whether their effort has that much of a significant **impact**. The influence of the **social environment** (positive or negative) was mentioned as being a reason (not) to use alternatives. For Eco 2, **Cost** is a recurring reason not to adopt an alternative, as well as **extra effort**, followed by **practicality**. Eco 2 answered **personal preference** (e.g. 'my bottled shampoo is better than any bar shampoo I tried') as well. Two out of five mentioned this as a reason why they would not adopt an alternative. In Eco 3, one person gave **health and medical reasons** as clarification on why they feel held back in trying new alternatives because their partner deals with severe allergies. One participant stated that the only reason not to try an alternative would be the **lack of knowledge** thereof. Some mentioned their **personal preference** for a single-use item as a reason not to use an alternative.

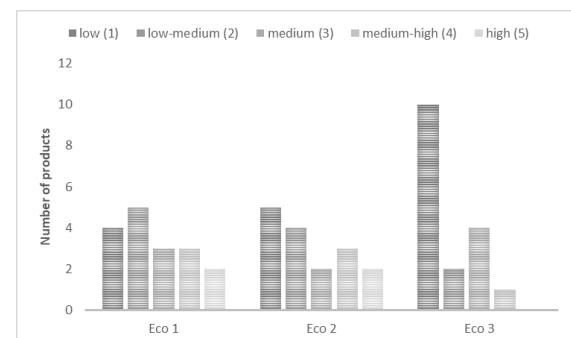
### *Reasons for giving up alternatives for single-use plastics*

The participants were asked whether they ever stopped using an alternative for single-use plastics. Most of the reasons given by the participants could be traced back to the same cause: **change of environment**, where their old patterns of use were broken and **new habits** would emerge. By moving from their parental home into student accommodation, participants suddenly had to do their own household chores. They experienced that **effort** is needed to maintain an ecological lifestyle. For example, a participant from Eco 1 buys sparkling water in plastic bottles because there is no room for a SodaStream in his room. A participant from Eco 2 does not use a SodaStream anymore because he would need to buy it for himself and it is too expensive. This led to a second observed reason to stop using alternatives: **cost of alternatives**. Next, the **practical aspect** of alternatives was another reason to stop using them. One participant stated that he does not drink sparkling water from glass bottles because they weigh too much. Therefore, he buys plastic bottles. Another participant mentioned that he does not use a lunchbox because it takes a lot of space in his backpack. In short, they stop using the alternative if they find it annoying or when it does not fit in their daily life or planning. Another reason to stop using alternatives was **personal preference**. The participants would start using an alternative, but along the way, they notice they do not like the product. As an example, a participant from Eco 3 explained she started using a shampoo bar. After using it a few times, she noticed that the formula would not work with her hair type. After testing alternative shampoo bars, she concluded that shampoo bars would not work for her, and gave up. In Eco 2, someone explained that she started buying bottled water because she did not like the tap water in her student accommodation. She later switched to a Brita-can to eliminate the problem and to avoid the usage of plastic bottles. Also, **hygiene** was mentioned, as some reusables are hard to clean. There were some slight differences between the three focus groups regarding the second research question. When participants from Eco 1 stopped using an alternative, they would not search for a better solution and only switch to another alternative if it was presented to them. This is in contrast to Eco 2, who put more effort into searching for a better solution for the alternative they stop using. When someone from Eco 3 stopped

using an alternative, he or she often tested out different alternatives. They would actively search for the best solution.

### *Evaluation of the perceived required behaviour change*

During the second part of the focus group, the participants had to collectively classify the selected 17 products in a matrix, with on the x-axis the required level (difficulty) of behaviour change (low, low-medium, medium, medium-high, high, and on the y-axis the type of sustainable intervention in the product lifecycle (reuse, material optimization, disposal). Every focus group classified each product in the same category on the y-axis, confirming their basic knowledge on the principle of product lifecycles. Differences were observed on the x-axis between Eco 1, Eco 2 and Eco 3, as can be seen in Figure 1. Participants in Eco 3 classified half of the products in the category 'low' and none in the category 'high'. They perceived the behaviour change as being less difficult. Eco 1 and Eco 2 both classified the products in the matrix more or less the same way. From the differences in classification between Eco 1, 2 and Eco 3, we can conclude that there is a gap in the perception of behaviour change between people with different levels of engagement in ecological living. Whoever is already engaged in ecological living and using most of the products, considers them as requiring less behaviour change since it matches their actual behaviour more.



**Figure 1. Classification of alternatives for single-use plastics according to their required behaviour change.**

### *Level of behaviour change in relation to type of impact*

Products focussing on reuse were spread along the line of the level of behaviour change, from some products requiring almost no behaviour

change (low behaviour change), to others being perceived as quite difficult and impactful on current patterns of use (high behaviour change). Products focusing on fewer materials/resources were often put in the middle spectrum of behaviour change: low-medium to medium-high. Products focussing on disposal were all considered to require no or very little behaviour change.

### Discussion and conclusion

The purpose of this study was to explore barriers that prevent a successful continued usage of alternatives for single-use plastics. There are **two main findings** to note from this study related to existing models and theories from behavioural psychology. People mostly stopped using products that **require significant behaviour change** and are considered as less practical, showing us the importance of habit strength, convenience, and situational factors. Another interesting finding is the **influence of a change of environment** in this specific target group. It can be considered as a situational factor, as well as a habitual influence: the students' habits completely change, which makes it more challenging to keep sustainable practices, but also offers opportunities for creating new habits. These results are consistent with the CADM model for behaviour change from Klöckner and Blöbaum (Klöckner & Blöbaum, 2010) and the Theory of Planned Behaviour (Ajzen, 1985), which offer potential for further investigations. In addition, other causes for unsuccessful adoption are the cost of the alternative and the practical aspect of the use of the alternative compared to its single-use item (convenience). Consumers already showing pro-environmental behaviour are more likely to consider the adoption and longer-term usage of new alternatives easier and require less behaviour change, but are also more likely to find points of improvements regarding their efforts for the environment. When designing reusable alternatives, hygiene and quality should be ensured to create product trust and consumer satisfaction.

Limitations of our exploratory study need to be acknowledged, most notably the relatively small sample (5 students in each focus group). The study was only conducted with students that are residing in student housing facilities, so no generalisations can be made on the whole population. This research should be repeated

with a larger sample group and more participants per focus group. However, this exploratory, qualitative research enabled us to find a focus for further research activities. The preliminary findings, such as the influence of habit strength and change of environment, should be further investigated over a longer period of time. This research focuses on intended and reported behaviour, while more research is needed on actual and habitual or unconscious behaviour. The impacts of (the perception of) environment and context should be further investigated.

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