Value Conflicts between Sustainable and Alternative Behaviour in Daily Routines

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ABSTRACT

The current and future challenges of sustainable development require a massive transformation of habits and behaviours. Behaviour support technology might be a suitable method to achieve such a transformation. Behaviour support technology is focused on guiding people' behaviour. However, supporting sustainable behaviour with behaviour support technology is not at all straightforward since it is not exactly known what values are relevant at this stage, and values are what guides our behaviour. The focus of this research will be on the support of sustainable behaviour, and the integration of sustainability into people's daily routines. We will try to identify the important values in the context of sustainable behaviour and identify the conflicts that arise between these values and other values important in the context of alternative behaviour in daily routines. We will do this by interviewing people directly about their values and by looking into Value Sensitive Design (VSD) and value literature. The outcome of this research will be a stepping stone for the design of a behaviour support agent that can effectively support people to stick to their sustainable routines or to change their routines sustainably.

Keywords

Value Conflicts, Pro-Environmental Behaviour, Daily Routines, Behaviour Support Agents, Value Sensitive Design

1. INTRODUCTION

Sustainability issues are one of our times' main concerns and include a complex set of interconnected environmental, social, and economic problems. Environmental protection may also be described as a social dilemma. That is, collectively, we are better off if the environment is protected, but rational self-interest often dictates environmental exploitation [1]. That being said, the current and future challenges of sustainable development require a massive transformation of habits and behaviours in the whole society at many levels. **Behaviour support technology** [2] is aimed at changing people their behaviour and might therefore be a suitable method for such a transformation. Numerous behaviour support frameworks have been developed, which typically focus on a specific domain or type of behaviour, such as monitoring our diet, emergency monitoring, or forgetting to perform certain tasks [3]. In this research, the focus will be on the support of sustainable behaviour, and the integration of sustainability into people's current daily routines.

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Sustainable, or Pro-Environmental behavior (used interchangeably), can be defined as all possible actions aimed at avoiding harm to and/or safeguarding the environment [4]. How people conduct such behaviour in daily life is still a complex question. For example, the relationship between environmental consciousness and pro-environmental behaviour is still being argued by many researchers [5]. Within the psychological literature, several theories depict why individuals behave in a certain way and how behaviour can be effectively changed. In general, it is acknowledged that human behaviour is influenced by internal and external factors [6]. External factors are for example political factors, social norms and economic factors. Internal factors comprise mainly people's beliefs, values, attitudes and emotions.

This research will focus on internal factors, namely values. Values represent what is important to us and hence guide our behaviour. They are stable and usually do not change over time [7]. Insights into these values could be helpful for the design of behaviour support technology, a support agent, that can effectively change behaviour in line with people's values, and that also helps people reflect on their values in moments where it is difficult to follow a new routine.

However, supporting sustainable behaviour with behaviour support technology is not at all straightforward since it is not exactly known what values are relevant at this stage. Furthermore, value conflicts could arise e.g. between pursuing self-interest and realizing the common good [1]. For a support agent to support sustainable behaviour it is therefore important to also understand people's everyday actions [4]. Because even though many people have explicit goals to reduce their energy consumption, many experience conflicts with other competing goals. This often makes behaviour like energy conservation undesirable or challenging [8]. Therefore, we anticipate that the support agent design would need to explore these competing goals, their underlying values, and the value conflicts that arise.

Surfacing such value conflicts and translating this into design requirements in a meaningful yet manageable way can be challenging [9]. A possible way to do this is by using **Value Sensitive Design (VSD)** methods. Value Sensitive Design is a theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process [10]. However, to be able to translate values into design requirements, using VSD, we first need to gain insight into the values important in this context.

Research has been devoted to demonstrate that different goals and values are attached to sustainable behaviour and to one of its (less- or non-sustainable) alternatives [11]. However, very few research studies have investigated the goals and values associated with the simplest alternative that is 'not behaving pro-environmentally' and their role as determinants of intentions and behaviour (i.e., [12,13]). The goal of this research is to gain insight into the values in the contexts of both

sustainable behaviour and alternative behaviour in daily routines. Besides, we would also like to gain insight into the value tensions and conflicts that arise between the two. The importance of this research is that it could enable to mitigate these value conflicts. Moreover, defining important values and value conflicts could contribute to defining design requirements (using VSD) for behaviour support agents. Altogether, these insights contribute to designing a behaviour support agent that effectively supports people to integrate sustainability into their daily routines, while the support is still in line with people's values.

1.1 Research Questions

The aforementioned goal of this research will be achieved by answering our research question (**RQ).** This main question is divided into sub-questions, which is done to more easily perform our research and to come to a grounded, complete answer to our RQ.

RQ: Which values are the most important in the context of sustainable behaviour and which value conflicts arise with values important in the context of alternative (less- or non-sustainable) behaviours in daily routines?

- **1.1:** Which values generally drive people to behave sustainably?
- **1.2:** Which values generally drive people to perform a less- or non-sustainable alternative behaviour?
- **1.3:** Which value conflicts exist between the values found above (*1.1* & *1.2*) and why?

The structure of this paper is as follows; in Section 2 some background information and related work, in which related literature and how this paper adds on to that, is discussed. The subsequent sections go into more detail on the research performed in this paper. Section 3 covers the research methodology, in which the different methods, the data collection, that serves as a part of the justification of the results, is elaborated on. Section 4 discusses the obtained results from the execution of the steps mentioned in the methodology.
Finally, implications are discussed in section 5, conclusions in sections 6 and future work in section 7.

2. BACKGROUND

2.1 Value Sensitive Design

In this research, we use a broader meaning of the term 'value', where a value refers to what a person or group of people consider important in life. Values emerge from the tools that we build and how we choose to use them, yet, in most of the current practice in designing computer technology and the related infrastructure of cyberspace, little is said about values [14]. This is where Value Sensitive Design (VSD) comes in. VSD is a theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process [10]. The primary goal of this approach is to influence the design of technology by explicitly attending to which human values are taken into consideration and integrated into and throughout the design process. Furthermore, values can seemingly conflict with economic goals and can be difficult to articulate clearly and translate into meaningful processes and designs. This is why we decided to include VSD into this research; to be able to design an effective support agent that accounts for the user's values in a principled and comprehensive matter throughout the whole design process.

2.2 Attitude-Behaviour Gaps

Despite their importance, it has become clear that values and attitudes often do not translate directly into actual behaviour. Many research studies have identified critical gaps and barriers between expressed values or attitudes and actual behaviours, both at the individual and collective levels (e.g. [15, 16, 17]).

One of the barriers is the intensity or priority of different values and attitudes themselves. People may agree that values such as security, freedom, economic prosperity, tolerance, responsibility, respect for nature, etc. are all important. The critical question here, however, is which values are prioritized and what tradeoffs, implicit or explicit, between values are made. In a recent study [18] they present these value tradeoffs as **the "self-other tradeoff".** This means that consumers often perceive sustainable actions as having some cost to the self, such as increased effort, increased cost, inferior quality, or inferior aesthetics [19]. In their research, Luchs et al. [19] even go a bit further into detail of the tradeoffs described above. They discuss the barrier as a tradeoff between altruistic & biospheric values and egoistic values.

Richetin et al. [20] explains something similar to value tradeoffs, however, they describe this as **a tradeoff between different goals**; goals attached to sustainable behaviour, and to one of its less or non-sustainable alternatives (e.g. Travelling by bike vs. Travelling by car, Recycling vs. Throwing everything in one bin). While performing a sustainable action and not performing the same action (and therefore performing a less- or non-sustainable alternative) can be considered as logical opposites, they are psychologically different because each is associated with separate (and not necessarily opposite) goals. For instance, whereas performing a sustainable action might be triggered by the goal to preserve the planet, it seems less likely that those not doing a sustainable action, and therefore performing a less- or non-sustainable alternative, have a goal of destroying the planet. A more likely goal might rather be to maintain a convenient way of life.

However, very few research studies (i.e.,[12,13]) have investigated these goals and values associated with the simplest alternative that is 'not behaving sustainably' and their role as determinants of intentions and behaviour. The focus on the two simplest alternatives that are 'doing' and 'not doing' might allow us to better understand the underlying mechanisms of engagement with sustainable behaviours that would go beyond improving the predictive power of models and to provide new insights on how to more successfully intervene and provide support. Goals that lead to action and to inaction (performing an alternative) should not be judged as mutually exclusive and should be considered together, in relation to other actions and everyday priorities. Moreover, by doing this, insights may be gained into why people choose to act sustainably (or not) during different activities.

Finally, Leiserowitz et al.[21] summarized findings from many different surveys and studies and concludes that a lot of work remains to be done to identify and understand the key relationships between sustainability values, attitudes, and behaviours, and to further apply that knowledge in the effort to accelerate the transition toward sustainability.

In conclusion, many value conflicts or tradeoffs are responsible for the gap between environmental attitudes and pro-environmental behaviour.

Nevertheless, values and attitudes clearly play an important role in determining pro-environmental behaviour. Moreover, many scholars have emphasized the importance of studying human values when explaining pro-environmental behaviour (e.g. [22,23]). We will focus on uncovering these different values and value conflicts that form a barrier to pro-environmental behaviour.

2.3 Egoistic, Altruistic & Biospheric Values

A common way to explain pro-environmental behaviour and the attitude-behaviour gaps described in the previous section, is to use the categorization of three important types of values ([17, 24]):

- Egoistic (i.e., self-enhancement or pro-self),
- Altruistic (i.e., self-transcendent or prosocial), and
- Biospheric (i.e., ecocentric)

People with a strong egoistic value orientation will especially consider the costs and benefits of pro-environmental behaviour for them personally: when the perceived benefits exceed the perceived costs they will behave in an environmentally friendly manner and vice versa. People with a strong altruistic value orientation will base their decision on behaving pro-environmentally or not on perceived costs and benefits for other people. Finally, people with a strong biospheric value orientation will mainly base their decision to act pro-environmentally (or not) on the perceived costs and benefits for the ecosystem and biosphere as a whole.

In many cases, acting on egoistic values implies not behaving pro-environmentally because the personal costs associated with the pro-environmental behaviour outweigh the personal benefits (i.e., from an egoistic value perspective). In contrast, acting on altruistic and biospheric values mostly entails acting pro-environmentally, because pro-environmental behaviour is often associated with high societal and environmental benefits. Empirical evidence suggests that pro-environmental behaviour is indeed a function of moral considerations and altruistic and/or biospheric values (e.g., [25, 26, 27]).

2.4 Knowledge Gap

As shortly explained in the previous sections (2.1-2.3), multiple studies looked into drivers of and attitudes towards sustainable behaviour and some even looked into value tradeoffs and conflicts as barriers to sustainable behaviour. However, previous work did not look into which values in the context of sustainable behaviour may be prioritized over other values in daily routines. Two studies mentioned [18, 19] did discuss the tradeoff between self-interested and sustainable behaviour a bit, but they focused this on marketing and consumerism only, not on daily routines.

No concrete literature was found so far that looked into the important values of both of these contexts: sustainable behaviour and alternative behaviour in daily routines. We strongly concur and would add that research could fruitfully focus on the goals and values that are linked to behaving pro-environmentally as well as on the goals and values that are linked to one of its alternatives. The outcome could facilitate the design of a support agent that can effectively promote sustainable behaviour in daily routine settings.

3. METHODOLOGY

3.1 Theoretical approach

First of all, a literature study shall be performed as a stepping stone for defining the most important values in the context of sustainable and alternative behaviour in daily routines. The search used databases such as ‘Google Scholar’ and ‘Scopus’. Combinations of different terms were used as search strings, e.g., “values” + “sustainability” + “behaviour” and “values” + “conflicts” + “routines”. Searches were repeated to identify literature at the interstices of other key terms such as “VSD”, “pro-environmental”, “support agent”.

3.2 Practical approach

For the second part of this research a practical, empirical, approach is chosen because it enables a deeper and more detailed understanding of why people behave as they do, and why they have (or do not have) difficulties behaving sustainably in their daily routines. This could support the conclusions found by literature with empirical findings, which enables us to answer the research questions in a grounded way.
There are various ways to measure values empirically. Most widely known and applied is the survey approach, in which people are questioned directly about their values. An alternative approach is an ethnographic approach with in-depth interviews. Because this last one is labour-intensive and because the experimental one has limited external validity and generalizability, the empirical research of values is predominantly done using surveys [28]. Therefore, to measure people’s values and attitudes we started our study by sending out an environmental attitude survey to our participants. This was done to validate that the people we recruited had a pro-environmental attitude because the agent will be designed for people who actively have to seek out the agent themselves and therefore need to be willing to change their routines pro-environmentally. Furthermore, we still aimed to conduct in-depth interviews with our participants as well. Because of the labour-intensiveness of these interviews and the combination with a survey, we only conducted this study (Survey & Interview) with five participants. The stand-alone survey does not provide us with any additional information, which is why we have a small sample size overall.

3.2.1 Survey

To measure people’s environmental attitude we use a survey-based metric devised by the US environmental sociologist Riley Dunlap and colleagues, the revised **New Ecological Paradigm (NEP)** [29]. It is designed to measure the environmental concern of groups of people using a survey instrument constructed of fifteen statements. Using a 7-point Likert scale, a commonly used rating scale, respondents are asked to indicate their strength of agreement with each statement (strongly agree, agree, unsure, disagree, strongly disagree). Responses to these fifteen statements are then used to calculate an average NEP score, which can be analysed and compared.

3.2.2 Interview

A semi-structured interview guide was designed and used during the interviews to address particular themes but also to provide opportunities for the informants to elaborate on aspects they considered relevant. We conducted the interview with five participants (N=5) which were pre-selected (due to personal knowledge of the participants) on their high pro-environmental attitude; validated by the Environmental Attitude Survey that we recorded. Furthermore, López Mosquera et al. [30] suggest that demographic and economic factors, such as

age, educational level, or place of residence, have less relevance compared to environmental attitudes, beliefs, and sensitivity to explain recycling, car use, and environmentally responsible purchasing behaviours. Similary, Botetzagias et al. [31], show that demographics have no significant influence on recycling behaviour statistically. This is the reason why we only recorded and analysed our participants' environmental attitudes and why we did not record any demographic information, such as age and educational level.

The semi-structured interview contains a set of specific questions asked of each participant but allows for follow up questions and conversation to tap the issues of interest to the participant. By means of the interview, we are trying to gain an insight into the participant's current daily routines, the motivations (values) behind their behaviour and their general attitude towards acting sustainably. We do this by discussing different scenarios in the context of daily routines and sustainable behaviour. Furthermore, we enable participants to talk about their behaviours freely and to give concrete examples.

3.2.3 Procedure & Analysis

Ethical approval and permission to conduct the study were granted by the Ethics Committee Computer & Information Science of the University of Twente.

Before the interviews, all participants received an information brochure and a consent form. The consent forms were filled in and signed by the participants and the author before the interviews. Following, all interviews were conducted via Microsoft Teams and were audio-recorded. During the interviews, notes were taken and after each interview a transcript with the most remarkable or relevant statements was made as soon as possible. Subsequently, these statements were compared and grouped into themes so that they could be analyzed and used to answer our research questions.

4. RESULTS

4.1 NEP Survey

Agreement with the eight odd-numbered items indicates pro-NEP orientation, therefore, responses were scored as 5 strongly agree, 4 mildly agree, 3 uncertain, 2 mildly disagree, 1 strongly disagree. Agreement with the seven even-numbered items indicates pro-DSP orientation (Contrast to NEP). Therefore, the scores were reversed for these seven items to perform the analysis. The total score of the 15 items can range between 15 and 75.

The result of the participants' attitudes measured by the NEP questionnaire shows that the overall average score was **57.8 out of the possible 75.** Compared to other research findings this is found a high NEP-score; one study from 2014 [32] measured the NEP attitudes of senior respondents in the United Kingdom, Japan, Germany and Hungary, with an overall sample size of 1338 people. The highest average NEP score was found for Germany: 56.18 out of the possible 75. Another study, from 2018 [33], measured the NEP attitudes of 60 high school students from Indonesia, which shows an overall average score of 46.42.

Although we have a very small sample size and therefore the results are not significant, we can still validate that our selected participants have a pro-environmental attitude individually, concluding from their rather high NEP scores (**Table 1**). Furthermore, each participant self-reported that they indeed have this attitude (requirement to participate in the study).

Participant	Total NEP score
1	63
2	54
3	52
4	61
5	59

Table 1: *Total NEP score per participant*

4.2 Sustainable Behaviour

Now, we will elaborate on the values important in the context of sustainable behavior, found by literature and the interviews conducted with our pro-environmental participants (validated by the NEP scale).

Motivational factors play a key role in pro-environmental behaviour and values are among the most important general motivational factors influencing behaviours [34]. Of particular interest to our research are general motivational factors, and therefore values, that can affect a wide range of behaviours, making them an important target for promoting consistent sustainable energy behaviour. Researchers distinguish between *primary motives*, the larger motives that let us engage in a whole set of behaviours (e.g. to engage in an environmental lifestyle) *and selective motives*; the motives that influence one specific action [35] (e.g. recycling, saving energy, buying eco-products, etc.).

As shown in **Table 2** [20], in a study about resource consumption, the most frequently reported motivation associated with reducing resource consumption was environmentally related (i.e., to protect nature). Moreover, in a study about what drives energy consumers[34], it was found that the motivation for moving to a sustainable energy system is driven largely by two values. One of which is to **protect the environment and the biosphere** (Biospheric values, Section 2.3), the other is to **enhance human well-being** (Altruistic values, section 2.3) (**RQ1.1**). These values are practically the same as the two most frequently reported ones found by [20] ('Save, protect and respect nature' N = 240 (31.66%) & 'Better future, well-being of future generations' N = 229 (30.21%)).

Reducing resource consumption	Not reducing resource consumption
Save, protect and respect nature 240 (31.66%)	Maintain actual lifestyle, easy life 413 (54.49%)
Better future, well-being of future generations 229 (30.21%)	Seek for immediate pleasure 92 (12.14%)
Improve quality of life 160 (21.10%)	Trust in resources 78 (10.29%)
Resources are limited 51 (6.73%)	Lack of time, time for doing other things 70 (9.23%)
General well-being (man, nature) 29 (3.83%)	Lack of interest 43 (5.67%)
Avoid environmental disasters 14 (1.85%)	Personal well-being and interest 27 (3.56%)
Better balance man/nature 14 (1.85%)	Essential need for resources 14 (1.85%)
Excessive consumption 11 (1.45%)	Laziness 10 (1.32%)
Save money 10 (1.32%)	No other alternatives 6 (.79%)
	Trust in human kind for finding other resources 5 (.66%)

Table 2*: Goals associated with reducing versus not reducing recourse consumption (Richetin et al. [20])*

What was clear from the interviews with our participants, however, was that they were not always aware of their motivations to act sustainably, although most did mention their ingrained environmental motivation ('*The thought behind this behaviour is to take care of the environment, but I am not always conscious about this because it happens so frequently every day.' (Participant 3)* & '*Deep down I do think of the environment, but it's more that I just like to do the right thing'(Participant 2)).*

When we asked explicitly for their motivation to perform a sustainable activity (e.g. separating waste or switching the lights off when leaving a room) we got very similar replies from our participants:

- *'I think it's not something I think about very actively, I think it's more that I just grew up with it, you're really used to it and it kind of feels wrong not to do it. I feel like it's something you kind of intrinsically want to do because it was taught to you so much over time.' (Participant 1)*
- *'It's not something you think about during every activity, you simply think that something is the right behaviour and then you just act upon this. I think that one day I taught myself or others have' (Participant 3)*
- *'I don't really have a motivation behind the sustainable behaviour, it's rather a norm I have that I live up to. I don't really think about it.' (Participant 2)*

According to Moisander [36], it is commonly accepted that the associated motives can be both overt and hidden, that is, consumers may or may not be aware of their motives for a given behaviour. Therefore, the answers given by our participants are not a surprise and this does also not mean that they do not have these environmental motivations and biospheric and altruistic values mentioned in the studies described above [20,34].

However, this made it very difficult for us to figure out their specific underlying values, even when explicitly asked for.

Furthermore, from the interview statements above it can also be derived that our participants were acting based on trying to do "the right thing" ('a norm that I live up to', 'the right behaviour' and 'it feels wrong not to do'). A given decision is usually considered 'right' if it brings about positive consequences for the environment and all people involved, preferably producing the greatest good for the greatest number of people. This generally implies acting on altruistic and biospheric values, which is hardly influenced by egoistic values, and this will consequently lead to more stable pro-environmental behaviour [37].

4.3 Alternative behaviour

Alternative behaviour can be defined as 'not doing' or 'behaving less- or non-sustainably' (Section 2.2). For example, if the 'doing'/sustainable behaviour is recycling, its 'not doing'/alternative behaviour is 'not recycling', which could be different less- or non-sustainable alternatives (e.g. separating trash only for a bit or throwing all trash in one bin).

Usually, internal barriers to pro-environmental behaviour are alternative, egoistic motivations that are more intense and directed differently; e.g. 'I will drive to work because I would rather be comfortable than environmentally sound'. In this example, the primary motives (environmental values) are overridden by the selective motives (personal comfort). As this example indicates, it can be hypothesized that primary motives, which evolve around altruistic or biospheric values (Section 2.3), are often covered up by the more immediate selective motives, which revolve around one's own needs/egoistic values (Section 2.3), e.g. being comfortable, saving money and time. One of our participants actually stated the following: *'I would not act accordingly if at a given moment in time my personal circumstances are more important than doing something small and beneficial for the environment, although I do try to avoid this from happening' (Participant 3),* which certainly confirms this hypothesis. Also in this example, the primary motives (biospheric & altruistic values) are overridden by the selective motives (egoistic values).

Furthermore, there were multiple participants that mentioned something about e.g. their hair taking up more time, and the comfort of a long warm shower ('*I would say comfort as an argument for the warm showers, and hair for the lengthiness of my shower' (Participant 1)* & *I'd like to feel clean and it's relaxing and comfortable. Sometimes I'd even like to massage a hair mask in my hair'. (Participant 4)*). Besides, regarding the recycling behaviour, multiple participants spoke of convenience as a motivation to not perform this particular behaviour (*'Sometimes I put everything in the rubbish bin when it's the only bin around, out of convenience.' (Participant 3*)). The same was true for their energy usage when asked why they were lacking here sometimes as well *('I just constantly leave my appliances on stand-by and all the plugs are always plugged-in. I know I should change it but I find it very inconvenient,.'(Participant 1)*).

In **Table 2** [20], it is also shown that the most frequently reported main goal associated with not reducing resource consumption was egoistic (i.e., to maintain one's easy way of life).

In the previous section (4.2), it was described that many people have the perception that reducing environmental problems enhance well-being for the majority of the world's population. However, many people also think that behaviour changes needed to achieve a sustainable energy transition will threaten rather than enhance human well-being, as such behaviour is seen as requiring greater financial expenditures, more time, more hassle, and less comfort (a threat to egoistic values). For example, travelling by public transport is seen as less pleasurable than travelling by car, and turning down the heat or air-conditioning can make a home less comfortable [34].
Summarizing all the above, **convenience and comfort** are two recurring *egoistic values* that certainly play an important role in shaping our (non-)environmental behaviours [16] (**RQ1.2**). This is also something that is reported repeatedly by our participants.

In addition to motivations and values, consumers' behaviour is usually assumed also to be determined by their **ability to perform a behaviour** ([38,39]). Ability is described by Moisander [36] to be a function of the personal resources (within the consumer) that are needed to perform the behaviour, as well as on the opportunity to perform the behaviour, which is determined by aspects of the direct environment. Opportunity generally refers to various external factors that impede or facilitate behaviour.
To summarize, people are not always motivated to do something for which they lack the necessary resources and opportunities. The different elements of motivation and behaviour are illustrated in **Figure 1** [36].

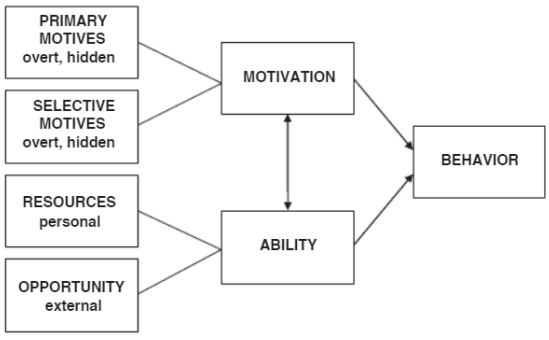

Figure 1: *Motivation and behaviour (Moisander [36])*

In the interview, it is found that the two functions of ability are also recurring subjects. They often underly the motivations of our participants to not perform a certain sustainable behaviour:

(OPPORTUNITY External)

- *'For example, when I am in a different country where they throw all kinds of trash together anyways, and it doesn't get recycled, then there is not really any point to separate waste when it ends up together' (Participant 1)*
- *'In the UK you just don't have the opportunity to recycle. I really wanted to, but I just was not able to.' (Participant 2*
- *'I am not entirely sure about the regulations in whole Brazil, but I know that in my region there hardly are any, which is quite frustrating because I would love to separate my waste' (Participant 4)*

(RESOURCES Personal)

- *'I would say sometimes the rules are a little bit unclear to me, especially when it comes to the yellow bin, which is for packaging/containers.' (Participant 1)*
- *'I do find it a bit ambiguous what can go with plastics and what can't' (Participant 3)*
- *'I don't know with every appliance what its energy usage is, that's why it's not something I pay attention to. If I would have the knowledge I would probably do this more.' (Participant 2*

4.4 Value Conflicts

4.4.1 Egoistic vs. Altruistic & Biospheric values

Given the literature findings and our interview outcomes discussed in the previous sections, it can be concluded that although people have a pro-environmental attitude, many still persist to choose alternative non-sustainable behaviours in their routines. De Groot & Steg [40] conclude that this is the case because people act more on egoistic values and less on altruistic and biospheric values, probably because many pro-environmental behaviours require individuals to restrain egoistic tendencies. This is also been called the self-other tradeoff [18] or the individual-collective paradox [41]. This would mean that **altruistic and biospheric values conflict with dominant egoistic values (R1.3).**

4.4.2 Cost of Behaviour

Similarly, Diekmann and Preisendoerfer [42] illustrated these conflicts by using a low-cost/high-cost model. They propose that people with pro-environmental attitudes choose the pro-environmental behaviours that demand the least cost. Cost in their model is not defined in a strictly economic sense but in a broader psychological sense that includes, among other factors, the time and effort needed to undertake a pro-environmental behaviour. Given the findings previously discussed, we argue that this cost resembles the threat to people's egoistic values. In their study, Diekmann and Preisendoerfer showed that environmental attitude and low-cost pro-environmental behaviour (e.g. recycling) do correlate significantly. People who care about the environment tend to engage in activities such as recycling but do not necessarily engage in activities that are more costly and inconvenient such as driving or flying less. In other words, a positive environmental attitude can directly influence low-cost pro-environmental behaviour (**Figure 2** [42]).

This is also something that is explicitly stated by one of our participants: *'I try to behave sustainably, but I try to start with the things that are the easiest to do' (Participant 3).*

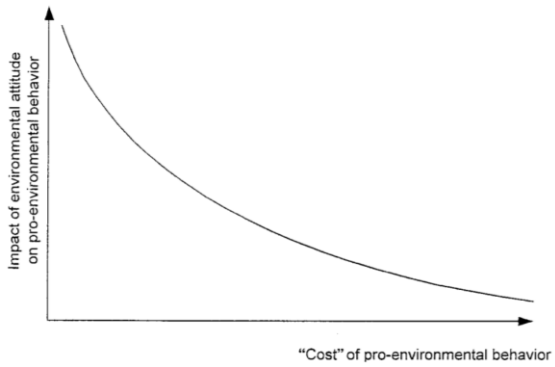

Figure 2: *Low-cost high-cost model of pro-environmental behaviour (Diekmann & Preisendoerfer [42])*

4.4.3 Schwartz Values

In multiple studies about values, its authors referred to or made use of the well-known Schwartz' value scale [43] to describe certain behaviour and value conflicts. Schwartz proposed a model arranged in a circular structure, which depicts ten correlated value categories. A study that looked into this model together with sustainable behaviour [44], concluded that Self-Transcendence values are consistently related to pro-environmental behaviours, whilst Self-Enhancement values tend to oppose such behaviours. The Self-Transcendence vs. Self-Enhancement dimension captures the conflict between values emphasizing "concern for the welfare and interests of others" and values that emphasize "pursuit of one's own interests, relative success and dominance over others". Now, to support our findings concerning value conflicts, we tried to scale the values we found on the Schwartz scale to see if they are opposing/in conflict on this scale as well. The main values found in this study as drivers for pro-environmental behaviour; to protect the environment & biosphere and to enhance human well-being, can both be scaled on the Self-Transcendence scale. The main values we found as drivers for alternative behaviours; comfort and convenience can be scaled under Self-Enhancement. This validates the values conflicts found in this study.

To summarize, we argue that people with a pro-environmental attitude do not have trouble behaving sustainably, only when the behaviour does not demand a relatively high cost or in other words when their egoistic values are not extremely conflicting with their altruistic and biospheric values. These findings and all the other findings from the previous sections are presented in **Table 3**. The first column presents the research questions (and corresponding sections), the second and third shortly answer these questions in terms of values; the value type and the more concrete values. The presented concrete values are the values that are found to be the most important, that together make up at least 60% of all the reported values in both literature and interviews. Therefore, this list of values is non-exhaustive; many other values that could be relevant in different contexts.

Research Questions	*Value Type(s)*	*Important values (non-exhaustive)*
Sustainable Behaviour (RQ1.1)	• Biospheric • Altruistic (Self-Transcendence)	• Protect environment & biosphere • Enhance human well-being
Alternative Behaviour (RQ1.2)	• Egoistic (Self-Enhancement)	• Comfort • Convenience
Value Conflicts (RQ1.3)	• Egoistic vs. Biospheric & Altruistic (Self-Transcendence vs. Self-Enhancement)	• *Combinations of the above*

Table 3: *Summary of findings*

5. DISCUSSION

Of course, this research paper tries to answer our research questions regarding values and value conflicts underlying sustainable and alternative behaviours in daily routines. However, while we were researching these values, we did some other findings that we found worth discussing. Namely, while looking into literature, but mostly during the interviews, we found that most daily routine behaviour was certainly not deliberate behaviour. Most people had no clear motivations at all for the daily routine behaviour that we discussed in our scenarios (e.g. showering and recycling). They all mentioned that their behaviours in these contexts were automatic and habitual. Because of this, it was also quite difficult for us to gain insights into the specific underlying values that drove our participants to behave sustainably (or not).

Moreover, our participants also showed us that they might be perfectly willing to change their behaviour but still fail to do so because they could not persist enough in practising the new behaviour until it had become a habit. This confirms the importance of an intervention, such as a behaviour support agent that helps people to persist.

5.1 Limitations

5.1.1 Sample size

Due to time constraints and Covid-19 implications, we managed to conduct a survey and an interview with 5 participants only, which provides us with limited results. Furthermore, this makes that our results are not significant or generalizable. However, the best attempt is done to connect the individual findings to the literature, which makes that we still present grounded conclusions.

5.1.2 Non-Sustainable Attitudes

For the purpose of this research, we have chosen to look into the values of people who already possess a sustainable attitude. However, it might be the case that these people do already perform mostly sustainable behaviour. Therefore, it could be that it is not necessary for them to reflect on their values and, therefore, to receive support. During the interview, it was found that this was the case for Participant 2, who appeared to already act in line with the altruistic and biospheric values. Consequently, the decision to only look into people with sustainable attitudes could've limited our results.

We found, however, that there are still barriers to sustainable behaviour for most people, despite their pro-environmental attitude. Nevertheless, it would be even more interesting and challenging to look into the values and conflicts of people who do not already have a sustainable attitude. This would probably require a different approach as it can be assumed that this group of people has even more dominant egoistic values and non-dominant or lacking altruistic and biospheric values, compared to the sustainable attitude group. Since values are relatively stable over time, this might be difficult to influence or change.

6. CONCLUSION

First of all, it is found that *altruistic and biospheric values*; **protecting the environment and biosphere & enhancing human well-being**, are the most important values in the context of sustainable behaviour (**RQ1.1**). Furthermore, they provide a stable basis for promoting sustainable behaviour since acting on altruistic and biospheric values mostly entails acting sustainably, because sustainable behaviour is often associated with high societal and environmental benefits. Moreover, pro-environmental behaviour is typically seen as 'doing the right thing', which is one of the main drivers to behave sustainably, reported by our interview participants. This generally also implies acting on altruistic and biospheric values since a given decision is usually considered 'right' if it brings about positive consequences for the environment and all people involved. This is hardly influenced by egoistic values.

Secondly, alternative behaviour can be defined as less- or non-sustainable behaviour and it was found that **convenience and comfort** are two recurring *egoistic values* that certainly play an important role in shaping these alternative behaviours [32] (**RQ1.2**). This is not only found by different studies, but it is also something that can be concluded from our interviews.

Thirdly, we argue that people with a pro-environmental attitude do not necessarily have trouble behaving sustainably, only when the behaviour does not demand a relatively high cost; when their egoistic values are not extremely conflicting with their altruistic and biospheric values. In other words, the value conflicts that create a barrier to behaving sustainably are **egoistic vs. altruistic & biospheric values**, or in Schwartz' terms: **Self-Transcendence vs. Self-Enhancement values** (**RQ1.3**).

Finally, in addition to motivations and values, people's behaviour is usually assumed also to be determined by their **ability to perform a behaviour**. When external opportunities or personal resources are lacking, it will have a huge influence on a person's motivation to perform sustainable behaviour, independently from values. Although this seems like a very obvious conclusion, we think it is important to account for in the design of a support agent.

Concluding, when designing interventions to promote stable pro-environmental behaviour, it is important to strengthen altruistic and biospheric values and, at the same time, decrease the conflict between egoistic versus altruistic and biospheric values. Because acting on the basis of altruistic and biospheric values generally benefits collective interests and/or society, it is important to examine when people are more willing to act on altruistic and biospheric values. Research shows that behaving morally often requires external support, be it through institutions, moralization [45]. Therefore we argue that a well-designed support agent could be a great intervention.
In the final section, besides other future work, a few suggestions will be discussed on how to translate these findings

into design requirements, to overcome the value conflicts and successfully support sustainable behaviour.

7. FUTURE WORK

7.1 Translating Values into Design Requirements

The next and crucial step is the translation of values into design requirements. If VSD is to be successful, the formulation of design requirements is obviously to be (partly) informed by values. Furthermore, design requirements play an important role in guiding the design process. Van de Poel [46] proposes to engineers to construct a 'value hierarchy' as a way of addressing the challenge of value specification in a systematic way. In this hierarchy, values are translated into norms, which in turn are translated into design requirements. This could be a framework to further look into.

Furthermore, we will discuss two promising strategies, suggested by de Groot & Steg [40] to increase the relative importance of altruistic and biospheric values in your design, for specific situations.

7.1.1 Making altruistic and biospheric values more salient

The first suggestion to promote pro-environmental behaviour may be by strengthening the relative importance of altruistic and biospheric values in specific situations or increasing the cognitive accessibility of these values. It is possible to make values more salient or to increase the cognitive accessibility of values, which will affect the way people prioritize their values in specific situations and consequently the extent to which different values influence attitudes, intentions, and behaviour in a particular situation (see e.g. [47, 48]). Informational strategies, providing someone with information, can be aimed at increasing actors' awareness of environmental problems, their knowledge of the environmental impacts of their behaviour, and their perception of (dis)advantages of behavioural alternatives (e.g., [49]). In specific situations, thorough knowledge may clarify how to act in line with altruistic and biospheric values. Such information is crucial to support people to act on their altruistic and biospheric values, which will make pro-environmental actions more likely.

Providing information will be especially effective if pro-environmental behaviours are associated with low costs (section 4.2.2). When the egoistic costs of acting sustainably are perceived to be high, many individuals will just refuse to meet them. Focusing on altruistic and biospheric considerations may be a risky strategy in this case, as this may result in reactance when people see no feasible behavioural alternatives available. Therefore, a second strategy may be needed to avoid reactance, which we describe in the following section.

7.1.2 Reducing conflicts between egoistic, altruistic, and biospheric values

When the conflict between egoistic and altruistic/biospheric considerations is strong, strengthening altruistic and biospheric values alone may not be sufficient to enhance pro-environmental behaviour because the individual costs of acting pro-environmentally will be too high.

Here, interventions are needed to render "anti-environmental" egoistic considerations less incompatible or even compatible with altruistic and biospheric considerations. Interventions could concentrate on actually changing the costs and benefits of a specific pro-environmental behaviour. For example, pro-environmental actions can be made more attractive through the use of incentives, and/or behaviour with a negative environmental impact can be made less attractive by the use of disincentives [50]. Interventions, such as support agents, can also focus on changing the perception or evaluation of individual costs and benefits of acting in an environmentally friendly manner to reduce the conflict between values.

7.2 Habits

Although these suggestions made by de Groot & Steg [40] are great and valid suggestions to take into account when looking into design requirements, we would argue that it would be important and useful to first look more into habitual sustainable behaviour first.

Namely, it is found that people tend to deliberate less over frequent behaviours, paying less attention to the options available to them, instead continuing to do what they usually do [51].

Since many sustainable behaviours occur frequently and recurrently in unvarying, daily routine, settings, more research needs to be done into these habits and how they relate to and interplay with people's values. Habits tend to be ingrained and difficult to change [52], and it has been suggested that frequently repeated behaviours have unique qualities that demand different explanations to infrequent behaviours [53]. Therefore, when someone's habits are non-sustainable, we argue that this can be challenging to change someone's habits pro-environmentally. That being said, we think that when designing a support agent it is not only important to account for people's values but also for people's habits; especially when these habits are non-sustainable and therefore even more difficult to change.

7.3 Shape Values

Finally, we would like to remark that all our participants pointed out that their habits were shaped while growing up because the behaviours were always taught to them by caregivers/parents or at school. This might therefore be a great area to look into, for example for the design of a support agent for children. Therefore we argue that future studies could also focus on examining how values can best be shaped or how to motivate people to act upon their values. One way to explore the determining factors that shape environmental values is to more closely study the life experiences that have shaped the beliefs and values of active environmentalists [16]. This practice would also be great to use in further research into the support of people with non-sustainable attitudes, as described in section 5.1.2.

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