Seeing is believing is doing?
On the role of future-oriented imagination in developing motivation for a sustainable lifestyle

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Abstract

The environmental and climate-related sustainability challenges facing the world today are complex, accelerating and urgent, and they call for change from multiple stakeholders. While governments, businesses and other institutions hold a high degree of responsibility for initiating and enabling the necessary change processes towards sustainable practices, so do also individuals and communities. Despite innovative change projects worldwide much remains to be done. However, making changes is difficult for many people, and even more so in situations characterised by uncertainty. In this study the role of future-oriented imagination in motivating changes towards sustainable lifestyles was explored through an experimental intervention design. Test group participants were exposed to a guided imagination of a sustainability scenario in the year 2028, followed by a writing assignment allowing them time to engage with how they see their own future life. The control group spent the same amount of time listening to a guided present-day reflection and writing about their current everyday life. Pre- and post-intervention, both groups completed lifestyle questionnaires. The pre-intervention questionnaire constituted the baseline assessment against which their post-intervention questionnaire results (which was asking both groups to record the lifestyle decisions they thought they would be making in the year 2028 on the same behaviours as in the pre-intervention questionnaire) were compared to check for reported degrees of changes. Besides their expected lifestyle changes, their predicted future personal change and degree of pro-environmental self-identity in the year 2028 was measured. The results show that test group participants, who were exposed to the future-oriented imagination, reported a substantially higher degree of future lifestyle changes and future pro-environmental self-identity than the control group, as well as predicting a higher degree of future personal change. Future-oriented imagination seems to be a potent pathway for eliciting future-oriented sustainability engagement while avoiding some of the risks of negative spillover. This suggests that future-oriented imagination can play an important role in developing motivation for sustainable lifestyle changes, and that it can be a complement to other psychological drivers for pro-environmental behaviours.

Keywords: environmental psychology, future-oriented imagination, pro-environmental behaviour, pro-environmental self-identity, sustainable development, sustainable lifestyles

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Summary

The world is facing great challenges from accelerating environmental and climate-related crises. Governments and businesses, as well as individual households, all need to make changes in their way of life and move towards a more sustainable mode of living, governing and doing business. The challenges are as great as they are urgent. However, making changes is difficult for people, and even more so in situations characterised by uncertainty. In this study the role of future-oriented imagination in motivating individuals to make changes towards more sustainable lifestyles was explored through an experimental design. The experiment was conducted through assigning the participants to either a test group, that would receive the experimental intervention, or to a control group. The test group participants were exposed to a guided imagination of a sustainability scenario in the year 2028, followed by a writing assignment allowing them time to engage with how they see their own future life. The control group spent the same amount of time listening to a guided present-day reflection and writing about their current everyday life. Before and after the experimental intervention both the test group and the control group completed lifestyle questionnaires, the first constituting the baseline assessment against which their second questionnaire results (which was asking both groups to record the lifestyle decisions they thought they would be making in the year 2028 on the same behaviours as in the first questionnaire) were compared to check for reported degrees of changes. Besides their expected lifestyle changes, their predicted future personal change and degree of pro-environmental self-identity in the year 2028 was also measured. The results show that test group participants, who were exposed to the future-oriented imagination, reported a substantially higher degree of future lifestyle changes and future pro-environmental self-identity than the control group, as well as predicting a higher degree of future personal change. This suggests that future-oriented imagination can play an important role in developing motivation for making sustainable lifestyle changes, and that it can be a complement to other psychological drivers for pro-environmental behaviours.

Keywords: environmental psychology, future-oriented imagination, pro-environmental behaviour, pro-environmental self-identity, sustainable development, sustainable lifestyles

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1. Introduction

The future is, and has always been, uncertain, unpredictable, and unknown. But never before in history have humans knowingly faced such monumental unknowabilities and uncertainties through their own contributions to climate dynamics and ecosystem degradation (IPCC 2014; McNeill & Engelke 2014; Steffen et al. 2015). The call for action and change is great. Since the ecological sustainability problems are closely related to production and consumption patterns, the unfolding climate crisis demands a transformation of the Western consumption-driven way of life towards sustainable lifestyles as well as sustainable governance and business practices (IPCC 2014; UNEP 2016a; Bengtsson et al. 2018). Across the world initiatives and innovative projects provide inspiration and concrete examples of possible transitions towards the sustainable development of societies (EEA 2016). However, efficiency improvements are often negated by increases in total resource consumption, which is a key driver of greenhouse gas (GHG-) emissions and other environmental issues (Mont & Plepys 2008; Bengtsson et al. 2018). And, so far, policies, information campaigns and other interventions have had limited success (Mont & Plepys 2008; Whitmarsh & O’Neill 2010).

When human beings experience worry or ambiguity they tend to cling to what they are familiar with (Holmes 2015), and salient situational uncertainty may activate and/or increase closed-mindedness, discriminatory tendencies and avoidance strategies (Brizi, Mannetti & Kruglanski 2016; Chernikova et al. 2017), which are negatively associated with creativity (Chernikova et al. 2017). Humans are also poorly equipped to deal with long-term, gradually changing issues that are complex and system-wide (Gifford 2011; APS 2017). These human tendencies, to become more closed-minded when feeling uncertain and to focus on short-term visible gains, are most unfortunate and counterproductive, albeit understandable, reactions at a point in time when the opposite is called for: visionary innovation, generous cooperation, and courageous interdisciplinary and cross-cultural inspiration (EEA 2016; UNEP 2016a). There is thus a mismatch between what the situation demands and the responses it all too often elicits.

How can this inaction be ‘unfrozen’? How can the gravity of the situation be framed without trivialising the problem, but not scaring people into reckless hedonistic action or into avoidance or a debilitating apathy either? How can people become engaged in and excited about the unknown and their own participation in its unfolding, instead of getting stuck as fear-stricken deniers or indifferent passive bystanders? It is clearly vital to move on many fronts at the same time, so the question of who is ultimately responsible and who should start the chain reaction of transitional change (i.e. individuals vs governments vs businesses) should not be allowed to detain the necessary change processes (Stoll-Kleemann, O’Riordan & Jaeger 2001). While there are obvious areas of responsibility for governments, institutions and businesses, it does not detract from the responsibility individuals and households face to make changes in how their way of life impacts the environment. However, when individuals start to make changes towards pro-environmental behaviours and sustainable lifestyles they need systemic encouragement and structural support from infrastructure provisions and policy incentives provided by society (Soper 2008; Evans & Abrahamse 2009; UNEP 2016a). There is a two-way dynamic operating between on the one hand individual lifestyles being influenced by e.g. technology, laws, and social values, and on the other hand technology and policymaking deriving inspiration from emerging social practices and changing behavioural patterns (Neuvonen et al. 2014). Governments can accomplish nothing without their citizens’ involvement, and individuals need governmental support and resource allocation. And the environment, with all its living creatures and life-affirming ecosystems, needs both governments, businesses and individuals to change their practices. Demanding engagement from individuals need not be viewed as a harsh measure or a punishment. It could instead be seen as an invitation to participate in co-creating a sustainable, equitable and meaningful future.

1.1. Problem background

As stated above, there is great urgency to the process of not only putting pressure on governments and corporations to make changes in policy and practice, but also of influencing individuals to shift to sustainable (low-carbon) lifestyles (IPCC 2014; Mont, Neuvonen & Lähteenoja 2014; Brick, Sherman & Kim 2017). The total material consumption (TMC) is a measure that can be used to indicate levels of sustainability (Mont, Neuvonen & Lähteenoja 2014; Neuvonen et al. 2014), and 6-8 tonnes/year is an estimated sustainable average per capita. For EU citizens, the TMC currently reaches an annual average of 40-50 tonnes per capita, so there is a pressing need for major changes (Mont, Neuvonen & Lähteenoja 2014).
Households are responsible for more than 60% of global GHG-emissions, and 50-80% of total resource use when accounting for both direct energy use and indirect energy embedded in the goods and services that households consume. Transportation, housing and food were found to be the most environmentally relevant consumption categories answering for 55-65% of total impact (Ivanova et al. 2016). Steen-Olsen et al. (2012) used three different footprint measurements to discern the impact of EU nations – ‘carbon footprint’ (GHG-emissions): more than double the global average; ‘land footprint’ (i.e. Ecological Footprint = global hectare of average land productivity): twice the global hectare; and (blue) ‘water footprint’: approximately 10% above global average (a large contribution to water stress was coming from agricultural irrigation in the Mediterranean region). Although there is variability between countries within the EU due to different biophysical conditions and consumption patterns, the analysis shows EU to be a net importer across all footprints and the strongest responsibility for this is placed on consumption patterns within Western EU nations.

The COP21 Paris Agreement pointed to sustainable patterns of production and consumption, and sustainable lifestyles, as key areas to focus on for climate change mitigation work (UNEP 2016a). Larsen and Hertwich (2009) suggest that footprint accounting primarily should be based on consumption rather than on production as it provides a better connection to what research has identified as the main driver of environmental pressure in industrialised countries, namely consumption. In linking these identified key areas to lifestyle recommendations, Wynes and Nicholas (2017) have shown that there is a discrepancy between the recommendations people receive via education and governmental information and the impact those recommendations have. The highest-impact choices they found within research (i.e. having one fewer child; living car-free; avoiding flying; eating a plant-based diet) were rarely mentioned, or were down-played. These four behaviours satisfies the criteria of having a high impact on GHG-emissions, being the ‘best-in-class’-action within their respective behavioural domains, as well as having a potential to influence a systemic change. That these recommendations are not public knowledge is problematic as it may give individuals faulty grounds for making lifestyle decisions. This negatively impacts substantial behavioural changes, which is a faster route towards reducing GHG-emissions than policy and infrastructure changes alone can provide. It is also a potentially harmful strategy, since recommendations of simpler and less effective behaviours may send messages that down-play the urgency of climate change mitigation. Sustainable low-carbon lifestyles need to be promoted, facilitated and supported in all contexts and cultures (Wynes & Nicholas 2017).

Sustainable lifestyles are indicated by the consumption areas that cause the highest environmental pressure, which are food, mobility, housing and tourism (Mont, Neuvonen & Lähteenoja 2014; EEA 2015; EEA 2016; UNEP 2016a). This directly involves individual lifestyle choices. Technological inventions are welcome and needed in order to make this sustainability transition. However, in addition to this, significant and fundamental revisions in how individuals live and understand wellbeing and a good quality of life are needed (Bengtsson et al. 2018), inviting significant contributions from the social sciences and from citizens themselves. Sustainable societies need to make room for a diversity of human lifestyles that are equitable, efficient, moderate and adapted to resource limits (Soper 2008; Mont, Neuvonen & Lähteenoja 2014; UNEP 2016a; Bengtsson et al. 2018). Everyone has a lifestyle that more or less (positively and/or negatively) impacts the environment, but since there is not only one possible lifestyle, there is potential to allow habits, preferences, values and choices to evolve with the needs of the time. Currently, the Western socio-cultural paradigm of consumption feeds the reluctance to make the necessary changes (Mont & Pleys 2008; Svensson 2012), which requires learning to imagine a less materialistic world that consumes less and more sustainably and equitably (UNEP 2016a).

Future scenarios offered by climate models suggest possible ways the future may unfold, but there are other ways to visualise and imagine the future. Scientific models, even though they are undoubtedly valuable, may also inadvertently restrict the scope of possible futures imagined and aimed for, due to their authoritative and deterministic-sounding discourses. Human creativity, imagination and ingenuity could also provide innovative and dramatically different visions for the future world, and great effort should be made to include such representations in the envisioning of a sustainable future (Hulme 2011). With the innovative potential that visions and imagery have for eliciting new forms of solidarity and community, the private act of imagination becomes an act ripe with possible political implications (Yusoff & Gabrys 2011).
"Given the challenges that climate change presents to us, which are political, social, cultural, moral, ethical, spiritual, physical, and emotional, our ability to imagine other possibilities, to embrace decidedly different futures with creativity and resolve, to learn to let go of the sense of permanence we may have felt about certain landscapes that have seemed to be always so, and to embrace change, is paramount to building resilience and adaptive capacity." (Yusoff & Gabrys 2011, p.529)

In order to support the emergence of sustainable lifestyles, research suggests that people may need help with imagining future sustainable development and what that entails in regards to lifestyle choices. Lack of imaginable pathways may cause people to disengage from involvement in the issue (UNEP 2016b). Neither the apocalyptic nor the salvific futures that Haraway (2016) points to as being common imaginative 'solutions' to deal with the discomfort of the unknown give much nourishment for realistic, down-to-earth imagery. The prevalence of simplistic either-or scenarios or premature commitment to primarily technological solutions can perhaps be explained by humans’ need for cognitive closure in situations of confusion or ambiguity (Brizi, Mannetti & Kruglanski 2016). This can express itself as, for example, avoidance of uncertainty and/or closed-mindedness, which induces a state of being that is negatively associated with creativity or the adoption of novel ideas or technologies (Chernikova et al. 2017).

Quoidbach, Gilbert and Wilson (2013) have found that people tend to predict less personal change in the future than they remember from their personal history. According to Quoidbach, Gilbert and Wilson’s (2013) understanding of this tendency, remembering past actions (cognitive reconstruction) is easier than imagining novel scenarios (cognitive construction), and the experienced imaginative difficulty and cognitive effort involved seems to be confused with perceived likelihood of change. Thus, if one cannot ‘see it’ one does not think it will happen. And if one does not think ‘it’ will happen it makes little sense to bother with making making strenuous efforts to change one’s habits. Acknowledging considerable change in the past but not expecting much of it in the future, may also be derived from a tendency to appreciate the present state of self as optimal. This may, however, lead to serious underestimations of future change – or overestimations of how optimal the present state is – and thus to suboptimal decisions regarding willingness and need for change. Thakral, Benoit and Schacter (2017) means that episodic simulation (i.e. future-oriented imagination) can have a positive effect on a number of psychological functions, such as long-term decision-making and planning, wellbeing and prosocial intentions. Earlier research (Anderson 1983) has also stipulated that manipulating cognitive availability of scenarios influences behavioural intentions and what people expect from themselves, and when they are presented with new contextual cues they might find their habits and behaviours disrupted enough to create a ‘window of opportunity’ for behavioural change (Verplanken & Roy 2016). On the other hand, studies have also shown that situational uncertainty may cause an increase in closed-mindedness, even for those who normally hold liberal and tolerant worldviews (Brizi, Mannetti & Kruglanski 2016), which opens up the question of whether that dynamic can be reversed by social (imaginative) support in staying with the uncertainty rather than prematurely satisfying one’s need for closure. As with all psychological traits there are interpersonal differences in closed-mindedness, and also in how spontaneously people’s minds engage in 'future thinking', i.e. their degree of 'future orientation', which is a trait found to be related to creativity (Chiu 2012). Visual vividness of mental imagery varies widely between individuals, and more vivid mental imagery is associated with stronger emotional responses through its influence on the emotional systems in the brain. Through the activation of perceptual and interpretational processes the imagined event may be experienced as similar to real events (Chen & Williams 2012). If mental imagery can be experienced as a real event the importance of what the mind is filled with becomes apparent.

"[…]it matters what ideas we use to think other ideas (with)"[…]"It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; […]It matters what stories makes worlds, what worlds make stories."” (Haraway 2016, p.12)

Can the effect of the above mentioned unhelpful reactions somehow be ameliorated, and the helpful responses harnessed and used for the common good?
1.2. Aim and research questions

The overall aim of this study was to explore the role of future-oriented imagination in creating motivation for changes in regards to acquiring a sustainable lifestyle, hypothesising that lack of imaginative capability may underly, or at least contribute to, difficulties in engaging with future-related lifestyle demands and the resistance to making behavioural changes. This hypothesised lack of imaginative capability was not seen as cognitively innate, but was viewed as a capacity that modern work-driven and consumption-based lifestyles do not encourage or provide time or opportunities for. The assumption was that it is likely to be an under-developed capacity for most people, relative to its potential.

The overarching research question was whether guided imagination of a rich future scenario (see 3.2.2. Guided imagination of 2028 and Appendix B), and active engagement with personally envisioning a future way of life, could supply sufficient imaginative lift to increase motivation, measured as change readiness, for future lifestyle changes. From that follows the more specific research questions:

1) Can guided future-oriented imagination help individuals overcome the strain and uncertainty of imagining the unknown, and thus increase their perceived likelihood of future change?

_Hypothesis: greater predicted future personal change in test group than in control group._

2) Can guided future-oriented imagination facilitate behavioural motivation for a sustainable lifestyle?

_Hypothesis: greater reported change between pre- and post-intervention assessments of self-reported lifestyle in test group than in control group._

3) Can guided future-oriented imagination increase pro-environmental self-identity?

_Hypothesis: higher ratings on pro-environmental self-identity question by test group than by control group._

4) What specific lifestyle changes do people predict they will make in the future?

_Qualitative analysis based on reported change between pre- and post-intervention assessments of self-reported lifestyle in both groups, including open question of what they believe to be important to change and written text by test group participants._

1.3. Delimitations

The demographical focus of this study was the EU region, and specifically middle-aged Swedish citizens with a stable financial situation. Due to the asymmetrical environmental impact from affluent groups in Western nations, based on their consumption-based lifestyles, they were chosen for this study as any lifestyle changes within this population segment holds great potential for making a significant difference (Steen-Olsen et al. 2012; Mont, Neuvonen & Lähteenoja 2014; Neuvonen et al. 2014; EEA 2016; Ivanova et al. 2016; Bengtsson et al. 2018). Also, people in this population segment were assumed to have established lifestyles and self-views, which allows for any changes recorded in this study to be regarded as a habit discontinuity.

1.4. Contributions to scientific field

According to Neuvonen et al. (2014), studies on individual sustainable lifestyles are vastly outnumbered by studies on macro-level changes, so studying aspects of individual lifestyle changes is in itself a contribution to the scientific field of sustainable development. More specifically, the intention to explore how guided future-oriented imagination may affect the readiness and willingness to change lifestyles in relation to a sustainable future has, to the best of my knowledge, not been focussed on before. The results of this study might offer suggestions of how imagining future scenarios could support and complement other known processes such as the formation of a pro-environmental self-identity (Whitmash & O’Neill 2010; Truelove et al. 2014; van der Werff, Steg & Keizer 2014; Lacasse 2016; Brick, Sherman & Kim 2017) and the habit discontinuity process (UNEP 2016b; Verplancken & Roy 2016). It could also add to the understanding of psychological barriers for pro-environmental behaviour (Gifford 2011), as well as it could contribute to
research on psychological drivers (Cooke & Fielding 2010), thus deepening and expanding the potential for continued progress towards sustainable lifestyles. Finally, it could inform policy-makers, educators and other change agents on how to communicate about future demands on lifestyles while encouraging co-creativity and diversity.

2. Theory

In this Theory section follows a theoretical review of diverse fields of research that on the one hand aim to help with explaining difficulties with and opportunities for eliciting the needed behavioural changes for sustainable development, and on the other hand provide a foundation for content and framing of the experimental intervention in this study, i.e. the guided imagination. The purpose of the overview is to explain the reasons for the numerous methodological choices on the path to answering the research questions, primarily affecting the design of the experimental intervention and the formulation of the guided imagination. Research-based suggestions for normative recommendations regarding what entails a sustainable lifestyle is included in this overview and has influenced the construction of the self-reported lifestyle assessment questionnaire that is used to provide the results of the experiments (see also Method section and Appendices A and B).

Terminology from different scientific traditions will be used throughout this Theory section, so for the sake of clarity ‘behaviour’ (and ‘action’) here refers in general to overt observable acts (Kåver 2006); ‘behavioural patterns’ refers to psychologically reinforced tendencies to behave in similar ways over time (Kåver 2006); ‘habits’ are similar to behavioural patterns but holds a higher degree of automaticity and makes for very durable and predictable behaviours (Klöckner 2013); ‘lifestyles’ are manifestations of individuals’ preferences, values, self-identities and habits, as well as expressions of cultural and social influences (UNEP 2016a); and ‘social practices’ are culturally emerged ways of acting within a certain domain (e.g. food, mobility and leisure) (Evans & Abrahamse 2009).

2.1. Sustainable lifestyles and pro-environmental behaviour

The aim of this study was not to investigate and categorise people’s lifestyles or to assess to what degree their lifestyles were sustainable, but to explore if the motivation for making lifestyle changes could be influenced by a guided imagination of a future scenario where a sustainable lifestyle is the norm. In this exploration research-based recommendations will be used in formulating those potential future social norms and practices (Table 3). The choice to primarily focus on lifestyles (i.e. behavioural clusters with multiple distinct behaviours within each behavioural domain) rather than solely on single behaviours, rests on the assumption that lifestyles are expressions of one’s self-identity and of socio-cultural influences. Single behaviours are also of interest, and difficulties with and opportunities for establishing pro-environmental behaviours (that might develop into lifestyle patterns) will be discussed.

2.1.1. Sustainable lifestyles

In defining sustainable lifestyles as "a cluster of habits and patterns of behaviour embedded in a society and facilitated by institutions, norms and infrastructures that frame individual choice, in order to minimize the use of natural resources and generation of wastes, while supporting fairness and prosperity for all.” UNEP (2016a, p.3) clearly positions the individual’s lifestyle within a social context. Sustainable lifestyles should always be viewed within a broader social and cultural context. According to Hedlund-de Witt, de Boer and Boersema (2014), sustainable lifestyles are based on intentional behaviours benefitting the environment, including pro-ecological, frugal, altruistic and equitable behaviours. Evans and Abrahamse (2009) also include how the social practices (dealing with food, mobility, energy consumption, waste management and recreation) that make up a certain way of life relates to an individual’s self-narrative. Additionally, they emphasize that lifestyles never reach an end-state, but rather evolve in a constant process of development and change. Manifest lifestyles rest on several factors that combine for the unique expression for each individual (Figure 1). Motivational factors - such as meeting basic needs, satisfying personal desires and preferences, fulfilling social expectations, being influenced by marketing or not having any real alternatives - combine with a set of drivers (e.g. values, awareness, knowledge, social norms, ability, technology, income level, media, price, infrastructure and policies) and determinants (attitudes, facilitators and infrastructure),
which result in a dynamic process of behavioural shaping across time and context (UNEP 2016a). Key points pertaining to sustainable lifestyles are, for example, that they are not static or universal; that they are influenced by the time and the societal context within which they occur; that they should rest on a foundation of decreased financial gaps within the population; that knowledge and information is not enough to elicit desired behaviours; that most lifestyle-related impacts on the environment can be ameliorated by targeting the consumption domains of food, mobility, housing, consumer goods, and leisure; and that the civil society needs to participate if any top-down approaches are to be successful (UNEP 2016a).

Figure 1. Factors influencing sustainable lifestyles (from UNEP 2016a, p.23, with permission from UNEP).

Individual behaviours and choices are thus dynamically interrelated and co-evolving with technological innovation, infrastructure development, policymaking, economic structures and culture. Sustainable lifestyles are, however, possible within diverse social, cultural and technological contexts, which sits well with the expectation that a variety of lifestyle demands from different people and groups will remain in the future (Neuvonen et al. 2014). Individuals need structural changes within a society’s infrastructure and services to be supportive of sustainable lifestyle-choices, and campaigns for promoting sustainable lifestyles also need to appeal to other agendas (e.g. health, human rights, animal rights, moderation, social justice, solidarity etc.) to more effectively motivate a sustainable lifestyle for a wider group of people positioned in diverse social and economic circumstances (Hobson 2002; Evans & Abrahamse 2009). To be experienced as fully meaningful for the individual who is already making voluntary changes, the social, political, economic and business domains too need to participate in the change (Hobson 2002; Evans & Abrahamse 2009).

The lifestyle domains emerging from diverse sets of data (consumption patterns, sustainability indicators for carbon, material and ecological footprints, life-cycle analysis), and thus becoming the vital focal points for change management, are food, housing, mobility/transportation (including tourism and entertainment) and consumption of goods and services (Mont, Neuvonen & Lähteenoja 2014; EEA 2015; UNEP 2016a).
Neuvonen et al. (2014) point to how the limit of TMC 6-8 tonnes per year and per capita as an impact target for a sustainable lifestyle in effect takes into account an equal distribution of natural resources globally, although its overarching goal is to achieve future ecosystem health and resilience, thus also addressing the social justice aspect of sustainable development.

2.1.2. Pro-environmental behaviour

Similar to the definition of sustainable lifestyles, pro-environmental behaviours are behaviours that are deliberate expressions of a wish to minimise a potentially negative impact on the environment, e.g. reduced resource and energy use; reduced production of waste and pollution (Kollmus & Agyeman 2002). Pro-environmental behaviours can be both specific and general, manifesting the behavioural qualities of pro-ecology, frugality, altruism and equity (Hedlund-de Witt, de Boer & Boersema 2014). Another categorisation of pro-environmental behaviours is linked to their context: 1) home-based everyday (habitual) practices, and 2) less frequent behaviours that still have a high environmental impact, such as travel, leisure and tourism (Barr, Shaw & Gilg 2011).

Some factors that, according to Kollmus and Agyeman (2002), have an influence (positive or negative) on pro-environmental behaviours are: demographic factors (gender, years of education); external factors (institutional/infrastructure, economic, social and cultural norms); and internal factors (pro-environmental knowledge and awareness, motivation, attitudes, values, emotional involvement, locus of control, priorities, responsibilities). Even though Kollmus and Agyeman (2002) did not include it in their model they also acknowledge the influence of habits, desires for comfort and convenience, and of personality traits. When internal and external factors align and reinforce each other one sees the biggest influence on pro-environmental behaviour. A pro-environmental consciousness is made up of environmental knowledge, values and attitudes, and emotional involvement (Kollmus & Agyeman 2002).

However, it is not always easy to follow through on pro-environmental intentions. Steen-Olsen et al. (2012) warn of how the increased distance between end-consumer and the production of consumer goods, together with the ‘invisibility’ of all the natural resources (e.g. carbon, land, water) that are embedded in the products, makes it difficult to make informed choices.

2.2. Psychological considerations

If ecosystems with their multitude of components and process dynamics are deemed complex and unpredictable, the human mind is no less so. As is shown below, psychological variables such as emotions, worldviews, values, preferences, intention, self-identity, cognitive capacity and personality traits intermingle and interplay both within the individual psyche and in intimate connection with the surrounding environment and its constantly shifting events, circumstances and conditions. Processes and aspects driving or hindering sustainable lifestyles and pro-environmental behaviours are numerous and complexly interrelated. Aligning with the aim of this study, and the specific purpose of this Theory section, a selection of psychological perspectives have been chosen to provide a basic understanding of what drives and hinders behavioural change, and what mediating variables influence behavioural decisions and shapes broader sets of behavioural patterns. To avoid feeding the idea of ‘the rational human being’ it is important to remember that links between diverse psychological and behavioural concepts and phenomena are correlational, not causal (Bamberg & Möser 2007). Aside from observed tendencies on an aggregated group level, the behaviour of a single individual is extremely difficult to predict as there are too numerous and complexly interrelated factors influencing choices (some psychological and others contextual). Theoretical constructs are by necessity simplified versions of a rather messy reality (Hughes & Månsson 1988).

2.2.1. Psychological barriers to pro-environmental behaviour

Environmental psychology and social science research have identified a large number of psychological hindrances in relation to pro-environmental behaviour. Gifford (2011) presents an integrative framework with seven categories of psychological barriers towards climate mitigating behaviour change, and these categories are further detailed into 29 sub-categories (Table 1). Closely related to the selected focus for this study is the category of limited cognition, which points to the fact that people are less rational than they often claim and hope to be. The human brain is deemed to be not much different than it was some thousands
of years ago, and it has primarily evolved in an environment that has shaped humans to pay attention to immediate and changing stimulus, especially stimulus pertaining to welfare and survival. This puts humans at odds with the type of information gained from the environment regarding climate change, which is a slow and inherently uncertain process, dispersed over vast distances which makes it difficult to feel a personal concern for it even after having been informed of its existence (Gifford 2011; APS 2017). Even though people are able to consciously ‘override’ this ancient neurological programming by deliberately focussing on other/specific types of information, it does take more effort and awareness to do so. Other examples of barriers are expectations to be ‘saved’ by technological advancements, potentially restrictive social norms within one’s social context, behavioural momentum and a too limited behavioural repertoire and/or behavioural frequency (Gifford 2011).

Table 1. Psychological barriers to climate change mitigation and adaptation.

<table>
<thead>
<tr>
<th>Psychological barrier</th>
<th>Sub-category (how the barrier manifests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited cognition</td>
<td>Ancient brain, Ignorance, Environmental numbness</td>
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<tr>
<td></td>
<td>Uncertainty, Judgemental discounting</td>
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<tr>
<td></td>
<td>Optimism bias, Perceived behavioural control/self-efficacy</td>
</tr>
<tr>
<td>Ideologies</td>
<td>Worldviews, Supernatural powers</td>
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<td></td>
<td>Technologiesalvation, System justification</td>
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<tr>
<td>Comparison with others</td>
<td>Social comparison, Social norms and networks</td>
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<td></td>
<td>Perceived inequtiy</td>
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<tr>
<td>Sunk costs</td>
<td>Financial investments, Behavioural momentum</td>
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<tr>
<td></td>
<td>Conflicting values, goals and aspirations</td>
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<tr>
<td>Discredence</td>
<td>Mistrust, Perceived program inadequacy</td>
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<td></td>
<td>Denial, Reactance</td>
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<tr>
<td>Perceived risks</td>
<td>Functional, Physical, Financial</td>
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<td></td>
<td>Social, Psychological, Temporal</td>
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<tr>
<td>Limited behaviour</td>
<td>Tokenism, Rebound effect</td>
</tr>
</tbody>
</table>

(adopted from Gifford 2011, with permission from Robert Gifford)

Broadly, Gifford (2011) paints a picture of a three-phase evolution of what he calls ‘climate-related inaction’: 1) genuine ignorance about the problem, 2) being aware, but interference from diverse psychological processes hinders action, 3) when action is finally taken it either does not recur, has trivial impact or is even counterproductive (see also 2.2.4. Spillover effect). In their study on Swiss citizens, Stoll-Kleeman, O’Riordan and Jaeger (2001) found that there basically was a consensus about the ‘goodness’ of low-energy futures (in relation to climate change), yet almost none of the participants were willing to make personal changes to move towards such a lifestyle. One possible explanation for this gap is that attitudes towards climate change relate to social norms, while responsibility for inconvenient actions falls on the specific individual. The denial dynamic is not only due to personal socio-psychological processes, but it is also influenced by the societal discourse. From the focus group discussions, Stoll-Kleeman, O’Riordan and Jaeger (2001) synthesized four different ways with which the individuals cognitively ‘solved’ the discrepancy between their knowledge about climate change and their personal behavioural patterns:

- The ‘comfort’ interpretation – unwillingness to compromise on self-identity-related habits and preferences.
- The "tragedy-of-the-commons” interpretation – cognitively constructing a sort of cost-benefit-analysis showing that the personal costs of behaviour change unrealistically exceeds the social gains, thus any demands for personal changes are unreasonable.
- The “managerial-fix” interpretation – not accepting the extent of the climate change problem and/or belief that it will be solved by technological or regulatory means.
- The "governance-distrust” interpretation – lack of trust in governmental capability to deliver effective climate change mitigation policies, partly due to strong focus on economy and to the influence by various lobbies.

Steg et al. (2014b) proposes that action consequences related to hedonic values (i.e. ‘the comfort interpretation’ in Stoll-Kleeman, O’Riordan & Jaeger 2001) may be important barriers for behavioural change. Similarly, egoistic values are negatively correlated with pro-environmental behaviours (i.e. the 'tragedy-of-the-commons-interpretation’ in Stoll-Kleeman, O’Riordan & Jaeger 2001) (Steg et al. 2014b). The top three reported hindrances to pro-environmental behaviour that Rewir (2008) found in their study on Swedish
target groups for communication on the climate issue (in a report commissioned by the Swedish Environmental Protection Agency) was: higher cost for environmental alternatives; a sense of uncertainty of what actually is the best choice for the environment/climate; and difficulty of changing established behaviours (Rewir 2008).

Habits, which are automated behaviours activated by contextual cues, are powerful behavioural predictors as they affect how strongly intention and personal norms influence behaviour. The stronger the habit is established (through frequency of execution, i.e. degree of automaticity) the more influence it will have, and the more it needs to be deactivated before new behaviours have a true chance of establishing themselves (Klöckner 2013). Verplanken and Roy (2016) describe this process of opening up for new behaviours as 'habit discontinuity'. Margetts and Kashima (2017) claim that before a sustainable lifestyle can be said to have been established, pro-environmental behaviours will be experienced as more difficult than habitual (possibly harmful) behaviours. One way to promote habit changes is to take advantage of naturally occurring life transitions, such as becoming an adult, moving to a new home, marriages, births, and retirement (UNEP 2016; Verplanken & Roy 2016).

A 'cognitive need for closure' is both a psychological trait, with variations between individuals on how dominant it is, and a state that can be induced via stress- and anxiety-provoking stimulus. A high need for closure is associated with closed-mindedness, avoidance of uncertainty, wanting group conformity (derogating deviators), preference for a central (uniting) authority, denial of anything that contradicts expectations (schema), in-group favoritism, low tolerance for diversity, production of fewer hypotheses (less creative), and high post-decision confidence (Chernikova et al. 2017). The intolerance of uncertainty in combination with the existential givens of life, being that it is uncertain and constantly changing, leads to increased levels of worry and anxiety, and may result in closed-mindedness and aversion to new ideas and circumstances (Chernikova et al. 2017).

### 2.2.2. Psychological drivers of pro-environmental behaviour

In environmental scientific literature it might sometimes seem like humans mainly are motivated by negative psychological factors, such as greed, selfishness, fear, guilt or shame, or that the consequences of shifting towards a sustainable lifestyle largely would be expected to be negative (i.e. causing discomfort, inconvenience, sacrifice) (Corral Verdugo 2012). Positive psychology is a research field still in its early phases, but already it holds promises to complement the picture provided by parts of the environmental psychology science that is marked by a negative bias and a more pessimistic view of human nature. The reasoning behind the negativity focus is the survival value of a primary focus on potential threats rather than on positive and pleasant experiences. However, as humans not only wish to avoid harm but also want to feel pleasure, wellbeing qualifies as a behavioural motivator also for the sustainable categories of behaviour (Cooke & Fielding 2010; Corral Verdugo 2012). And, voices critical of the 'green agenda' often tend to downplay the more unattractive aspects of the strongly work-driven consumer-life fully cluttered with 'stuff'. This Soper (2008) calls the 'anti-hedonist tolerance', i.e. a form of habituation to the technological changes and gadgets that increasingly distract and numbs from sensual enjoyments, and over time obscures attention from the loss. But she warns of the danger of framing alternatives to the present consumer-society in overly nostalgic or retrospective modes. Although there is much to be learned from history there are many avant-garde practices emerging within the 'green movement'. At its core are alternative conceptualisations of what it means to flourish and thrive, and of what is actually experienced as pleasant, fulfilling and meaningful (Soper 2008). People are more likely to freely choose a sustainable lifestyle when it is associated with expectations of pleasure and satisfaction from positive self-actualisation (Steg et al. 2014a), and when engaging in those behaviours fulfils the psychological needs for autonomy, competence and relatedness (Cooke & Fielding 2010). In studying effects of subliminal priming (i.e. communication targeting non-conscious perception) Veltkamp, Custers and Aarts (2011) found that motivation can be increased, even in absence of specific needs related to the motivational object, when the message was linked to a positive affect (reward signal).

Norms and accepted social practices change over time, just as emotional responses to objects and practices do. This opens up for cultural reconfigurations and new perspectives on how to meet human needs. Soper (2008) identifies this desire for diversity, change, self-development and novelty as specifically human. If sustainable lifestyles and a 'downshifting narrative’ were to become normalised and adopted by the wider
mainstream society, the observation that living sustainably does not solely entail hardship, sacrifice and deprivation but also offers its own enjoyment and satisfactions would more often become evident through personal experience rather than via persuasion (Shirani et al. 2015). When associations to a sustainable lifestyle are decoupled from dire expectations of personal sacrifice egoistic and hedonic values may also be recruited as pro-environmental change drivers (Steg et al. 2014b).

Inspiration and encouragement can be found in psychological research showing how positive behavioural activators (e.g. emotions, virtues, strengths, competencies) and psycho-emotional consequences (e.g. well-being, happiness, satisfaction, relatedness) are related to sustainable behaviour (Cooke & Fielding 2010; Corral Verdugo 2012). Psychological and contextual factors that have been positively associated with an individual’s disposition towards pro-environmental behaviour are a biospheric orientation (unity with nature, environmental protection, world of beauty, worldview considering humans as part of nature), positive personality traits (responsibility, external locus of control, extroversion, consciousness, future-orientation), psychological capacities (environmental knowledge, pro-environmental skills, pro-environmental competency), situational factors (physical – technical tools, geographical climate, savings) and normative factors (social models/norm, legal regulation) (Corral Verdugo 2012).

Klöckner (2013) assumes in his ‘comprehensive action determination model’ that intentions and perceived behavioural control directly determines pro-environmental behaviour, together with habit strength as both a predictive and moderating factor. A positive side to the influence of habits is that as sustainable habits are formed they require less effort to be maintained, and are as robustly stable against change or extinction as any other category of habitual behaviours. Furthermore, Klöckner’s model (2013) assumes personal norms to be predicted by awareness of consequences and ascription of responsibility, perceived behavioural control, social norms, values and worldviews. Bamberg and Möser (2007) found, through a replication of an earlier meta-analysis of psycho-social determinants for pro-environmental behaviour, indications that intention to act pro-environmentally explained almost a third of the pro-environmental behavioural variance, and also that intention acts as a mediator for all other psycho-social variables. Intention is primarily formed by attitude, personal moral norms and perceived behavioural control. Personal moral norms appear to be shaped by a combination of internal attribution (seeing oneself as a moral agent), social norms, problem awareness and feelings of guilt. The ‘self-determination theory’ provides similar links between understanding the rationale for pro-environmental behaviours, then actively engaging in such behaviours and integrating those behavioural choices into one’s self-view, and lastly, experiencing enjoyment from acting in accordance with one’s self-identity (Cooke & Fielding 2010). Concerning motivation for pro-environmental behaviours specifically, Bamberg and Möser (2007) argue for a combination of self-interest and pro-social motives, but they also emphasize that future research will need to explore more how moral norms are being formed and activated. Broadly one can assume that for motivation to translate into action the driving forces need to match or exceed the restraining forces (Kruglanski, Chernikova & Schori-Eyal 2014).

‘Goal theory’ is a framework for understanding how goals and behaviours are related. Goals can be divided into three categories: hedonic (feeling good), gain (guarding/improving one’s resources) or normative (acting appropriately) goals. Goal categories influence perception and the way, and what, information becomes accessible for processing, thus affecting which alternatives are considered when deciding on an action (Steg et al. 2014a; Steg et al. 2014b). Normative goals for pro-environmental behaviours should be encouraged as they are associated with voluntary behaviours that benefit others (even future generations) and the environment, even when such actions are costly or difficult (Steg et al. 2014a). What goal(-s) are presently active varies over time and contexts, but some goals may be chronically activated and thus be demanding priority regardless of circumstances. It is, however, likely that most goals are malleable and subject to change, which makes them available for priming effects. What goal will be pursued in a given situation is also determined by resource availability (e.g. money, time) for goal achievement (Margetts & Kashima 2017).

Values are understood to be more general than goals, and as transcending situations and contexts (Steg et al. 2014b). The value dimensions presented by ‘value theory’, and elaborated upon by Steg et al. (2014b), are on the one hand a continuum from ‘openness to change’ to ‘conservatism’, and on the other hand a scale ranging between ‘egoistic’ (focussing on personal gains/benefits) and ‘hedonic’ (focussing on personal comfort/pleasure) to ‘altruistic’ (concern for the welfare of other human beings) and ‘biospheric’ (concern for the quality of nature for its own sake) values. In general, it has been found that altruistic and biospheric values are linked to pro-environmental attitudes and behaviours (Corral Verdugo 2012; Steg et al. 2014b),
but hedonic and egoistic values can also be satisfied by pro-environmental actions (e.g. feeling good when spending time in 'clean' nature, and saving money while saving energy) (Soper 2008; Evans & Abrahamse 2009). Psychological benefits from pro-environmental behavioural change, in Soper’s (2008) terms labelled 'alternative hedonism', can for the individual also be reaped from 1) accessing new modes of living 'the good life' (e.g. time for family, friends and hobbies, healthier eating practices, natural physical exercise etc.), and 2) avoiding the 'ills' of the work-driven and consumption-based lifestyle (e.g. stress, congestion, pollution, ill health, loss of community and personal contacts). Respondents in a study by Evans and Abrahamse (2009) talked about the pleasure they experienced from shifts in how they ate (e.g. 'slow food'), how they transported themselves (e.g. giving up car and walking/bicycling instead), and how they chose to spend time with family and friends, or pursued hobbies, instead of devoting their lives to all that goes into maintaining a consumer-based lifestyle.

Another way of distinguishing between sources of benefits and rewards for acting pro-environmentally are 'extrinsic' (e.g. good reputation, preservation of natural resources, material savings and gains) and 'intrinsic' sources (e.g. satisfaction, feeling competent, happiness, wellbeing, psychological restoration, social relatedness). Leading a life primarily based on intrinsic values and motivation is associated with psychological health and wellbeing (Hedlund-de Witt, de Boer & Boersema 2014). Activities that are intrinsically reinforced, or autonomously motivated as 'self-determination theory' defines it, are also more durable as they do not depend on external reinforcement in order to avoid behavioural extinction. The reward is in the action itself - it feels inherently good to perform it (Cooke & Fielding 2010; Corral Verdugo 2012). Aiming to strengthen the pro-environmental self-identity could be a cost-effective way of promoting sustainable lifestyles, rather than relying on external incentives that may undermine intrinsic motivation as well as risk being extinguished at the removal of the external incentive (van der Werff, Steg & Keizer 2013).

2.2.3. Pro-environmental self-identity

Self-identities are formed both by individual motivations (e.g. self-enhancement, self-esteem) and by one's various social roles and the expectations of others. Identities fill the dual role of both distinguishing oneself from others and signalling to which groups one belongs (Whitmash & O’Neill 2010). Identity-formation is based on how the performed behaviour signals a desired identity (e.g. 'environmentalist'), and is fuelled by the individual’s wish to be perceived as a consistent person by his/her peers (Brick, Sherman & Kim 2017). In an experimental study on subliminal priming for generosity Andersson et al. (2017) found indications for priming efforts to mainly enhance already underlying values. With a pro-environmental self-identity one communicates that caring for the environment is important, and that this will guide one’s behaviours. A pro-environmental self-identity is established from self-observation, that is, perceiving and remembering oneself acting pro-environmentally, both regarding general and specific behaviours (Whitmash & O’Neill 2010).

van der Werff, Steg & Keizer (2014) point out that a degree of cognitive-perceptual abstraction helps one to act morally in a generalised way.

Openly labelling oneself and one’s behaviours as 'environmentalist' strengthens the pro-environmental self-identity, which makes for a stronger predictor of future pro-environmental attitude and behaviour than if one would act pro-environmentally only to reduce a sense of guilt (Lacasse 2016). van der Werff, Steg and Keizer (2014) found that people’s environmental self-identities were strengthened when they were reminded of having performed (eight) past pro-environmental behaviours, and especially when they remembered themselves performing a variety of behaviours, and when the behaviours were unique and difficult (costly, effortful) to perform. However, as is discussed below in more detail (2.2.4 Spillover effect), being reminded of past pro-environmental behaviour may cause a negative effect by eliciting a sense of having done one’s share already (Truelove et al. 2014). Whether reminding people of their past pro-environmental behaviours always and specifically activates their pro-environmental self-identity is also problematised by Margetts and Kashima (2017), who suggest that it perhaps activates a goal achievement framework instead.

How much self-identity in reality affects behaviour could also be linked to cultural contexts. In some cultures (e.g. USA) 'social identity' influences pro-environmental behaviours, whereas in other cultures (e.g. Japan) 'social norms' may have a stronger influence (Brick, Sherman & Kim 2017). That social norms are important guides for behaviour could also possibly be inferred from Chen and Williams (2012) who found that re-lived (remembered) as well as pre-lived (imagined) social pain was experienced as more painful than imagined (past or future) physical pain. It is, however, not straightforwardly positive to label someone an
’environmentalist’. As Brick, Sherman and Kim (2017) found in their study with US citizens who regarded themselves as ‘anti-environmentalists’, connecting their pro-environmental behaviour with an pro-environmental identity made the behaviour less likely in the future since they did not want to be regarded as being ‘environmentalist’.

2.2.4. Spillover effects

It has been shown that eliciting a specific pro-environmental behaviour may result in more pro-environmental behaviours, but also that it may lead to a negative spillover effect where the initial benefits from the performed behaviour is eradicated by subsequent behaviours (Truelove et al. 2014). Spillover effects can thus be either positive (an initial pro-environmental behaviour leading to more pro-environmental actions) or negative (engaging in a pro-environmental action makes further such actions less likely – i.e. through creating a sense that one has done one’s share, or by having reduced the anxiety/guilt that was motivating the initial behaviour, thus having exhausted the source of behavioural motivation). Negative spillover is not only problematic as a hindrance from allowing distinctive behaviours to develop into behavioural patterns and lifestyles, it may also bind people to behaviours that are ineffective or, in worst case, even causing an increase in harmful behaviours. Some other names for negative spillover found in the theoretical literature are ‘tokenism’, which deals with the tendency of adopting easy behaviours that have too small or no real effect (Gifford 2011; APS 2017); ‘single action bias’, which is a term describing how risk-perception is lowered after having performed one action, regardless of how effective that action was in actually reducing the risk (Truelove et al. 2014); ‘moral licensing’ which is linked to contribution ethics and points to how people refrain from further action as they feel they have done their share (Truelove et al. 2014; Lacasse 2016); and ‘rebound effect’, which describes how after having performed some pro-environmental behaviour the impact of that action is offset by subsequent actions, such as rewarding oneself with an environmentally harmful activity because one ‘has been doing so good’ (Gifford 2011; APS 2017).

Table 2 offers a summary of strategies for eliciting positive spillover and avoiding negative spillover.

Table 2. Some suggestions for eliciting positive spillover and avoiding negative spillover.

<table>
<thead>
<tr>
<th>Suggested strategies</th>
<th>How it works</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labelling someone as an ‘environmentalist’ (only if ‘true’ and seen as positive).</td>
<td>Strengthens pro-environmental self-identity.</td>
<td>Lacasse 2016</td>
</tr>
<tr>
<td>For establishing long-term pro-environmental behaviours it is better to encourage more costly/difficult behaviours.</td>
<td>Strengthens pro-environmental self-identity.</td>
<td>Steg et al. 2014a; Truelove et al. 2014; van der Werff, Steg &amp; Keizer 2014; Margetts &amp; Kashima 2017</td>
</tr>
<tr>
<td>Activation of a ‘sustainability goal’.</td>
<td>Establishing links between multiple pro-environmental behaviours.</td>
<td>Margetts &amp; Kashima 2017</td>
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Strategies to avoid/be careful with

<table>
<thead>
<tr>
<th>How it works</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overemphasizing extrinsic rewards.</td>
<td>May crowd out existing intrinsic rewards. Behaviour may be extinguished when extrinsic reward is removed.</td>
</tr>
<tr>
<td>Concrete reminders of past pro-environmental behaviours.</td>
<td>May give a feeling of having done one’s share already.</td>
</tr>
<tr>
<td>Labelling someone an ‘environmentalist’ when it has a negative connotation for them.</td>
<td>May stop with existing pro-environmental behaviours to avoid being seen as ‘environmentalist’.</td>
</tr>
<tr>
<td>Labelling someone an ‘environmentalist’ based on too little/not true ‘evidence’.</td>
<td>When pro-environmental behaviour is driven by fear/guilt, the affect-based motivation might be removed.</td>
</tr>
<tr>
<td>Suggesting too easy actions/goals.</td>
<td>Does not strengthen pro-environmental self-identity, and may cause feeling of having done one’s share.</td>
</tr>
<tr>
<td>Primarily offer opportunity to recycle.</td>
<td>May increase consumption because of guilt reduction.</td>
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</table>

Truelove et al. (2014) have systematised and structured the insights about spillover effect from a wide field of research, providing arguments for a reasoned approach to climate communication and behavioural interventions. They found some major factors influencing behaviours and choices, such as decision mode
Encouraging calculation-based decision-making (e.g. cost-benefit-analysis) show little net spillover effect, while emphasis on affect-based decision-making invites the danger of negative spillover via single action bias, moral licensing or rebound effects. It seems that rule-and-role-based decision-making, where normative contextual and social cues trigger specific behaviours, latches on to the power of social identity which is associated more with positive spillover. In reality people most likely employ multiple decision-modes simultaneously, weighing the results from the different ‘analyses’ before making a choice. One can, however, expect people to differ in their tendencies, and as a rule of thumb one can point to how people with a preference for a calculating outcome-focus more likely tend towards negative spillover, and the opposite for those who favour a rule-/norm-based focus. This suggests that one should aim to encourage a norm-based motivation rather than focussing on the benefits of the behaviour when promoting pro-environmental behaviours and a sustainable lifestyle, as well as taking care not to crowd out intrinsic motivation by over-emphasizing extrinsic reinforcements. Furthermore, Truelove et al. (2014) also found that abstract reminders of behaving pro-environmentally in the past was more likely to lead to positive spillover (via a generalised pro-environmental self-identity) than more concrete reminders did. This could possibly be explained by how concrete reminders might give credence to thoughts of ‘having done one’s share already’. Thus, a pro-environmental self-identity may act as a mediator for positive spillover, whereas fear-/guilt-driven behaviour makes negative spillover more likely. So, the central concept of the positive spillover effect seems to be self-identity (Whitmarsh & O’Neill 2010; Truelove et al. 2014; van der Werff, Steg & Keizer 2014; Lacasse 2016; Brick, Sherman & Kim 2017). The negative spillover effect, on the other hand, seems to be functionally related to how the performance of a pro-environmental behaviour alleviates the emotion (e.g. fear, guilt, shame) driving the behaviour, thus eradicating the motivational foundation for further behaviours (Truelove et al. 2014; Lacasse 2016).

When a pro-environmental self-identity can be encouraged, strengthened and supported in a sensitive way, much positive spillover follows automatically. However, it is not an uncomplicated matter to link distinctive behaviours with a desired self-identity and expect a set of behaviours as a given result. For instance, if a person has a high degree of environmental knowledge as well as a strong pro-environmental self-identity one might expect positive spillover due to them realising the relatedness between behaviours within and between lifestyle domains. For people with a high degree of environmental knowledge but a weak pro-environmental self-identity (or even an anti-environmentalist self-identity) that same knowledge may, on the contrary, lead to them concluding that one action within each domain should suffice, thus resulting in a negative spillover (Truelove et al. 2014). In a study with ‘lifestyle focus groups’ Barr, Shaw and Gilg (2011) found support for positive spillover between home-based (everyday, habitual) pro-environmental behaviours, but not across contexts to the issues of air travel, tourism and leisure activities. Here even the most committed environmentalists seemed to accept a degree of discrepancy between ingrained values (self-identity) and overt choices. Justification for engaging in known environmentally harmful practices revolved around perceived social benefits, financial and time savings, and it being a social norm to fly often and cheaply.

### 2.2.5. Imagination

The content of one’s imagination can be positive or negative, pleasant or unpleasant, realistic or innovative. However, imagining future events does not mean fantasising or daydreaming about them, but to engage with a future scenario judging it to hold some degree of attainability. Simply daydreaming does not increase motivation, as it may provide sufficient undemanding enjoyment in the moment. It may also divert from including realistic obstacles and leave one unprepared for practical action (Vasquez & Buehler 2007). Exercising the imaginative capacity may lead to beneficial outcomes such as behavioural flexibility, improved long-term planning, emotional resilience and wellbeing (Yusoff & Gabrys 2011; Chiu 2012; Honey-Rosés et al. 2014; Thakral, Benoit & Schacter 2017). Despite these positive effects, imagining the future seems to be rather difficult. Indications showing that people tend to remember more personal change when they think about their past than they expect to experience in the future has been explained by Quoidbach, Gilbert and Wilson (2013) with a number of hypotheses. One explanation revolves around the differences in cognitive effort involved in the two mental tasks of remembering (cognitive reconstruction) and of imagining (cognitive construction), and reflects how the perceived difficulty with ‘coming up with’
as many concrete ideas for future change as memory brought up from the past can be confused with the likelihood of it happening. This is supported by earlier research (Anderson 1983) stating that the ease with which one imagines an event affects how likely it is judged to be. Individuals’ expectations of their own behaviour is, according to Anderson (1983), partly based on how easy it is for them to ‘see’ themselves performing that action, which increases a sense of control through perceived smoothness in the action selection process (Wenke, Fleming & Haggard 2010). Through their influence on the emotional systems in the brain, imagined events may be experienced as quite similar to real events, especially when the visual vividness of the imagery increases and stimulates a stronger emotional response (Chen & Williams 2012). Anderson (1983) suggests that by manipulating the cognitive availability of a behaviourual scenario one can increase the expectancy of that action being performed. This is supported by research on subliminal priming showing behavioural effects on information processed even on non-conscious levels (Veltkamp, Custers & Aarts 2011). Another hypothesis explaining the lower predictions of future change (Quoidbach, Gilbert & Wilson 2013) focuses on the overestimation of how optimal the present state of self is, with a sense that all past experiences have been leading up to a present-day peak. Both hypothesised processes lead to suboptimal engagement with the future, and less than optimal decision-making.

For individuals with a high need for cognitive closure, time spent spontaneously in an imaginative mode is likely to be short as they strive to find (quick and firm) answers to avoid their unpleasant experience of uncertainty and ambiguity, which causes them anxiety. This tendency manifests for example as avoidance of uncertainty, intolerance of ambiguity and closed-mindedness (Brizi, Mannetti & Kruglanski 2016; Chernikova et al. 2017). None of those responses are compatible with creativity and innovative lifestyle changes, but they are highly likely to be activated by the increasing reports on future environmental and societal risks and threats.

Information and details retrieved from memory can be used and recombined to create ‘new events’ (Thakral, Benoit & Schacter 2017), and Addis, Wong and Schacter (2007) highlights the function and value of imagination by suggesting that the retrieval of past events (memory) primarily has the role of enabling future thinking, i.e. providing stimulation for future scenarios and anticipation of possible needs. This function is evolutionary advantageous when employed as a modifier of current behaviour patterns to meet those anticipated future needs. Imagining the future, despite it being inherently unpredictable, also improves behavioural flexibility, creativity and long-term goal achievement (Chiu 2012).

Future needs and challenges reach beyond the sphere of the individual and Honey-Rosés et al. (2014) posit that imaginative exercises may have multiple beneficial outcomes. Exercising the imaginative capability might broaden temporal depth and provide contexts for visualising the potential consequences that decision-making might have on the future, thus supporting a transformative learning-based leadership. When solutions and future pathways seem unimaginable people may disengage from the issue, so exercising the imaginative capacity may help prevent that (UNEP 2016b). It might also increase emotional resilience and the ability and willingness to act morally responsibly with future generations in mind (Honey-Rosés et al. 2014). For ease of personal engagement Bashir et al. (2014) advises that communication about the future should make it appear temporally and socially closer to the audience. However, the temporal distance provided by future imagination facilitates high-level and abstract mental construction, which is related to creativity (Chiu 2012), and to imputed meaning and importance of goals (Vasquez & Buehler 2007). Thakral, Benoit and Schacter (2017) state that imagining the future (episodic simulation) has a positive effect on a number of psychological functions, such as long-term decision-making and planning, wellbeing and pro-social intentions. It has also been positively correlated to creativity and problem-solving (Chiu 2012; Honey-Rosés et al. 2014). Yusoff and Gabrys (2011) claim that the counterbalancing effect imagination has between ‘what is’ and ‘how it might be otherwise’ is one of its most important potentials, supporting the development of adaptiveness and emotional resilience. How people interpret their past behaviour can alter their self-view and it may influence their future behaviours and attitudes (Lacasse 2016). Maybe the same is true even if the behaviour they ‘remember’ having performed only took place in their imagination?

2.3. Recommendations for sustainability interventions

In an attempt to combine the knowledge offered above into practical recommendations for communicative activities and behavioural interventions, which was represented in the form of a guided imagination/visualisation in this study, diverse strands of research-based suggestions are summarised in Table 3.
Table 3. Summary of recommendations for sustainability interventions and communication.

<table>
<thead>
<tr>
<th>What to do</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identity, norms, and visions</strong></td>
<td></td>
</tr>
<tr>
<td><em>Allow for lifestyle diversity.</em></td>
<td>Mont, Neuvonen &amp; Lahteenoja 2014; EEA 2016; UNEP 2016b</td>
</tr>
<tr>
<td><em>Reframe quality of life and wellbeing, inspire positive visions.</em></td>
<td>Soper 2008; Mont, Neuvonen &amp; Lahteenoja 2014; Shirani et al. 2015; UNEP 2016b; APS 2017</td>
</tr>
<tr>
<td><em>Supply cues about social norms and social support.</em></td>
<td>REWIR 2008; Cooke &amp; Fielding 2010; Whitmarsh &amp; O’Neill 2010; Klöckner 2013; Steg et al. 2014a; Shirani et al. 2015; UNEP 2016b; Verplanken &amp; Roy 2016; APS 2017</td>
</tr>
<tr>
<td><em>Strengthen pro-environmental self-identity, e.g. by reminding of past pro-environmental behaviours.</em></td>
<td>Whitmarsh &amp; O’Neill 2010; Truelove et al. 2014; van der Werff, Steg &amp; Keizer 2014</td>
</tr>
<tr>
<td><em>Focus on social innovation.</em></td>
<td>Mont, Neuvonen &amp; Lahteenoja 2014</td>
</tr>
<tr>
<td><em>Base messages on intrinsic values and non-materialistic worldviews.</em></td>
<td>Cooke &amp; Fielding 2010; Hedlund-de Witt, de Boer &amp; Boersema 2014; Shirani et al. 2015; APS 2017</td>
</tr>
<tr>
<td>Encourage normative and multiple (sustainability) goals.</td>
<td>Steg et al. 2014a; UNEP 2016b; Margetts &amp; Kashima 2017</td>
</tr>
<tr>
<td>Adapt the message and make future seem personally significant (but viewed from a third-person perspective).</td>
<td>Whitmarsh &amp; O’Neill 2010; Verplanken &amp; Roy 2016; APS 2017; Vasquez &amp; Buehler 2007</td>
</tr>
<tr>
<td><strong>Behaviours</strong></td>
<td></td>
</tr>
<tr>
<td><em>Provide practical behavioural recommendations.</em></td>
<td>Cooke &amp; Fielding 2010; Klöckner 2013; UNEP 2016b; APS 2017</td>
</tr>
<tr>
<td>For ‘anti-environmentalists’ – target private behaviours without environmental label; spend little/no time trying to make sceptics/climate deniers change opinion.</td>
<td>Brick, Sherman &amp; Kim 2017; Rewir 2008</td>
</tr>
<tr>
<td><em>Provide opportunity for habit disruption and new contextual and behavioural cues.</em></td>
<td>Klöckner 2013; UNEP 2016b; Verplanken &amp; Roy 2016</td>
</tr>
<tr>
<td><em>Envision learning opportunities, skills mastery (individual and collective), social connection and community contribution.</em></td>
<td>Vasquez &amp; Buehler 2007; Cooke &amp; Fielding 2010; Whitmarsh &amp; O’Neill 2010; Mont, Neuvonen &amp; Lahteenoja 2014; EEA 2016; UNEP 2016b; APS 2017</td>
</tr>
<tr>
<td>Target high impact behaviours to avoid negative spillover.</td>
<td>Truelove et al. 2014; UNEP 2016b; Margetts &amp; Kashima 2017; Wynes &amp; Nicholas 2017</td>
</tr>
<tr>
<td><strong>Strategies</strong></td>
<td></td>
</tr>
<tr>
<td>Systematic planning, implementation and evaluation of behavioural interventions.</td>
<td>Steg &amp; Vlek 2009; UNEP 2016b</td>
</tr>
<tr>
<td>*Multiple approaches – 1) bottom-up: individuals/households (social innovation &amp; local sustainability practices); 2) top-down: policy-makers (changing the societal context, e.g. infrastructure, incentives, technology).</td>
<td>Hobson 2002; Neuvonen et al. 2014; EEA 2016; UNEP 2016a; UNEP 2016b; APS 2017</td>
</tr>
<tr>
<td>Multiple framing perspectives – 1) <em>promotion</em>: promote goal achievement and increased gains; 2) <em>prevention</em>: focus on minimising losses. Adapt message to suit different groups/values/attitudes.</td>
<td>Rewir 2008; Schome &amp; Marx 2009; Steg et al. 2014b; APS 2017</td>
</tr>
<tr>
<td><em>Make future appear temporally and socially closer.</em></td>
<td>Bashir et al. 2014</td>
</tr>
<tr>
<td>Supportive messages and activities for connecting to nature.</td>
<td>APS 2017</td>
</tr>
<tr>
<td><em>Align pro-environmental messages with other communicative agendas (e.g. health, human rights, animal rights, moderation, downshifting, social justice, solidarity)</em></td>
<td>Hobson 2002; Evans &amp; Abrahamse 2009; Cooke &amp; Fielding 2010; Shirani et al. 2015; UNEP 2016b</td>
</tr>
<tr>
<td><em>Appealing narrative storytelling (in appropriate language) combined with scientific information, vivid imagery and experiential scenarios. Delivered by trusted messenger.</em></td>
<td>Schome &amp; Marx 2009; Shirani et al. 2015; UNEP 2016b</td>
</tr>
<tr>
<td><em>Include both protection of physical environment (conservative consumption of natural resources) and of social environment (through solidarity and fairness).</em></td>
<td>Hobson 2002; Corral Verdugo 2012</td>
</tr>
<tr>
<td>Emphasize ‘legacy’ - what to leave for future generations.</td>
<td>Brick, Sherman &amp; Kim 2017</td>
</tr>
<tr>
<td>Communication– remember to also listen and to co-create.</td>
<td>EEA 2016; UNEP 2016a; UNEP 2016b; APS 2017</td>
</tr>
</tbody>
</table>

* Incorporated into guided imagination of 2028 (see also 3.2.2. Guided imagination of 2028 and Appendix B) in an attempt to provide an everyday scenario-narrative.

Klöckner (2013) provides a quick model for behavioural interventions and suggests that interventions primarily should focus on influencing intentions, habits and perceived behavioural control. Attitudes, social and personal norms should be targeted in support of influencing the intention. For strategic reasons Hobson (2002) points to the importance of framing interventions and communication within a larger societal context. He warns that appeals for the individual consumer to make pro-environmental changes might back-fire if this is promoted without a background context of governmental responsibility and structural support for...
making equitable and fair choices. Schome and Marx (2009) also recommend that care be taken to frame messages from multiple perspectives and to adapt the message to appeal to different groups, attitudes and values. Regarding communicative content it is suggested to combine scientific information and scenarios that involve experiential imagery (Schome & Marx 2009).

To make interventions more effective Steg and Vlek (2009) emphasize the need for systematic planning, implementation and evaluation, which includes identification of target behaviour(s) and underlying behavioural drivers, and selection of appropriate intervention to connect to and change the specific behaviour(s) and their determinants. Finally, they advise that evaluations always be included in the intervention plans, with assessments of how the intervention has affected the behaviour(s) and its drivers as well as the resulting quality of life and environment. UNEP (2016b) supports this systematic approach and offers a four-step strategy roadmap for developing sustainable lifestyles (Figure 2).

### Figure 2. Strategy roadmap for developing sustainable lifestyles (based on UNEP 2016b).

The Australian Psychological Society recently produced a handbook with scientifically supported strategies - *The Climate Change Empowerment Handbook – psychological strategies to tackle climate change* - for the purpose of supporting individuals, groups, institutions and communities to increase their communication, collaboration and engagement with climate-related issues. The psychological strategies are summarised by the acronym ACTIVATE: Acknowledge feelings; Create social norms; Talk about it; Inspire positive visions; Value it; Act personally and collectively; Time is now; Engage with nature (APS 2017).

In order to avoid debilitating emotional reactions to the climate change threats, APS (2017) recommends the development of emotional self-regulation skills, such as acknowledging and expressing feelings, seeking social support, keeping healthy routines, stress management and psychological restoration, problem-solving, taking action and being self-compassionate. In the same way that one is inspired by others, one should be aware of how one can make one’s own pro-environmental choices, and one’s satisfaction with making them visible to others. In this way one’s self and one’s efforts can serve as a model for others and thus contribute to the development of pro-environmental social norms. One of these norms should ideally be about opening up communication around environmental issues, but making sure not to perpetuate myths. Instead, APS (2017) encourages the gathering of science-based information and facts, and engaging people.
in everyday conversation as well as engaging with politicians and policymakers. In communication it is important to remember to also listen, with interest and respect, as everyone has something to contribute. When working together with others, positive visions of what a sustainable society might entail can emerge and function as powerful motivators for making the needed lifestyle changes. Visions should of course be inspiring, but they also need to be plausible and suggesting constructive actions that will involve people in making the effort – both for themselves and for others. The social norms portrayed in the positive visions should ideally connect diverse sets of values, but with an emphasis on intrinsic values such as a sense of community, positive self-identity, connection to friends and family, caring for and cooperating with others, and pride in helping to make the world better. Acting pro-environmentally (i.e. reducing one’s carbon footprint), individually and/or collectively, has a psychological significance in itself since it helps to avoid a sense of helplessness or despair. And it acts as a reminder that climate change is personally relevant as it threatens people and places that one cares about. At the heart of it all is nature. With a strong relationship to nature motivation for pro-environmental behaviour increases, at the same time spending time in nature restores one’s energy and wellbeing, thus providing the stamina needed for future changes (APS 2017).

2.4. Summary of theoretical overview

The insights from the theoretical overview which are most relevant for this study are how the processes of self-identity formation and habit discontinuity can support the development of sustainable lifestyles. They appear to be potentially effective areas for intervention when the intent is to boost the inclination towards behavioural change. Both of these areas were addressed by the guided imagination offered to the test group in this study. The research questions all revolve around the assumed association between self-identity, habits and lifestyle/behaviour. What was being explored in the experiment was whether activating the imagination (guided imagination and writing assignment) could have a similar effect on pro-environmental self-identity as being reminded of past pro-environmental behaviours (Whitmarch & O’Neill 2010; Truelove et al. 2014; van der Werff, Steg & Keizer 2014). Additionally, the experiment tested whether the time spent in imagining oneself in a future scenario different from the present everyday life (thus suspending the current lifestyle while being provided with new contextual and social norm cues) could cause a ‘habit discontinuity’ through an imagined life transition (UNEP 2016b; Verplanken & Roy 2016), as well as the imaginary ‘rehearsal’ of new habits could increase the cognitive availability of a new behavioural script and thus augment the expectancy of acting in that way (Anderson 1983; Wenke, Fleming & Haggard 2010; Veltkamp, Custers & Aarts 2011).

3. Method

The method and instruments employed in this project were specifically designed to explore the questions that have arisen from the crisis scenario described in the introduction and from the applicable theories, hypotheses and scientific results described in the Theory section of this paper. The overall approach was thus deductive, with an experimental design (Table 4) testing the research questions (Bryman 2011). The sentiment behind the entire project was one of exploration, and it should be viewed as a pilot study.

3.1. Procedure

The experimental situation (Table 4), which was executed in an individual setting, began with a brief introduction and information about how the data would be recorded, archived and used in regards to anonymity, and also with a reminder that participation at any point could be stopped should the participant wish to disengage. The experiment per se began with a self-assessment questionnaire on sustainable lifestyle-behaviours to provide a baseline assessment (1). After the ‘intervention’, which was the guided future imagination and writing for the test group (B2a+B2b), or the guided present-day self-reflection and writing for the control group (A2a +A2b), all the participants again filled in the lifestyle questionnaire (3), but this time while trying to imagine how they will act in the year 2028. As part of the second questionnaire there were also questions of how much they predict they will change in the future, to what degree they see themselves as having a pro-environmental self-identity, and an open question regarding what changes are assumed to be important to make in the coming ten years (3). Demographic data was lastly recorded on a separate document to avoid prompting the present self-identity. The whole experimental procedure took from 50-60 minutes per participant.
3.1. Methodological limitations

This study focussed on immediate effects of the experimental intervention. Ideally there would have been a follow-up assessment some months, or maybe even a year, after the intervention to assess whether any motivational changes had translated into actual changes in the participants’ lifestyles. The exposure time for the intervention was also brief (+30 minutes) and might not be sufficient for the identification with and internalisation of a future sustainable lifestyle, or to function as a ‘disruption’ of present habits. Another limitation was the relatively small sample size, which only allows for speculations around tentative tendencies and for suggesting pathways for future research.

A limitation related to the instruments was that the lifestyle questionnaire, with its aim being to measure reported changes between pre- and post-intervention assessments, does not capture domain-related behaviours in an exhaustive way. For each domain only six behaviours were chosen from a criteria focussing on accessibility of the behaviours, i.e. that they should be relatively easy for the participant to assess without access to, for example, electricity bills or car mileage.

With self-report assessments always comes the risk of ‘social desirability effects’ in the reported data (Brick, Sherman & Kim 2017). Even with the intent of providing a ‘neutral’ invitation to participate in the study, information that no individual analysis would be done (only group results), and with a brief description of the project there is still always the possibility that participants through their own guesses and conclusions answered the questions to ‘please’ the researcher. However, that risk applies equally to both groups, and since the aim is not to assess a ‘true value’ of sustainability but rather a propensity/readiness for change it should be fairly balanced out as an influence on the results. A final limitation was that accuracy of behavioural self-reports depend on introspective honesty as well as self-observational competence.

3.2. Instruments

3.2.1. Lifestyle questionnaire

To provide both a baseline assessment of current lifestyle and a post-intervention assessment of predicted changes, two lifestyle questionnaires (Appendix A) were designed specifically for this experiment. Inspiration was found in the theoretical overview and then adapted to current needs and circumstances. To simplify the self-observational task, pro-environmental behaviours that would be easy to assess without access to items such as energy bills were chosen for the questionnaire. As stated above, the purpose was not to categorise the responses into levels of sustainability, but only to record any self-predicted changes between pre- and post-intervention assessments.

Regarding the sustainable lifestyle domains (food, housing, transport, consumption), the questions were chosen for their relevance (see 2.1.1 Sustainable lifestyles), and formulated for easy recollection of personal behaviour. The self-assessments were made on Likert scales of intensity or frequency (1-7), or as a stated number (frequency). The reasoning behind the extended Likert scales (instead of for example only 1-5) was to a) make it harder to remember the selected response made in the pre-intervention assessment, and b) provide an opportunity to report also smaller steps of predicted future change. What the study wished to measure was an orientation towards change, not necessarily complete ideological conversion. Based on the individual baseline established in the pre-intervention assessment, any changes in the post-intervention assessment were marked -1 for lower degree of sustainability, and +1 for higher degree of sustainability.

Table 4. Procedural design of the experimental intervention.

<table>
<thead>
<tr>
<th>Control group</th>
<th>Test group</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2b 15 mins: writing on everyday life in 2018</td>
<td>B2b 15 mins: writing on everyday life in 2028</td>
</tr>
<tr>
<td>3) Lifestyle questionnaire 2 (2028) + Predicted future change + Important aspects to change + Pro-environmental self-identity assessment</td>
<td>3) Lifestyle questionnaire 2 (2028) + Predicted future change + Important aspects to change + Pro-environmental self-identity assessment</td>
</tr>
</tbody>
</table>

[18]
With 24 questions in the questionnaire the possible score range was between -24 to +24 points. Essentially, what was assumed to be measured was a ‘change readiness’-score, or a degree of ‘habit discontinuity’.

In the post-intervention questionnaire an open question regarding what type/-s of changes (personal and/or lifestyle) they consider to be most important to change in the coming ten years was included as a complement to the qualitative analysis of predicted behavioural/motivational changes.

A question about predicted future personal change appears near the end of the post-intervention questionnaire, and was quite central to the research aim of this study. With inspiration from Quoidbach, Gilbert and Wilson (2013) the question was phrased ‘If you think ahead to your life the coming 10 years (from present-day to 2028), how much do you think that you will change as a person in that time (personality, knowledge, competence, habits, values, opinions, behaviours etc)?’, and the answer was marked on a scale of 1-10 (from ‘not at all’ to ‘very much’). This question was assumed to relate to both degree of achieved ‘habit discontinuity’, ‘change readiness/future orientation’, and attachment to present self-identity.

The final element included in the post-intervention questionnaire was the question about pro-environmental self-identity, which is an important factor if one wishes to promote sustainable lifestyles (see 2.4 Summary of theoretical overview). Instead of the three questions used by van der Werff, Steg and Keizer (2014) to measure pro-environmental self-identity, it was here simplified into one statement (‘In 2028 I am a person who is actively engaged for a better environment’) to which they could agree on a scale of 1-10 (from ‘strongly disagree’ to ‘strongly agree’). The reason for placing this question at the very end of the post-intervention questionnaire was to avoid any unnecessary confounding influence from having made a self-identity statement (commitment) before making the self-assessments, which could risk increasing the ‘social desirability effect’ by awakening a desire to act coherently (i.e. ‘now that I have stated that I care about the environment I should’ report a ‘good behaviour’).

3.2.2. Guided imagination of a sustainable 2028

The guided imagination (Appendix B), which was offered as a 15 minutes recording that the test group participants listened to with headphones (to support concentration), was the heart of the intervention of this experiment. It served as an induced contextual change, possibly providing an opportunity for habit discontinuity, an empowerment of a pro-environmental self-identity, and a reminder of the significance of a sustainable lifestyle. Inspiration for the imaginative content was derived from the theoretical review (Table 3), and together with a ‘creative license’ the framing of the 2028 scenario aimed to provide a realistic everyday ‘feel’ of a sustainable future scenario, while still allowing scope for human diversity and individual freedom of choice.

3.2.3. Guided present-day self-reflection

In order to mirror the procedural design for the test group the control group listened to a 15 minutes long recorded guidance, but for them the focus was on self-reflection on their present-day life (Appendix B).

3.2.4. Writing assignment

In addition to the guided imagination the test group participants were asked to spend 15 minutes writing a personal description of what their life in the year 2028 could be like. The participants were encouraged to approach the assignment in their own unique ways, thus facilitating personal engagement in the imaginative experience. They were not specifically instructed to write about sustainability aspects, but were given complete freedom to write about their future life in their own way. The writing assignment was included to provide an opportunity to personalise the future scenario, i.e. to ‘rehearse’ their (new) habits, but also to avoid the risk of them merely passively listening to the guidance (or perhaps even daydreaming about something else). The control group participants also spent 15 minutes writing a personal description, but for them the instruction was to elaborate on their present everyday life.

The instructions for the writing assignment for both groups were briefly explained and then left in written form (Appendix C) for the participants to consult during the writing, if needed. What the test group participants wrote in the written assignment was included in the qualitative analysis.
3.3. Method of analysis

The overarching research aim of this study was to explore whether the guided imagination would enhance the 'future change readiness' of the test group participants, thus increasing their motivation and willingness to adopt more sustainable lifestyles in the future. The quantitative analysis was based on between-group effect size and confidence interval calculations (Coe 2002; Löfgren 2006; Carlbring 2012; Kelley & Preacher 2012) for the following research questions:

1) Predicted future personal change  
2) Magnitude of 'sustainable lifestyle'-change (reported changes from pre- to post-intervention)  
3) Pro-environmental self-identity

The statistical data was calculated using online calculators. For calculating mean (\(\bar{X}\)) and standard deviation (SD) Calculator.net (2008-2018) was used, and for effect size (ES) and confidence interval (CI) calculators from Social Science Statistics (2018) were employed. Effect size was calculated using Cohen’s d (Social Science Statistics 2018). Confidence interval provides information about the degree of uncertainty associated with the result (Coe 2002; Kelley & Preacher 2012), and between-group effect size answers the question 'What is the difference between groups after the intervention?'. For a general estimate or rule of thumb, a small effect size is assumed to be around 0,2; a medium effect size = 0,5; and a large effect size ≥ 0,8 (Carlbring 2012).

To answer the fourth research question regarding which sustainable lifestyle-behaviours and/or lifestyle domains that the participants found most amenable and/or important to change a qualitative analysis explores what, if any, patterns emerge from the responses from the two groups (Bryman 2011). Data for this analysis was the estimated lifestyle changes reported in the lifestyle questionnaire, the answers to the open question about what aspects was deemed most important to change, and what the test group participants wrote in the written assignment.

3.4. Participants

Harris (2016) suggests that for moral reasons affluent groups (regardless of nationality) carry a heavier burden of accountability and responsibility for making urgent lifestyle adjustments. Given the general socio-economic profile of the Swedish population, with an average annual salary of 393 600 SEK (SCB 2017), and the cut-off levels for belonging to the top 1% of global wealth currently found at the level of an annual salary of 272 072 SEK (Kurt 2018; Forex 2018), one can argue that Swedish people are a definite target group for making significant lifestyle changes.

3.4.1. Selection and recruitment

In order to match the above-mentioned target group criteria, participants in the age group 35-50, with a stable financial situation were invited to contribute to a research study on lifestyles (see 3.4.2 Sample demographics and Table 5). Besides financial stability meeting the inclusion criteria of the target group, it also made it possible to assume that their lifestyle choices are expressions of self-identity, personal values and preferences rather than choices based on economic constraints. Additionally, focusing on this age-group was based on the assumption that their habits and self-identities have been well established and settled into robust lifestyles.

The participants were recruited via social networks, a so called 'convenience sample' (Bryman 2011), with a description of the study as being about lifestyles and set within the context of a master thesis in sustainable development. Allocation of the participants to the control group or to the test group was done alternately as they signed up for participation, but there was a deliberate attempt to ensure that the groups were gender balanced. In practicality that meant that the first female was assigned to the test group, the second female to the control group, the first male to the test group, and the second male to the control group, etc. In this way the two groups were non-matched and the group assignment was randomised.

To enable as many participants as possible to contribute to the study, a high degree of flexibility of when and where the experiment was conducted was offered, with the only constraint being that it was performed...
in a place they felt comfortable in and where disturbances and interruptions could be avoided. The locations of the experiment were mostly in the participants’ homes, but also in some workplaces.

3.4.2. Sample demographics

The participants came from the towns/cities of Västerås, Mariefred, Gävle, Stockholm and Umeå. The majority lived in detached houses or townhouses (8 in control group and 6 in test group, with the remaining three in the test group living in co-op apartments), with an average 2.06 adults (1.63 in control group and 2.44 in test group) and 1.18 children <18 years (1.38 in control group and 1 in test group) in the household. Educational levels were widely distributed in both groups. Within the control group one person had gone only to elementary school, two had graduated from college, and five had university degrees. In the test group three had graduated from college, five held university degrees and one had a PhD-degree. Age and income levels of the sample are presented in Table 5.

Table 5. Sample demographics.

<table>
<thead>
<tr>
<th></th>
<th>TOTAL (n=17: 8 males, 9 females)</th>
<th>Control group (4 males, 4 females)</th>
<th>Test group (4 males, 5 females)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>Mean: 44  Median: 44.5  Range: 36 - 50</td>
<td>Mean: 44.12  Median: 44.5  Range: 36 - 50</td>
<td>Mean: 44  Median: 44  Range: 40 - 48</td>
</tr>
<tr>
<td><strong>Income: gross annual (SEK)</strong></td>
<td>Mean: 494 188  Range: 277 200 – 876 000</td>
<td>Mean: 466 350  Range: 277 200 – 876 000</td>
<td>Mean: 519 000  Range: 480 000 – 612 000</td>
</tr>
</tbody>
</table>

3.4.3. Ethical considerations

The legal boundaries for research ethics regarding research involving humans do not include undergraduate work (Vetenskapsrådet 2017). However, since this project attempts to elicit cognitive, emotional, motivational and behavioural changes it was still natural to consider the ethical implications. The guided imagery aimed to promote an intrinsic value base, which according to Hedlund-de Witt, de Boer and Boersema (2014) is linked to sustainable lifestyles. Intrinsic values are associated with psychological health and well-being, so the effects of participation were predicted to be primarily positive. To ameliorate possibly adverse effects all participants were encouraged to contact me with questions, comments or delayed reactions. Upon recruitment they were informed about guarantees of anonymity of their responses and their right to withdraw at any time from participation.

4. Results

Table 6. Summary of results (mean (X), standard deviation (SD), range, effect size, and confidence interval).

<table>
<thead>
<tr>
<th></th>
<th>Test group n=9</th>
<th>Control group n=8</th>
<th>Effect size* (Cohen’s d)</th>
<th>Confidence interval* 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predicted change</strong></td>
<td>X = 6.33  SD = 2.65  range = 3-10</td>
<td>X = 5.38  SD = 2.07  range = 3-8</td>
<td>d = 0.40</td>
<td>0.96 +/- 2.48</td>
</tr>
<tr>
<td><strong>Lifestyle change</strong></td>
<td>X = 16.56  SD = 4.28  range = 9-20</td>
<td>X = 8.25  SD = 4.30  range = 2-14</td>
<td>d = 1.94</td>
<td>8.31 +/- 4.44</td>
</tr>
<tr>
<td><strong>Self-identity</strong></td>
<td>X = 8.78  SD = 1.56  range = 6-10</td>
<td>X = 6.38  SD = 1.30  range = 4-8</td>
<td>d = 1.67</td>
<td>2.40 +/- 1.50</td>
</tr>
</tbody>
</table>

*Calculations performed using online calculators (Social Science Statistics 2018)

4.1. Research question 1 - predicted future personal change

The research question regarding predicted future personal change was explored through the post-intervention question “If you think ahead to your life the coming 10 years (from present-day to 2028), how much do you think that you will change as a person in that time (personality, knowledge, competence, habits, values, opinions, behaviours etc.)?”, and the answer was marked on a scale of 1-10 from ‘not at all’ to ‘very much’. The results show a small to medium effect size (Cohen’s d = 0.40) of the intervention, and with a 95% confidence interval pointing to a high degree of likelihood that replicated experimentation would yield a similar result in group differences (Table 6), it is fair to say that there is some support for the hypothesis.
that a future-oriented guided imagination would help participants to expect a higher than normal magnitude of personal change in the future.

4.2. Research question 2 - reported lifestyle changes

On the reported differences between pre- and post-intervention questionnaire assessments (with a possible change score ranging between -24 to +24 points) all of the participants reported expected changes towards increased sustainability in the future, but there was a very large effect size (Cohen’s d = 1.94) for the intervention (Table 6). As a comparison, in research performed on the impact of relaxation training on medical symptoms the average effect size was reported to be 0.52 (Coe 2002). And given the 95% confidence interval suggesting that repetition of the experiment would result in a similar group difference there is strong support for the hypothesis stating that a future-oriented guided imagination can facilitate motivation for a sustainable lifestyle.

4.3. Research question 3 - pro-environmental self-identity

The difference between the test group and the control group on their assessed pro-environmental self-identity (scale 1-10) points to a very large effect size (Cohen’s d = 1.67) and a 95% confidence interval provides a high degree of certainty that it is a stable result (Table 6). There is thus support for the hypothesis stating that a future-oriented guided imagination can promote a pro-environmental self-identity.

4.4. Research question 4 - qualitative patterns of lifestyle change

4.4.1. Patterns of lifestyle change emerging from questionnaire

The possible range of result scores for the separate questionnaire questions was between -1 to +1, showing the direction of change from either less to more sustainable choices. At this point it might be appropriate with a reminder of the fact that the scores only point to reported changes from pre-intervention (2018) to post-intervention (2028) assessments, and do not say anything about to what degree the participants’ lifestyles were sustainable (either at baseline or in the predicted future). For a general overview of the results see Table 7.

For the control group it seems that food was the most potent lifestyle domain for sustainability changes (domain mean score 0.59). The highest score was found for cooking/eating seasonally appropriate food (0.88), with high scores (>0.5) also for eating less meat, buying more organic food and growing more food for oneself. Other behaviours/choices in the other lifestyle domains that appear to be available for change were selection of renewable energy sources (0.88), selection of environmentally friendly car model (0.88), renting/borrowing things instead of buying (0.75), and recycling more (0.63). There was one behaviour with an overall negative development for the control group, in terms of sustainability, and that was number of trips abroad (-0.38), suggesting an expected increase. This was found in combination with a zero result for change of transport (mainly flying) for those trips.

For the test group there were positive changes towards sustainability in all lifestyle domains and on all behaviours, and <0.5 scores only for six behaviours (food waste 0.44; recycling 0.22; everyday transport 0.22; number of people in car 0.44; number of trips abroad 0.44; mode of transport for travelling abroad 0.44). The lifestyle domain with the lowest reported change for the test group was transportation (domain mean 0.5), with only two behaviours exceeding 0.5, i.e. selecting an environmentally friendly car model (0.89) and mode of transport for domestic travels (0.56). The most homogeneously and positively changed lifestyle domain for the test group was consumption (domain mean 0.85). Other behaviours that received high scores were eating less meat (0.78), buying local food (0.89), buying organic food (0.89), growing more food (1), lowering indoor temperature (0.78), switching off appliances (0.78), saving on water usage (0.67), selection of renewable energy sources (0.89), and selection of environmentally friendly car model (0.89).
Table 7. Group results on lifestyle change scores (group mean (X) per behaviour/question and per domain).

<table>
<thead>
<tr>
<th></th>
<th>Test group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X / behaviour</td>
<td>X / domain</td>
</tr>
<tr>
<td>Meat/week</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>Food waste</td>
<td>0.44</td>
<td>0.25</td>
</tr>
<tr>
<td>Seasonal food</td>
<td>0.56</td>
<td>0.88</td>
</tr>
<tr>
<td>Local food</td>
<td>0.89</td>
<td>0.5</td>
</tr>
<tr>
<td>Organic food</td>
<td>0.89</td>
<td>0.63</td>
</tr>
<tr>
<td>Grow own food</td>
<td>1 food = 0.76</td>
<td>0.63 food = 0.59</td>
</tr>
<tr>
<td>Indoor temperature</td>
<td>0.78</td>
<td>0.38</td>
</tr>
<tr>
<td>Switch off appliances</td>
<td>0.78</td>
<td>0.13</td>
</tr>
<tr>
<td>Save water</td>
<td>0.67</td>
<td>0.38</td>
</tr>
<tr>
<td>Energy efficient appliances</td>
<td>0.56</td>
<td>0.25</td>
</tr>
<tr>
<td>Renewable energy sources</td>
<td>0.89</td>
<td>0.88</td>
</tr>
<tr>
<td>Recycling</td>
<td>0.22 home = 0.65</td>
<td>0.63 home = 0.44</td>
</tr>
<tr>
<td>Everyday transport</td>
<td>0.22</td>
<td>0.25</td>
</tr>
<tr>
<td>Environmentally friendly car model</td>
<td>0.89</td>
<td>0.88</td>
</tr>
<tr>
<td>Number of people in car</td>
<td>0.44</td>
<td>0.13</td>
</tr>
<tr>
<td>Mode of domestic travel</td>
<td>0.56</td>
<td>0</td>
</tr>
<tr>
<td>Number of trips abroad</td>
<td>0.44 transportation = 0.5</td>
<td>0 transportation = 0.15</td>
</tr>
<tr>
<td>Mode of travel for trips abroad</td>
<td>0.44 transportation = 0.5</td>
<td>0 transportation = 0.15</td>
</tr>
<tr>
<td>Second hand clothes</td>
<td>1</td>
<td>0.38</td>
</tr>
<tr>
<td>Second hand furniture</td>
<td>0.89</td>
<td>0.13</td>
</tr>
<tr>
<td>Borrowing/renting</td>
<td>0.89</td>
<td>0.75</td>
</tr>
<tr>
<td>Repairing</td>
<td>0.78</td>
<td>0</td>
</tr>
<tr>
<td>Selling/giving away</td>
<td>0.78</td>
<td>0</td>
</tr>
<tr>
<td>Lending/renting out</td>
<td>0.78 consumption = 0.85</td>
<td>0 consumption = 0.21</td>
</tr>
</tbody>
</table>

When viewed from the perspective of the four lifestyle domains (Table 7) there emerged a pattern of similarity between the two groups regarding food (higher degree of change, with the lowest within-domain score for both groups on food waste) and transportation (lowest degree of change of the four domains, with highest within-domain score for both groups on selection of environmentally friendly car model). Home-related behaviours were more diversely reported in the two groups, although the highest within-domain score was found in both groups for selection of renewable energy sources. The test group had >0.5 scores on all home-related behaviours other than recycling, which was the second and final >0.5 home domain behaviour for the control group (0.63), the first being selection of renewable energy sources (0.88). For the consumption domain there was an even greater difference between the two groups (domain mean 0.21 for control group and 0.85 for test group), where for the control group only one behaviour (renting/borrowing things) exceeded 0.5, while all the consumption behaviours scored between 0.78-1 for the test group.

4.4.2. Responses to the open questionnaire question about future changes

Future changes reported by the control group revolved around becoming more environmentally aware, eating less meat, driving and commuting less, causing less food waste, recycling more and leading a less stressful and more contented life. For the test group the responses were similar but they also included making more conscious and sustainable choices, consuming and travelling less, and spending more time with family and friends, with whom they also share a sustainable lifestyle.

4.4.3. Lifestyle change patterns emerging from writing assignment (by test group participants)

Themes emerging from the future-oriented stories written by the test group participants centred around having more time and freedom in their everyday life in 2028. All of the accounts pointed to an increase in sustainability and the stories gave a feeling of ‘gain’, not of loss, sacrifice or misery. Some participants wrote about a substantial change in their personal and social life while others envisioned more gradual changes in already established lifestyle patterns. Many stories spoke of downshifting and about lives with less consumption:
"I live in the same house, and I share more things with the neighbours" (Man, 43 years old)

"In my everyday life in 2028 I meet neighbours, friends and colleagues who also have realised the benefits of consuming less and stop chasing high status through expensive gadgets. Instead they have gained time, health and quality of life. [...] The lowered income is compensated by fewer and wiser purchases, I have an opportunity to grow some food myself. Maybe I have also chosen to move to smaller and cheaper accommodations.” (Woman, 43 years old)

"When we buy things we try to buy second hand, or new things that are well made and of higher quality."
(Man, 46 years old)

Related to this change of pace were accounts of work-life balance where time for friends, family and relaxation was available as a result of deciding to work less and/or working remotely with a high degree of freedom as to when and how much to work. Having more time for relationships was also associated with visions of increased cooperation:

"Neighbourhood-cooperation, a 'small-village'. [...] I associate to post-war/post-crisis times = people talk and cooperate and help each other.” (Woman, 40 years old)

"We spend time with friends that we have known for a long time and with whom we share values, politically as well as regarding interests. Our children are 34 and 30 years old and if we are lucky we have grandchildren. I hope we can help out as much as possible. I believe we spend a lot of time together in nature and through sports, perhaps we get involved in some activity of our grandchildren’s choosing.” (Woman, 45 years old)

"Guests come and visit, they stay a while – help out. Creative ideas arise in conversations and discussions.”
(Woman, 44 years old)

Other frequent themes that appeared in the texts focussed on spending time in nature and growing more food oneself. Also related to food were ideas of composting, switching to a vegetarian diet and buying from local producers. Regarding technology and transportation there seemed to be a consensus among the test group participants that they will travel and commute less in the future, partly supported by developments in communication technologies and partly due to conscious lifestyle choices to work less and be more contented with staying at home. For the transportation demands that remain they envisioned better and more reliable public transport, (driverless) electric cars and cycling as desirable alternatives.

4.5. Experimental observations

During the experimental situation it was apparent that all participants were aware of the sustainability focus of the study, even without it being explicitly mentioned. Many participants made spontaneous comments while finishing up the session about how the participation had made them think about how they live their lives and how they wished to try harder to live more sustainably. There were at times self-judging exclamations from some participants while filling in the questionnaires – 'This is bad', 'I am bad' – showing that they knew how they 'should' act/choose.

One (male) participant chose several high impact behaviours on the post-intervention assessment with an explicit reasoning that technological advancements will have made them harmless by then. Two (female) participants expressed feelings of joy and happiness after having listened to the future-oriented guided imagination. This positive response seemed to be elicited by the cooperation/community aspect of the guided imagination. One participant was 'provoked' by it, while others made no specific comment after listening to the recording.

Lastly, as a side note, it is important to point out that participants with low scores on lifestyle changes can not be viewed as 'unsustainable', since the score does not reveal anything about degree of sustainability, only about self-predicted lifestyle changes towards increased sustainability between the years 2018 and 2028. All participants had realistic response profiles on the questionnaire, with room for 'improvements'. So, low scores for any individual was equally not a sign of them already leading a perfectly sustainable life.
5. Discussion

5.1. General analysis of results

In response to the aim of this research study, which was to explore the role of future-oriented imagination in creating motivation for making changes towards a more sustainable lifestyle, all of the research questions have been answered with support for the hypotheses. This suggests that the intervention, with its combination of a guided imagination of the year 2028 and active personal engagement via a writing assignment, promoted an increase in motivation for future lifestyle changes in the direction of higher degrees of sustainability. The effect sizes were large enough to encourage confidence in that the intervention had an actual impact on motivation. Here it is important to point out the difference between the elicited increase in motivation and change readiness and actual behaviour changes, which were not assessed in this study.

Uncertainties regarding the results from this study may be found in the general response tendencies of ‘social desirability’ for questionnaires (Brick, Sherman & Kim 2017), and in the fact that the participants’ self-assessments were noncommittal with no follow-up on actual behavioural changes. However, those circumstances were equal for both groups, and the writing assignments for the test group (see 4.1.4 Qualitative patterns of lifestyle change – ‘Lifestyle patterns emerging from the written assignment (by test group participants’) reveal personal stories in line with the quantitative results. These specific uncertainties can thus be rejected as having unduly influenced or caused the resultant effect sizes.

Regarding the choice of population segment for this study (middle-aged, affluent Western individuals from a consumer-based culture), besides it being a population segment in which changes towards sustainable lifestyles would make a significant difference to the world as their lifestyle has the most negative environmental impact, the basic assumption was that they would have settled into established and preferred lifestyle patterns and views of themselves, and thus would be reluctant to make changes and be resistant to coercion. The idea behind this ‘difficult population’ choice was that any effects from the intervention could be trusted to be relevant. However, even with the positive results of this study and the support they give for the research hypotheses, one can never be fully certain that the process dynamics driving these effects are correctly pinpointed and/or understood. If nothing else, the results offer encouragement and suggestions for further exploration into the role of the future-oriented imagination in preparing for and motivating lifestyle changes.

Below follows a review and analysis of the results for the four research questions, but initially it could be useful to be reminded of the general assumption underlying the result analysis as well as the research hypotheses. The guided imagination was assumed to function as a contextual framework for communicating a possible future sustainability scenario (Table 3), with the writing assignment further enhancing the self-identification with personal changes and lifestyle choices. The basic idea informing the design of the intervention was that the effect, if any, would be derived through the process of spending time imagining the presently unknown future and in personalising a future lifestyle. This was facilitated by the freedom from a narrow prescriptive ‘mould’ in the future scenario. Instead an open instruction prompted the participants to include what felt to be realistic and interesting for themselves in the writing assignment. Even though a ‘footprint budget’ was offered as a generalised behaviour restriction in the guided imagination of the year 2028 there was no explicit pressure to conform in a specific way or to accept any specific lifestyle choices. Positive encouragement was given for diversity (see Appendix B). Légal et al. (2012) found that goal priming helped increase the positive evaluation of a message (and its content and source) as well as behavioural intentions. In their study they activated the goal ‘to trust’ and found that it enhanced the acceptance of the message. In this study ‘trust’ was not asked for explicitly, but may have been implicitly encouraged through allowing for lifestyle diversity and openly stating that there are no ‘right’ and ‘wrong’ responses (i.e. avoiding enforcing specific responses and allowing for ‘free will’ – that is, appearing non-threatening and non-judgmental). Even without the explicit intention to use subliminal priming in the intervention, that sort of process dynamic could be partly at work here, in the same way it is influential in any natural communication setting. Individuals process information outside of conscious awareness on a daily basis, so
without specifically using subliminal influence techniques the intervention communication is expected to have also non-conscious effects (Veltkamp, Custers & Aarts 2011).

5.1.1. Research question 1 - predicted future personal change

A small to moderate effect size (0.40) was found in support of the hypothesis expecting a greater predicted future personal change for test group participants (Table 6), suggesting that the guided future-oriented imagination helped them overcome some of the cognitive strain (Quoidbach, Gilbert & Wilson 2013) and the uncertainty of imagining the unknown (Chernikova et al. 2017). Having 'seen' the future may have increased the sense of likelihood of future changes through enhanced scenario availability (Anderson 1983; Wenke, Fleming & Haggard 2010; Veltkamp, Custers & Aarts 2011), and by exercising their imaginative capability they may have improved their ability to anticipate future needs (Addis, Wong & Schacter 2007). Quoidbach, Gilbert and Wilson (2013) found a trend in their studies pointing to a general decrease in expected change as one gets older. However, since the mean age of the two groups was the same (Table 5) they are comparable and the result is not explained by such age-related dynamics.

5.1.2. Research question 2 - reported lifestyle changes

The hypothetical expectation that the test group participants would report a greater degree of future lifestyle changes than the control group participants was positively met with a very large effect size (1.94) for the intervention. This suggests that guided future-oriented imagination indeed does facilitate motivation for a sustainable lifestyle. Hence it could be suggested that imaginative efforts and their explicit and subliminal priming effects could be sufficiently potent to disrupt existing habits (Verwijmeren et al. 2011; Verplanken & Roy 2016), and through mental rehearsal establish a foundation for new behaviours to emerge (Anderson 1983; Wenke, Fleming & Haggard 2010; Veltkamp, Custers & Aarts 2011).

5.1.3. Research question 3 - pro-environmental self-identity

The test group participants rated themselves as having a pro-environmental self-identity in the year 2028 to a much higher degree than the control group participants. The effect size of the intervention was very large (1.67), thus giving positive support for the research question asking if guided future-oriented imagination would increase the pro-environmental self-identity. Since the question specifically asked for the participants’ predicted level of future pro-environmental self-identity, the risk of inadvertently having tapped into a goal achievement process should be minimal (Margetts & Kashima 2017). Andersson et al. (2017) found tentative results in their experimental study on subliminal priming of generosity stating that priming mainly worked as an enhancer of already underlying values, and that priming was strengthened when the goal was aligned with the value (i.e. generosity towards a worthy and needing recipient rather than to someone neutral/random). It could then be argued that the experimental intervention enhanced an already existing value base in line with a pro-environmental self-identity, assuming that there initially were no fundamental differences between the participants in respective group. Even though Andersson et al. (2017) caution against using their results as anything but suggestions it is possible to at least propose that the guided imagination and the writing assignment through a process of reminding the test group participants of their values and their environmental concerns did strengthen their view of themselves as being actively pro-environmental. This finding supports and temporally extends the results of van der Werff, Steg and Keizer (2014) suggesting that not only is a pro-environmental self-identity strengthened by being reminded of past pro-environmental actions, but it can also be strengthened via ‘previews’ of future actions.

5.1.4. Research question 4 – qualitative patterns of lifestyle change

The responses to the open question about what the participants believed to be important to change in the future, the content of the writing assignment of the test group, and the qualitative analysis of the questionnaire assessments of lifestyle changes between the years 2018-2028 showed both similarities and differences between the two groups. Similarities were found in some of the questionnaire results (high scores for behaviours such as selection of energy source, selection of environmentally friendly car model, renting/borrowing more things instead of buying them; low scores for food waste, and the transportation domain being the overall lowest scored domain for both groups) and in the responses to the open question about future personal changes. Here participants from both groups mentioned expectations of increased environmental
awareness and behaviours related to that (e.g. eating less meat, driving less, less food waste, more recycling) but also aspects linked to a more psychologically sustainable lifestyle, such as leading a less stressful life and being more content. The responses from the test group participants went over and above this and included also visions of consuming and travelling less, making better (conscious and sustainable) choices, and devoting time to close relations with whom they shared a valued lifestyle. There was thus no contradiction in the responses between the two groups, only a broader and deeper description by the test group participants, which is understandable since they had a 30 minutes head start in thinking about themselves in the future compared to the control group. It is however interesting to note that decreased consumption was only mentioned by the test group and that this matches the pattern from the questionnaire results. Consumption was the lifestyle domain where the two groups diverged most clearly, with the test group making a clear statement towards significant lifestyle changes. Also, the single consumption behaviour that exceeded 0,5 (renting/borrowing) for the control group may just as well have been based on money saving intentions instead of being a pro-environmental choice. It seems fair to conclude that the intervention had a pervasive effect on the test group participants in the direction of increased sustainability and readiness for lifestyle changes.

When looking at the questionnaire results from the viewpoint of the contextual behaviour categories of 1) home-based practices and 2) less frequent but high-impact behaviours such as travelling abroad (Barr, Shaw & Gilg 2011), a pattern emerged where for both groups transportation was assessed as the least changed domain, in comparison to the more home-based domains (including food and consumption). Apparently, it was more difficult for all participants to envision different transportation habits, both in their everyday life and when travelling abroad. As highlighted before, this could mean that they already make quite sustainable choices and that the room for 'improvement' is small, but it could also mean that they feel less in control regarding these types of choices and that they need infrastructural support in order to start making those changes (Hobson 2002; Kollmuss & Agyeman 2002; Evans & Abrahamse 2009; UNEP 2016a). Given that both groups scored high on selection of an environmentally friendly car model it can be assumed that they have some faith in technological development providing more sustainable alternatives in the future. Relating the results to UNEP’s (2016a) influencing factors (Figure 1) one can argue that facilitators and infrastructure play a pronounced role in the transportation domain and in other specific behaviours where individuals’ attitudes are insufficient for creating behavioural changes (e.g. buying second hand items requires second hand stores, energy efficient appliances depend on market/product availability). People need support from governmental policies and public services, and they depend on market conditions, product options and physical infrastructure. For behaviours that are more within the sphere of personal control, especially for the test group participants, the scores were also higher (e.g. eating less meat, selection of renewable energy source, and consumption patterns).

For the writing assignment the test group participants were only instructed to write about the everyday life they themselves thought they would be leading in the year 2028. It did not have to be a sustainable life or any different from their present-day life. And yet they all described a realistic development towards a more sustainable lifestyle, both regarding its impact on the environment and on their own wellbeing. The feelings expressed through their stories were positive and pointed to benefits, with no references to having made sacrifices or leading an impoverished life. This corroborates the results from Soper (2008) and Evans and Abrahamse (2009), showing that much of the 'goods' in life remain after making more sustainable choices while at the same time some of the 'ills' of the work-intensive consumer-based life are being left behind. Emphasizing intrinsic benefits and rewards is associated with psychological health and wellbeing (Hedlund-de Witt, de Boer & Boersema 2014), and linking behavioural decisions to norms is expected to support intrinsic motivation and identification with pro-environmental values (Steg et al. 2014a). These personal stories could be seen as seeds of a future sustainability norm, with a socially positive and self-enriching narrative at its core (Hulme 2011; Yusoff & Gabrys 2011), thus fulfilling both self-interest and pro-social motives (Bamberg & Möser 2007).

Some of the results could possibly be explained by the spillover effects dynamic. For instance, perhaps the expected increase in trips abroad for the control group was partly due to them reporting an increase in behaviours such as selection of pro-environmental energy sources and better cars, eating less meat and recycling more, which may have sufficiently alleviated any negative emotions and to have given a sense of having contributed one’s share and thus being allowed some indulgences. And maybe the overall positive development towards sustainability seen in the test group results was driven by a positive spillover effect,
mediated by a strengthened pro-environmental self-identity (Truelove et al. 2014; van der Werff, Steg & Keizer 2014; Lacasse 2016).

5.2. Key conclusions

Imagining oneself in the future seems to be a potent mediator for increased motivation for behavioural change. Even though the responses in this study were noncommittal and it is uncertain whether in reality they will translate into actual behavioural shifts or not, it was the same circumstances for both groups and substantial effects were found following the experimental intervention. A primary conclusion from this is that it is possible to influence and support individuals’ motivation for changes towards increased sustainability by providing a guiding framework and time for engaging in future-oriented imagination. The key factors investigated in this study, and that were found to have been positively influenced, were cognitive readiness for personal changes in the future, change of habits towards increasingly sustainable lifestyles and subscription to a pro-environmental self-identity. Finding different ways to overcome the human tendencies of avoidance and closed-mindedness is very helpful in propelling the lifestyle changes that are so urgently needed, and future-oriented imagination could contribute with a cost-effective pathway to enhancing intrinsic motivations and norm-based decision-making that also values the desire for diversity and protects the freedom of choice for the individual.

It seems reasonable to assume that not only the process of future-oriented imagination is responsible for the results of this study, but also that the content of the guided imagination had an impact. Even without emphasis on fact-based educative components and clear and comprehensive solutions to the current socio-economic-environmental predicament a distinct movement towards personal sustainability changes was registered in this study, which suggests that the combination of providing cues and allowing space for (temporal and normative) diversification and personalisation is important in sustainability interventions. Care was taken to encourage individual choices, but the framework of societal/governmental responsibility and structural support and the cues for social norms and community support appears to have given a momentum of its own to the imagined future lifestyles. Presumably this emerged because of a generated sense of connectedness, fairness and equity, combatting feelings of aloneness and unreasonable individual responsibility. Some of the spontaneous comments to the guided imagination were positive responses of not feeling alone or weighted down by a singularly personal responsibility, but rather that both responsibility and innovative possibilities were shared and created in communities with others. In moving away from ‘either-or’ debates about accountability it seems more fruitful to steer the discussion towards a ‘both-and’ perspective where each and everyone has an active role in making sustainability choices, albeit in different domains, in different ways and to different degrees. Communicating clearly about where and how responsibilities are dispersed across stakeholders, and how they in some areas overlap, could improve the overall willingness to act and it could dissipate the confusion and uncertainty that seems to be locking people into situations of inaction. Households have both freedom and responsibilities for addressing many lifestyle-related behaviours, but for non-home-based behaviours (such as flying), and behaviour domains heavily impacted by for example infrastructure and market provisions, governments will probably have to step in more distinctly with incentives and regulations.

Given the reported earlier research findings of benefits from exercising the capability of imagining the future, among which are improvements in skills such as planning, problem-solving, long-term decision-making, and in creativity, adaptiveness, prosocial intentions and emotional resilience, it is strongly recommended and encouraged that policy- and decision-makers themselves regularly engage in such practices to prepare them for their responsibilities for present and future generations.

5.3. Theoretical and practical implications

To some extent theoretical and practical implications have already been discussed above in the context of the research results and the key conclusions. In the following some additional thoughts on potential implications are presented.

5.3.1. Theoretical implications

Existing research into psychological factors related to pro-environmental behaviours is complemented by
the results of this study in suggesting how future-oriented imagination could help ameliorate barriers like limited cognition (e.g. environmental numbness, perceived lack of behavioural control and self-efficacy), comparison (perceived social norms and inequity), sunk costs (behavioural momentum/habits) and limited behavioural repertoires (Gifford 2011; Truelove et al. 2014; UNEP 2016b; Verplanken & Roy 2016), while at the same time the results show support for drivers such as pro-environmental goals, values and intentions.

The goals and values found in the written accounts of the future, authored by the test group participants, included hedonic (enjoying the benefits of a downshifted lifestyle), gain (i.e. guarding one’s psychological resources) and normative (caring for nature) goals (Steg et al. 2014a; Steg et al. 2014b), and values leaning more towards openness to change and altruistic-biospheric (Steg et al. 2014b) were hinted at. However, the altruistic-biospheric position was neither emphasized nor put in opposition of egoistic-hedonic values. Perhaps this could be seen as an expression of those seemingly opposing positions becoming merged into an account of ‘the common good’? Within the freedom of imagination it may be easier to envelop a ‘both-and’ perspective, rather than a creativity-restricting ‘either-or’ perspective, making it a fertile playground for exercising an innovative mindset and exploring the gap between ‘what is’ and ‘what could be’ (Yusoff & Gabrys 2011; Chiu 2012). Since there already is research available establishing a link between future thinking (imagination) and a diverse set of positive psychological states, traits and skills (e.g. long-term decision-making, planning, anticipation of future needs, long-term goal achievement, wellbeing, prosocial intentions, creativity, problem-solving, staying engaged with the problem, emotional resilience, adaptiveness, behavioural flexibility, and broadened temporal depth aiding consequential thinking) it might not be too far a stretch to assume that some of those effects also could be expected from engaging in such future-oriented imagination as was offered in the experimental intervention of this study (e.g. Chiu 2012; Honey-Rosés et al. 2014; Thakral, Benoit & Schaeter 2017).

Intention, perceived behavioural control and habit strength are seen as predictive and moderating factors for pro-environmental behaviours (Klöckner 2013; Verplanken & Roy 2016), with intention explaining almost a third of the variance of the behaviours as well as acting as a mediator for all psycho-social variables (Bamberg & Möser 2007). If it can be accepted as a general interpretation of the results of this study that the readiness to make future changes has indeed been affected in the direction towards increased sustainability, it stands to reason that the psychological variable pro-environmental intention has been influenced positively, thus inviting future-oriented imagination as a psychological variable interacting with other important pro-environmental drivers. Another strong predictor of future pro-environmental behaviours is a pro-environmental self-identity (e.g. van der Werff, Steg & Keiser 2014; Lacasse 2016), which could be explained by how rewarding it feels when one is acting in accordance with one’s values and one’s self-identity (Cooke & Fielding 2010). Having achieved an increase in the pro-environmental self-identity variable through future-oriented imagination it is also possible that the risk of inadvertently causing a negative spillover effect by reminding individuals of past pro-environmental behaviours is lessened as a ‘preview’ of future actions probably does not reduce any present feelings of guilt or give cause for ‘celebrating having done good’ by increasing one’s consumption (Truelove et al. 2014).

Research shows that when a behaviour is compatible with what has been primed for the sense of control increases, and this perceived behavioural control has been found to be an important mediator and/or predictor for pro-environmental behaviour decisions (Gifford 2011; Klöckner 2013). The freedom to choose leads to higher involvement in self-generated behaviours. In combination with perceived control this gives a feeling of ‘smoothness’ in the action selection process, which supports compliance with priming objectives (Wenke, Fleming & Haggard 2010). Veltkamp, Custers and Aarts (2011) found that subliminal priming can increase motivation, even in absence of a specific need (which in this study pertains to the existence or non-existence of pro-participation environmental awareness and/or concern), when what is being primed is linked to a positive affect, as it apparently was, judging from the writing assignments by the test group participants. These positive accounts could be said to have been derived from psychological drivers such as ‘alternative hedonism’, and they displayed psychological benefits such as wellbeing and intrinsic satisfaction, as well as mental access to new modes of living a good life (e.g. Soper 2008; Evans & Abrahamse 2009). Since people are more likely to find prospects of change attractive when they are associated with pleasure and positive self-actualisation (Steg et al. 2014a), and when they fulfil the psychological needs of autonomy, competence and relatedness (Cooke & Fielding 2010), the intervention of this study seems to have successfully fulfilled the dual goal of lowering any major resistance and providing inspiration for adopting a more sustainable lifestyle.

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5.3.2. Practical implications

For policy-makers, educators and other change agents, the results suggest that communication about future lifestyle changes should include both limitations and opportunities (in this study represented by the ‘footprint budget’ restrictions in combination with encouragements of diversity and innovation in the guided imagination), and that the communicative effort clearly should invite diversity and innovation alongside such stated boundaries. Efforts to invite interactivity and personalisation is thus strongly encouraged, albeit not solely to elicit individual motivation but also to provide politicians, policy-makers and other decision-makers with valuable input and ideas (Neuvonen et al. 2014). That interactivity could play a part in increased motivation for behavioural change is also supported by findings from a social advertising experiment suggesting that interactivity leads to higher and more personalised involvement (due to reduced distance between subject and object of advertising), and that the interactive freedom could have prompted a higher degree of identification and willingness to act in the real world in alignment with the advertising environment (Viktorovna Antonova 2015). A possible operative process generally influencing the results of this study could be that the intervention provides time for making the test group participants familiar with a scenario of sustainable lifestyles, even before it manifests in real life, creating an easier pathway of cognitive and behavioural access to those choices (Anderson 1983; Wenke, Fleming & Haggard 2010).

It is also recommended for sustainability interventions to focus on intention, habits and perceived behavioural control (Gifford 2011; Klöckner 2013; Verplanken & Roy 2016), as well as on norm-based and intrinsic rewards as they constitute a robust and cost-effective pathway for behavioural management (Hedlund-de Witt, de Boer & Boersema 2014; Truelove et al. 2014).

5.4. Suggestions for future research

From one of the methodological limitations of this study follows an obvious first suggestion for future research, which would be to perform a follow-up of actual lifestyle changes (compared to baseline assessment in the pre-intervention questionnaire) for the participants of this study. The purpose would be to assess to what degree the increased motivation has been sustained and/or translated into behavioural changes, and if it has, which behaviours have changed and which have not. Replicating this study with a larger sample would be amending another of the methodological limitations. A larger study could also include correlational hypotheses and explore possible differences on diverse parameters, such as gender, age, education and income level.

Another interesting evolution of the current experimental design would be to investigate whether it was the combination of listening and writing that made the intervention so potent, or if it was one of those parts that contributed more singularly to the effect? Also, what happens when the intervention is offered within a group setting, with collaborative future-making instead of the individual writing assignment? Could high-impact low-frequency behaviours such as flying be influenced by a scenario specifically targeting diverse modes of transportation, transcending the current mobility paradigm? And what could be found when other specific domains and/or behaviours are in focus and are given a broader and deeper scope?

A related idea that has been generated by the background reading for this study revolves around the nature and function of open-mindedness in generating motivation for change. It would be interesting to explore correlations between open-mindedness and for example book-reading and film-watching, related to which genres one reads/watches (fantasy/sci-fi versus ‘realistic’ novels/films), i.e. if you are accustomed to visualising and accepting futures and/or worlds different from the one you live in, are you then more inclined and open to changing yourself and your lifestyle?

6. Summary

With the great need for changes in lifestyles as well as in governance and business practices required to meet the environmental sustainability challenges of this time, it is evident that sustainability campaigns and interventions addressing many fronts at the same time are needed. Since the environmental impact of households is highly significant, this study chose to investigate ways of promoting the development of
sustainable lifestyles with reduced consumption in the areas of food, housing, transportation and consumption. Due to the risk that a lack of imaginable pathways forward may cause disengagement from the issue of sustainable lifestyles, and the problem of cognitive construction (imagination) being more mentally strenuous than remembering or reconstructing past events, thus leaving the playing field open for less effortful habitual choices, there was an identified need to explore ways of nurturing a future-oriented imaginative capability that could act as a habit disruption opening up for new emerging lifestyle practices, as well as to function as seeds for positive sustainability narratives. It could be argued that given the urgency of the matter at hand it is important to change human and organisational behaviours no matter on what grounds. Be it through regulations, laws, enhanced pro-environmental self-identity, values, social norms, economical savings etc., it is important to make tangible changes. However, in the long-term perspective it matters very much what narratives, what social norms and what values are being fostered. If those driving factors stay the same as today the worldview that have led the world into this predicament will also prevail, and any fast-track short-term changes risk being delays, or in worst case hindrances, of genuinely transformative processes. The need and urgency to reframe ideas of the human place, function and role in the wider context of an interconnected world is illustrated by the emerging and deepening crises and how the critical situation demonstrates that it is no longer possible to view humanity as autonomous and sovereign in relation to nature. Acknowledging that the world has moved into the era of Anthropocene forces people to make responsible choices.

"The Anthropocene marks severe discontinuities; what comes after will not be like what came before. I think our job is to make the Anthropocene as short/thin as possible and to cultivate with each other in every way imaginable epochs to come that can replenish refuge." (Haraway 2016, p.100)

The fundamental aim of this study was to explore the role of future-oriented imagination in motivating changes towards a sustainable lifestyle, and the hypotheses were all positively supported by the experimental results. This suggests that engaging in an imaginative exercise envisioning oneself in the future may contribute to increased readiness for future personal changes, a higher motivation for a general lifestyle shift towards increased degrees of sustainability, and a stronger sense of holding a pro-environmental self-identity. So even without confirmation that the results will translate into actual lifestyle changes for the participants it can be argued that the intervention successfully influenced psychological factors such as intention, self-identity and values, all associated with pro-environmental behaviours. Any future research following from this study could benefit from exploring further what it was that made the intervention effective, and it would also be interesting to see what could be accomplished in a collaborative group setting or if a specific lifestyle domain such as transportation was targeted.

In light of the limitations of this study, mainly being that it was conducted with a relatively small sample and without long-term follow-up of concrete behavioural changes, it still offers valuable tentative information into potential ways of encouraging sustainable lifestyles via a strengthened pro-environmental self-identity while side-stepping the process of negative spillover. Furthermore, future-oriented imagination provides access to ‘role-models’, social norms and novel practices that might not be available in the individual’s proximity. Inviting busy modern people to engage in active reflection about their lifestyle choices and future needs is very likely a radically transformative activity in itself. However, to take full advantage of the potential of future-oriented imagination it should not only be considered for ‘people-oriented interventions’, but also as a regular practice for policy- and decision-makers, enabling them to develop their leadership qualities. And even more impetus could be derived from efforts to contextualise stakeholder responsibilities and to support networks of cooperation within and across communities. When individuals on the one hand realise that they will need to contribute by making changes and receive guidance on what they could do, and on the other hand experience other people and organisations also stepping up to take their share of the responsibilities, a lot of energy could be released and directed towards making substantial changes. Engaging in exercises of the imaginative capability should thus by no measures or means be regarded as a frivolous or trivial pass-time activity, but rather as a priming of future-readiness, creativity and motivation for inevitable adaptations and changes. It may prove to be a cost-effective and respectful pathway to overcome tendencies of avoidance and closed-mindedness in the face of uncertainty, and a pathway that encourages diversity and innovation as well as social support. If it is possible, as it seems to be, to familiarise oneself with the unknown and train one’s mental and emotional reflexes not to recoil from uncertainty and challenges but to approach them with curiosity and self-confidence, and with an extended invitation to people around to join in, then humanity might be closer to a position of truly harnessing the much-cherished
human capacity for ingenuity and collaboration – for the better of all. The results of this study suggest that future-oriented imagination may provide a pathway to promote engagement with personal changes in a direction that benefit everyone. The future may still be inherently unknowable, but it can all the same appear familiar and uniquely interesting for the individual. The future can be speaking to the individual as something that concerns him/her personally as they have already seen themselves living in it. Considering how sustainable lifestyles might promote mental health, there is good reason for the wider public to expect not only hardship but also intrinsic benefits from making pro-environmental changes. Demanding change is not a punishment. It is an invitation.

Surely the future is uncertain, but that also means that it is not predetermined or completely without hope. The future is unpredictable, thus presently unidentified forces or chance events may interfere. The future is unknown, and so it remains open for imagination and for living it into existence.
7. Acknowledgements

I wish firstly to express my deep gratitude to my supervisor Josefin Wangel for her generously supportive feedback and suggestions. It has been a thoroughly joyous learning experience working with you! I also owe a debt of gratitude to my friends Amanda Vincent and Daniela Garcia-Caro for reading through the manuscript and checking it for ‘weird English’, and for giving valuable feedback and encouragement. Any remaining mistakes and shortcomings are all mine. For their willingness to ‘bounce thoughts’ around statistics I thank psychologists Sture Nöjd and Niclas Kaiser. For generously permitting me to use their figures/tables I thank Sarah Harper (United Nations Environment) and Robert Gifford. I will also nurture all the feedback given by my evaluator Elina Eriksson, my opponent Alexandre Hureau and my examiner Giuliano Di Baldassarre – thank you for taking your time to help me improve my work. For all their practical help I want to thank course coordinator Malgorzata ‘Gosia’ Blicharska and study counsellor Amanda Johnson.

Lastly, I wish to extend my profound gratitude to all the participants who so generously gave of their time. Without you - no study!
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Appendices

Appendix A. Lifestyle questionnaire 1 and 2 (incl. demographics)

(original in Swedish, translation by author)

Lifestyle questionnaire

In this questionnaire you will find a number of questions and statements related to different everyday decisions. Read carefully and answer as best you can. Even when you don’t know the exact answer your qualified estimate is valuable. There are no right or wrong answers, so answer as honestly and directly as you can.

Food

1) How often (per week) do you eat meat? __________
2) How often (per week) do you have to discard food that has gone bad? __________
3) How often do you shop for and cook with seasonal ingredients?
   1 2 3 4 5 6 7
   Never 2 3 4 5 6 7
   Always
4) How often do you shop for locally grown (within Sweden) food?
   1 2 3 4 5 6 7
   Never 2 3 4 5 6 7
   Always
5) How often do you shop for organic (ecological) food?
   1 2 3 4 5 6 7
   Never 2 3 4 5 6 7
   Always
6) To what extent do you grow your own food?
   1 2 3 4 5 6 7
   Never 2 3 4 5 6 7
   To a high degree

Home

7) How often do you deliberately lower the indoor temperature in order to save energy?
   1 2 3 4 5 6 7
   Never 2 3 4 5 6 7
   Always
8) How often do you switch off appliances/lighting in order to save energy, rather than leaving them in standby-mode?
   1 2 3 4 5 6 7
   Never 2 3 4 5 6 7
   Always
9) How careful are you about using as little water as possible (showers, washing-up, irrigation etc)?
   1 2 3 4 5 6 7
   Not careful at all 2 3 4 5 6 7
   Very careful
10) How often does the energy efficiency of appliances and electronic equipment decide what you buy?
    1 2 3 4 5 6 7
    Never 2 3 4 5 6 7
    Always
11) How important is the proportion of renewable energy sources when you choose energy supplier?
    1 2 3 4 5 6 7
    Not at all 2 3 4 5 6 7
    Completely decisive
12) How much of your household waste do you recycle?
    1 2 3 4 5 6 7
    None 2 3 4 5 6 7
    All that is collected by the municipality
Transportation

13) What is your normal everyday mode of transport?
Walking □ Bike □ Bus □ Car □ Train □ Other __________

14) If you have a car, what significance had its degree of environmental impact have for your decision to buy it?
1 2 3 4 5 6 7
None at all Very big significance

15) If you normally travel by car, how many join you in the car? __________

16) How do you normally travel domestically?
Train □ Bus □ Car □ Flying □ Boat □ Other __________

17) How often (per year) do you travel abroad? __________

18) If/when you travel abroad, how do you usually travel?
Train □ Bus □ Car □ Flying □ Boat □ Other __________

Consumption

19) How large a proportion of your clothes-/shoe-purchases are second hand?
1 2 3 4 5 6 7
None All

20) How large a proportion of the furniture/decoration details that you buy are second hand?
1 2 3 4 5 6 7
None All

21) How often (per year) do you borrow/rent what you want/need instead of buying it for yourself? _____
22) How often (per year) do you repair things instead of throwing them away? __________
23) How often (per year) do you sell or give away things instead of throwing them away? __________
24) How often (per year) do you lend/rent out something that you own (home/clothes/tools/things)? _

Lifestyle questionnaire 2
This is a similar questionnaire to the one you filled in before. Now imagine that you are filling in the questionnaire as your future self (year 2028), based on the everyday decisions you think you will be making then.

IMAGINE THAT IT IS year 2028 and answer according to how you think you would act then.

Food

1) How often (per week) do you eat meat? ________________
2) How often (per week) do you have to discard food that has gone bad? ________________
3) How often do you shop for and cook with seasonal ingredients?
1 2 3 4 5 6 7
Never Always
4) How often do you shop for locally grown (within Sweden) food?
1 2 3 4 5 6 7
Never Always
5) How often do you shop for organic (ecological) food?
1 2 3 4 5 6 7
6) To what extent do you grow your own food?

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<td>Never</td>
<td>Not at all</td>
<td>To a high degree</td>
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7) How often do you deliberately lower the indoor temperature in order to save energy?

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8) How often do you switch off appliances/lighting in order to save energy, rather than leaving them in standby-mode?

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<td>Never</td>
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9) How careful are you about using as little water as possible (showers, washing-up, irrigation etc)?

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<td>Not careful at all</td>
<td>Very careful</td>
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10) How often does the energy efficiency of appliances and electronic equipment decide what you buy?

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11) How important is the proportion of renewable energy sources when you choose energy supplier/contract?

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<td>Not at all</td>
<td>Completely decisive</td>
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12) How much of your household waste do you recycle?

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<td>None</td>
<td>All that is collected by the municipality</td>
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13) What is your normal everyday mode of transport?

- Walking □
- Bike □
- Bus □
- Car □
- Train □
- Other □

14) If you have a car, what significance had its degree of environmental impact have for your decision to buy it?

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<tr>
<td>None at all</td>
<td>Very big significance</td>
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15) If you normally travel by car, how many join you in the car? □

16) How do you normally travel domestically?

- Train □
- Bus □
- Car □
- Flying □
- Boat □
- Other □

17) How often (per year) do you travel abroad? □

18) If/when you travel abroad, how do you usually travel?

- Train □
- Bus □
- Car □
- Flying □
- Boat □
- Other □

19) How large a proportion of you clothes-/shoe-purchases are second hand?

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<tr>
<td>None</td>
<td>All</td>
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</tbody>
</table>
20) How large a proportion of the furniture/decoration details that you buy are second hand?

1  2  3  4  5  6  7
None  All

21) How often (per year) do you borrow/rent what you want/need instead of buying it for yourself? _____

22) How often (per year) do you repair things instead of throwing them away? ________

23) How often (per year) do you sell or give away things instead of throwing them away? ________

24) How often (per year) do you lend/rent out something that you own (home/clothes/tools/things)? _____

And finally a few questions about how you view yourself:

Personal change

If you think ahead to your life the coming 10 years (from present-day to 2028), how much do you think that you will change as a person in that time (personality, knowledge, competence, habits, values, opinions, behaviours etc)?

1  2  3  4  5  6  7  8  9  10
Not at all Very much

What aspect of yourself and/or your lifestyle do you think is important to change before 2028?

_____________________________________________________________________________________

_____________________________________________________________________________________

In 2028 I am a person who is actively engaged for a better environment.

1  2  3  4  5  6  7  8  9  10
Strongly disagree Strongly agree

Complementary information (demographics)

Gender:  Female □ Male □ Other □

Age: _______________

Your monthly income (before tax): _______________

Educational level:

elementary school □ college □ university □ doctoral studies □

Housing:

detached house/townhouse □ co-operative apartment □ Rented apartment □ Other __

Number of adults in the household: _______________

Number of children (under 18 years) in the household: _______________
Appendix B. Manuscript for guided imagination (test group) and for guided self-reflection (control group)

(original in Swedish, translation by author)

Manuscript for guided imagination (test group) (15 mins)

With the help of a guided visualisation you will for a while be making a journey in time and doing a tour of your life as it may be ten years into the future....in the year 2028....

Imagine that you´ve actually taken a step into the year 2028...by and large the world is the same....but a lot is going on all over the world....at last, a global cooperation between governments, scientists, businesses and local population groups has begun....a lot is happening now....many promising technological projects are under way – among others the cleaning of the oceans from microplastics, restoration of forests and ecosystems, desalination for irrigation in arid regions, increased energy efficiency from solar-, wind, and wave-power – but perhaps the most important has been the diverse concrete projects dealing with increases in quality of life and sustainability on the local level....

Imagine yourself on an ordinary day.......an afternoon in 2028......you have finished working for the day and just sat down at a café table in the town square.......you are waiting for your friend who is buying coffee for the two of you......you just bought vegetables at the neighbourhood farmers market.......looking down into your bag you plan what to cook for your evening meal..........later this evening there will be a citizens' council meeting and you will attend it for the first time since your name got picked in the annual draw.......you are both a bit tense and curious about what it actually means to be able to participate and contribute to solutions for the city’s different needs.....but you feel secure, knowing some of the other participants......they have already done half their term on the citizens’council, and they seem very positive......the solutions last year for the urban farms, the bicycle lending scheme and the new bus routes turned out really well......also, you have heard good things about the the process leader supporting the council, so the curiosity outweighs the nervousness...

.......you see your friend balancing a well-stocked tray....so you get up to help out......while having your coffee you watch the people in the square and enjoy how much more pleasant it feels now that there is not so much car traffic.......you hear the murmur of human voices, a laughter, a child crying out.........bird song and every now and then a ‘ding-a-ling’ from bike-bells.......occasionally a bus passing by...........imagine what you see when you let your eyes wander around the square........are there any fragrances?....

......during your conversation you and your friend talk about how changing your everyday choices to fit within the 'footprint budget' is going......just imagine that we in Sweden have been able to for three years in a row celebrate that our common planetary footprint has diminished!!!!......it is a relief that the pressure on the earth’s resources is decreasing......you wonder if there might be a sort of extra national day for these celebrations?.......

.....your friend tells you about the workplace 'footprint consultant' they have recently hired and how valuable their help has been for education and coaching........you give a tip about a new 'app' that can be linked to the debit card, and that summarises the 'footprint' as you buy goods and services.......you both agree that it sometimes can be hard to keep up......all the time there are new tools and services being developed, making it comprehensible and possible to live well and yet consume within the planetary boundaries........you are both fascinated about how uniquely individual life choices are possible to make and still be living within a sustainable framework.......there really isn’t just one good way to live.......you talk about a colleague who recently started retraining to become a 'footprint accountant'.......and from a neighbour you’ve heard of a neighbourhood group that are joining up to create a shared budget and make shared purchases and investments...........your friend tells you about thoughts of maybe applying for a job at the new global institute charged with the responsibility for gathering data about all products in order to label them with their footprint.....the Swedish branch seem to be always looking for more staff and the
in-service training is said to be really good……

….you mention changes you’ve noticed at work……even though the results continue to be good you’ve noticed that the sense of in-house competition has eased up and that it is more fun to cooperate with the colleagues……you believe it might be related to the intense work you’ve done to put your work into the context of how it actually contributes to society……it feels as though it has brought you together in a good and important way……you remind yourself having read in the newspaper that sick-leave statistics have improved steadily over the last years……so perhaps the same has happened in other workplaces?……last year was apparently the first year when psychological causes like stress no longer was the primary cause for sick leave……your friend continues by telling you about how public health researchers all over the world have noticed tendencies of decreases in big public health problems like asthma, depression, stress and obesity……and for the natural environment pressure has also eased up……less greenhouse gases, less plundering of natural resources and cleaner air and water…..transitioning our way of life and changing how we spend our time has started to have a positive effect….for all……everywhere……

…..you sit quietly for a while, thinking for yourselves……you remind yourself of the difference from before……..how nice it is with the time you now have for your family and your friends……how you have energy and desire for your leisure interests……..how much you appreciate the occasions when you walk, bike or use the public transport instead of sitting alone in the car…..stressed out by traffic congestion or lack of parking spaces……..you feel a sense of wonder over the helpfulness growing between friends and neighbours……..you no longer compare yourselves so much……or feel the pressure to own a lot of stuff……..you borrow more from each other……..there seems to be more time left to help out with everyday things……cooking and eating together……..the neighbourhood farm is a good example……most people gladly spend a few hours now and then helping out in different ways …some are there nearly every day……there are things to do all year round…..the latest big project was starting up a communal composting bin……..so in future seasons you will be able to cultivate in your own soil…..the collection of rainwater now works perfectly after you’ve installed some larger barrels……..the next step seems to be building a chicken yard…..to provide eggs and fertiliser for the cultivation …even bee hives have been suggested on and off……..in a month’s time there will be a neighbourhood party partly funded by income from the vegetable sales……

…..it also feels good to see so many new creative businesses popping up all the time……second hand-shops for different goods……..restaurants working to combat food waste……..repair shops for this and that……gadgets- and services agencies……..car pools……..creator’s shops upgrading and bringing new life to clothes and gadgets…..perhaps you should sign up for one of their evening classes and bring with you something that you’d enjoy recreating into something new?…..

…..in the moment that is left…please continue by yourself to play with the idea of how your life is this year 2028……….and how you and your family and your friends help each other with things that are difficult, while at the same time you give each other creative tips and encouragement for things working well……………………..in a moment a bell will mark the end of this visualisation …round off in a way that feels good for you..take the time you need..[PLING!]
arrive?........what do you do?..........who do you meet?...............what happens?....................

How – and between what places – do you move around during an ordinary day?......what do you usually do in the different locations?........what do you see?........what do you hear?..........what do people around you do?.........

Where do you eat your meals?......what do you eat?........do you eat with other people, or by yourself?........do you have coffee breaks during the day?.......when and where do you have your coffee breaks?........with whom?.......

When the working day is done.......where do you go?.......directly home, or somewhere else first?..... how do you get there?........what happens when you get there?...............what do you do?........

And when you get home for the day.......what happens then?.......what do you do?.........how do you feel?.......how do you round off the day and prepare for the night?.......

If you think about your life in general....... 

..what do you like to do in your leisure time?.......how do you feel while doing that?.......who do spend time with?.......... 

..what are your normal household chores?........where do you buy the stuff you need for home? 

..what you need for yourself?........how do you go about cleaning?.......cooking?.....doing the laundry?....... 

......what other experiences are recurring in your everyday life?....................

......now let your mind wonder freely around your everyday life for some time......in a moment a bell will mark the end of this time of reflection...take the time you need to finish in a way that is good for you....[PLING!]
Appendix C. Instructions for writing assignments

(original in Swedish, translation by author)

A STORY ABOUT YOUR EVERYDAY LIFE IN 2028 (test group)

Now you have 15 minutes for writing your own description of your everyday life in 2028. It can be as a story, as bullet points, as a mindmap, or in some other way that you choose yourself. Try to describe as many aspects as possible of your everyday life. Don’t think too much about phrasing and other ‘technical’ aspects of the writing, the important thing is that you write about your everyday life, the way you imagine it to be in 2028.

Perhaps you are helped by the following questions, but you choose freely how you describe your everyday life in 2028 and what you include in that description.

What do you do? Who do you spend time/work with? What other people do you meet on a normal day? What do the people around you do?

What do you see? What do you hear? What do you feel?

A STORY ABOUT YOUR EVERYDAY LIFE (control group)

Now you have 15 minutes for writing your own description of your everyday life. It can be as a story, as bullet points, as a mindmap, or in some other way that you choose yourself. Try to describe as many aspects as possible of your everyday life. Don’t think too much about phrasing and other ‘technical’ aspects of the writing, the important thing is that you write about your everyday life.

Perhaps you are helped by the following questions, but you choose freely how you describe your everyday life and what you include in that description.

What do you do? Who do you spend time/work with? What other people do you meet on a normal day? What do the people around you do?

What do you see? What do you hear? What do you feel?