

The Effects of Temporal Comparisons on Pro-Environmental Behaviour

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Abstract

This research examines whether making temporal comparisons with one's own past behaviour can promote future mitigating intentions and behaviours. Participants compared their present selves to their past selves in terms of environmental behaviours, and indicated their intentions for future environmental behaviours. Participants indicated improvement from past selves to present selves – an upwards trajectory of environmental behaviours over time (Study 1). Participants reporting steeper improvement over past years indicated greater intentions to perform environmental actions in the future, but only when their improvement from the past was made salient (Study 1). When participants were instructed to recall different types of temporal trajectories in their own environmental behaviour (upwards, downwards, level), the type of recalled temporal trajectory did not affect participants' environmental intentions or subsequent environmental behaviour (Study 2). Environmental identity and the expected impact of the environmental behaviours on climate change was linked positively to intended and subsequent environmental behaviours.

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The Effects of Temporal Comparisons on Pro-Environmental Behaviour

Climate Change

Over the past few years, climate change has come to the forefront of many discussions and international debates. Previously thought of as something that would not affect us for decades, it has quickly become a more pressing concern, with the consequences already being felt on a global scale. There are numerous environmental problems that pose a threat to environmental sustainability, including global warming, air pollution, and water shortages. Many of these problems can be attributed to human behaviour (Vlek & Steg, 2007), and thus can be mitigated by changing the relevant behaviour to reduce its environmental impacts. Despite an increasing need to alter our destructive behaviours, there has been no equivalent increase in the level of engagement in pro-environmental behaviours seen around the globe (Hohne et al., 2009). As Gifford (2008) so poignantly put it, if we are to avoid being “the science that fiddled while the planet burned”, psychologists must increase research on problems pertaining to the improvement of the environmental situation. That is precisely what I intend to do with this research. Particularly, this research will be exploring whether someone’s behaviours and attitudes related to the environment can be affected by highlighting past environmental behaviours through the use of temporal comparisons.

Within the scope of this research, the term attitude will refer to an individual’s possible favourable or unfavorable evaluative reaction towards engaging in pro-environmental behaviours (DeLamater, Myers & Collett, 2014). Specifically, this research investigates attitudes pertaining to the environmental impact of both overall human behaviour (e.g., *Do you think human behaviour could affect climate change?*), as

well as personal behaviours (e.g., *Do you think your own personal behaviour can affect climate change?*).

How Do We Make People Act More Environmentally Friendly?

What is stopping people from acting more environmentally given that there are so many ways to get involved? For many, adapting a more pro-environmental lifestyle is possible, but people just are not changing to the extent that is needed (Gifford, 2011). There are several barriers inhibiting individuals from making more environmental choices. For example, it may be that people simply do not think about climate change, and whether their actions are affecting the environment - a concept known as environmental numbness (Gifford, 2008). For those who are consciously aware of their actions, they may believe that their individual effort is too trivial to make any real difference in the climate crisis. As suggested by Whitmarsh (2009), there may be a tendency for individuals to overestimate their efforts in the mitigation of climate change, and underestimate the negative impact their actions may incur. This type of rationale can easily discourage people from making any truly meaningful changes to their lifestyles (Gifford, 2008).

Another important climate mitigating behaviour, recycling (Burn, 1991; Schultz, Oskamp, & Mainieri, 1995; Thøgerson & Olander, 2003), largely depends on one's access to these facilities and resources, something that is not yet established in all Canadian cities. Individuals who are interested in recycling but live in communities that do not offer the service free-of-charge are often required to pay an extra cost. This type of economic barrier is not only related to recycling, but other environmental behaviours as well. One example is conserving water and electricity. Many people think of simple,

albeit less effective, methods of conservation, such as turning off the lights, or running the dishwasher on a full load. However, there are other, costlier options, such as replacing old appliances with newer, more efficient models. In fact, despite being a more effective climate mitigating behaviour, energy conservation was viewed less favourably and more difficult than other environmental actions, such as recycling. Individuals who do undertake these behaviours often do so due to their long-term financial rewards rather than out of concern for the environment (Whitmarsh, 2009).

An additional environmental barrier may be best described in one word: convenience. For instance, using reusable products is an easy climate mitigating behaviour, but people are still opting for the more convenient disposable products (such as bags and coffee cups). Using disposable products results in numerous environmental problems. Botsman and Rogers (2010) describe one of these problems in the form of a garbage patch in the Pacific Ocean, roughly the size of a continent. It is said to be composed nearly entirely of single-use items, such as plastic bags, that have made their way from land to sea. It is not just the decision to invest in reusable products that is affected by convenience. Driving is a key aspect in the human contribution to climate change (Bamberg, Ajzen & Schmidt, 2003), and people often choose to drive – whether to work, or the grocery store – rather than using public transit or bicycling due to the heightened convenience.

Although these barriers to engage in pro-environmental behaviour - and more not mentioned here - are ubiquitous, scientists have identified many factors that promote environmental behaviour. One method is simply to remove the specific barriers inhibiting a behaviour. For example, McKenzie-Mohr (2000), discusses how each behaviour comes

with its own specific barrier. He mentions a Canadian city that attempted to reduce water use by 10% by breaking down a specifically identified barrier (in this case, residents did not know when they had adequately watered their lawns, resulting in over-watering). Residents were each given a water gauge and asked to only water on specific days. Those given the water gauge decreased watering by 54%, whereas other residents increased lawn watering 15%. Although in this case the behavioural barrier was easily identified, some behaviours may have more than one barrier inhibiting it. In those situations, education is a possible solution. Some demographic factors, such as years of education, have shown a positive correlation between education and amounts recycled (Kollmuss & Agyeman, 2002). Fujii and Garling (2003) examined another environmental behaviour, driving. They found that by temporarily forcing frequent car drivers to use different methods of transportation, long-term reductions in car use were seen. Specifically, during an 8-day highway closure, frequent drivers were required to take public transit in place of driving. One year following the highway closure, those same drivers continued to take public transit more frequently than those drivers who did not switch to public transit during the closure.

In sum, there are many different behaviours that could mitigate climate change - recycling, energy and water conservation, investing in reusable materials, and many others. Some of these behaviours have been studied in past research on factors that boost or prevent pro-environmental action, and all might impact the climate (Whitmarsh, 2009; Whitmarsh & O'Neill, 2010; Gatersleben, Murtagh, & Abrahamse, 2012). Instead of focusing on one single behaviour, I will assess a mix of different types of pro-environmental behaviours, to capture a range of actions that might mitigate climate

change. Then, I intend to investigate a factor that might promote the range of pro-environmental action: temporal comparisons with one's own engagement in these behaviours in the past.

Past Behaviour

Past behaviour has been recognized as a strong predictor of both future intentions and behaviour (Ouellette & Wood, 1998; Verplanken & Orbell, 2003). Highlighting how well an individual performed behaviours in the past may contribute towards a more favourable attitude and greater perceived control (i.e., less difficulty performing that behaviour) in the future. This in turn may indirectly contribute to future intentions. In environmental terms, for example, frequently turning the lights off when leaving a room may instill a sense of environmental identity and perceived control. These factors may then contribute to positive intentions to perform that behaviour in the future (Ouellette & Wood, 1998). These same factors may go beyond intentions, and contribute to an increase in future environmental behaviours. Studies examining behaviours have shown evidence that reminders of past pro-social behaviour can affect decisions to be pro-social in the future (Gneezy, Imas, Nelson, Brown & Norton, 2012). However, there is conflicting research on how that future behaviour is affected. For example, past helpful behaviour may create a helpful self-identity, thus encouraging individuals to pursue subsequent helpful actions (Hart, Atkins, & Ford, 1998; Gneezy et al, 2012; Aquino & Reed, 2002). Specifically, Gneezy and colleagues, (2012) found that those participants who donated half their earned payment to charity (helpful behaviour) were more likely to subsequently send a truthful message as opposed to a self-serving message (subsequent helpful behaviour) due to an increased helpful self-identity. These behaviours are not

unlike environmental behaviours, as both serve a purpose to help, whether it be other people or the environment. I anticipate my findings to be similar to those found by Gneezy and colleagues (2012), to the extent that recalling past environmental behaviours contributes to an environmental identity, thus leading to subsequent environmental intentions and actions. Conversely, past helpful actions may result in subsequent selfish behaviours, as individuals may feel they have fulfilled their moral duty and pursue more self-serving actions (Mazar & Zhong, 2010; Monin & Miller, 2001). For instance, Mazar and Zhong (2010) found that participants who *purchased* environmentally friendly products compared to conventional products (helpful action) were more likely to cheat and steal money on a subsequent task (self-serving behaviour). It is my intention to discover whether temporal comparisons with one's own past behaviours can promote future environmental behaviours, as opposed to hindering them. In particular, whether reflecting on the improvement from one's own past environmental behaviour has the ability to contribute to an environment identity, thus increasing subsequent environmental intentions and behaviours.

Temporal Comparisons

Throughout everyday life, people frequently engage in temporal self-comparisons – comparisons of the present self to the self at some point in the past or future (Albert, 1977). For example, individuals may compare their current weight to that of five years ago, or their current salary to what they wish to be making in two years. These thoughts about who one once was or who one will be in the future can affect thoughts and behaviours in the present (e.g., Strahan & Wilson, 2006), depending on the types of comparisons people make.

There are two types of comparisons people often make with their past, upward and downward. Individuals making upward comparisons will see their present self as having declined from their past self, in other words, their past self was better. Oppositely, individuals making downward comparisons will see their present self as having improved from the past, their past selves were inferior (Wilson & Ross, 2000). When considering the past, downward comparisons seem to be more common, as people generally perceive themselves as improving over time (Wilson & Ross, 2001). For example, Wilson and Ross (2000) found that university students rated their present selves as superior to their past selves (downward comparison) when considering social skills, driving ability, academic dedication and self-confidence. Whether their perceived improvement is accurate or not, these comparisons may lead an individual to feel good about their present self. This potentially has the added benefit of leading people to believe that they are also improving over time, continuing the upward trajectory.

Kanten and Teigen (2008) explored this idea using a group of university students and revealed that, not only do individuals regard their present self as superior to their past self, they also extend this into the future, predicting improvement through passing years. Specifically, participants predicted improvement two years into the future actually exceeded their perceived improvement over an equal time span in the past. Similarly, Busseri, Choma, and Sadava, (2009) conducted a longitudinal study examining young adults past, present and anticipated future life satisfaction. Specifically, participants were asked to rate how satisfied they were in the present, one year ago in the past, and how satisfied they expected to be five years in the future. Results revealed that participants

rated themselves as having greater life satisfaction in the present compared to the past (downward comparison), and anticipating this to continue into the projected future.

Given this information, it is therefore possible that highlighting how good an individual was in the past may encourage them to do even better in the present, in an effort to surpass their past self and hold onto that downward comparison and gratifying upward trajectory. In environmental terms, for instance, emphasizing how often one recycled in the past may promote more recycling, or other environmentally friendly behaviours in the present and into the future to avoid upward comparisons with the past self and maintain the perception of improving over time.

Past Pro-environmental Behaviours

Is it possible that considering past pro-environmental behaviours will encourage more pro-environmental behaviours in the future? There has been some research investigating whether previous engagement in pro-environmental behaviours has any effect on pro-environmental behaviours in the future. Particularly, a recent longitudinal correlational study indicated that engagement in pro-environmental behaviours in the past was related to engagement in other pro-environmental behaviours in the future (Thøgersen & Olander, 2003). Specifically, they showed that individuals who recycled in the past tended to increase their purchase of organic food products the following year. This research suggests that past pro-environmental actions may promote subsequent pro-environmental actions. Also, in an experimental study, participants were more likely to choose a sustainable product after they were reminded of a range of pro-environmental actions they often perform in the past (Cornelissen, Pandelaere, Warlop, & Dewitte, 2008). These findings demonstrate that it may be possible for past pro-environmental

behaviour to promote subsequent environmentally-friendly actions. A more recent study came to a similar conclusion. Van der Werff, Steg and Keizer (2014) concluded in two of their studies that past environmental behaviours may influence future environmental behaviours. Specifically, they found that considering a past fuel-efficient driving style promoted the intention to reduce meat consumption. These results suggest a type of spillover effect – performing one type of environmental behaviour may promote engagement in other types of environmental actions. In their second study, they found that reminding participants of their past environmental behaviours resulted in participants choosing more environmentally friendly products. It is plausible, then, that past pro-environmental actions may promote subsequent environmentally friendly behaviours. One suggestion as to why this may be possible is in the concept of self-identity, and how acquiring a particular self-identity may increase future behaviours in line with that identity. For example, Aquino, Freeman, Reed, Lim and Felps (2009) found that participants who recalled and read a list of the Ten Commandments, thus activating their moral identity, were more likely to intend on behaving in a pro-social manner. Individuals recalling their past environmental actions may activate their environmental identity, which may then encourage individuals to act more environmentally in the future.

Identity

People who believe they have a strong environmental identity are more likely to reduce waste and conserve energy (Whitmarsh & O'Neill, 2010), and are also more likely to engage in pro-environmental behaviours, such as recycling (Gatersleben, et al., 2012). Further, individuals with a strong environmental identity have been found to use less

energy, and choose more sustainable products, along with using paper more economically (Van der Werff et al., 2014).

Specifically, Gatersleben and colleagues (2012) conducted three studies to determine the role of identity on pro-environmental behaviours. Participants were asked about their environmental values, pro-environmental behaviour, and to what extent they considered themselves to be conscious consumers (ex., environmentally friendly). Results revealed that environmental identity was significantly related to intention to act pro-environmentally in all three studies. Specifically, an environmental identity was related to recycling, buying Fair Trade products, and avoiding vacations that required flying. This research allows us to draw the conclusion that self-identity may in fact contribute to the types of behaviours people perform. For instance, people with a strong environmental self-identity will regard themselves as an environmentally-friendly person, and thus be more likely to act engage in environmentally friendly behaviours (Van Der Werff, Steg, & Keizer, 2013). Specifically, Van Der Werff and colleagues (2013) found that environmental identity fully mediates the relationship between values and environmental intentions and behaviour. Participants were asked about their values, environmental identity, and to choose between two products (sustainable vs not). The stronger participants' environmental values, the stronger their environmental identity might be. The stronger one's environmental identity, the more often one might chose sustainable products. This suggests that individuals with a strong environmental identity may be more likely to pursue environmental behaviours.

With the knowledge that self- identity may influence behaviour, is it possible, then, for behaviour to influence self-identity? There is empirical evidence that suggests

past behaviour does influence self-identity. For example, Lee, Piliavin and Call (1999) found that donating blood in the past contributed to an individual's blood-donor identity, which in turn influenced the donor's intention to give blood in the future. Gneezy et al. (2012) determined that when individuals engage in pro-social behaviour, it signals their pro-social identity, thereby resulting in continuing pro-social behaviour.

Theoretically, this concept could be extended into environmental behaviours. For example, recycling in the past may strengthen an individual's environmental self-identity, which may in turn promote their engagement in subsequent environmental behaviours, such as turning off the lights when leaving a room. If environmental identity is influenced by past pro-environmental behaviour, then it should be possible to strengthen one's environmental identity by making improvement in past pro-environmental behaviours salient, thereby increasing future intentions and behaviours. I intend to investigate this in my second study. Various temporal trajectories (improvement, decline, consistency) will be examined to determine whether one type of trajectory increases environmental identity more than another. Further, I will examine whether an increased environmental identity, as an effect of considering past environmental behaviours, leads to an increase in subsequent environmental intentions and behaviours.

Research Question

In the present research I examine factors that could motivate individuals to engage in pro-environmental behaviour. Particularly, this research project makes use of temporal comparisons and examines how reflecting on past environmental behaviours can potentially affect future behaviours and attitudes related to the environment. In Study 1 I explore whether engagement in pro-environmental behaviours improves or declines from

the past to present, and whether this is an indicator as to how often participants intend on engaging in pro-environmental behaviours in the future. Based on research that suggests people tend to perceive improvement from their past (Wilson & Ross, 2001), I hypothesize that when participants compare their present selves to their past selves, they will perceive an improvement from the past (Hypothesis 1).

Second, I expect participants who have perceived improvement from their past to the present will intend to continue improving into the future. That is, participants who perceive improvement from the past should indicate that they intend on continuing to improve into their projected future, thus maintaining an upward trajectory (Hypothesis 2). This is based on previous research that suggests perceived improvement from the past tends to continue into the projected future (Kanten & Teigen, 2008), as well as studies that demonstrate how completion of pro-environmental behaviours in the past is related to more pro-environmental behaviours in the future (Thørgersen & Olander, 2003; Cornelissen et al., 2008; Van der Werff et al., 2014).

In addition to simply indicating the intention to continue pursuing environmental behaviours in the future, I believe participants who have indicated *more* improvement from the past will also indicate relatively more expected improvement for the future. In other words, the greater the perceived improvement from the past, the greater the intention to improve into the future (Hypothesis 3). On the flipside, I believe it is likely for individuals who perceive no improvement or who perceive decline from the past to continue to intend no improvement in the future.

To further investigate temporal comparisons, and how reflecting on past environmental behaviours can potentially affect future behaviours and attitudes related to

the environment, a second study was run. Study 2 goes beyond intentions and assesses actual subsequent behaviours. Further, it explores the effects of differing trajectories on both predicted intentions and subsequent behaviours. To do this, I use four separate conditions to explore the different trajectories (improvement, decline, consistency, control) of past pro-environmental behaviour and their relationship with intended and actual future pro-environmental behaviour. By examining trajectories separately, I am able to establish whether there is a difference between trajectories of past behaviour, thus allowing me to determine whether one type of temporal comparison is more advantageous in terms of promoting behaviour change. I hypothesize that those participants instructed to focus on the improvement in their behaviours from the past will intend to engage, as well as actually engage, in more subsequent environmental behaviours (Hypothesis 2).

Second, Study 2 explores the effect of environmental identity on behavioural intentions and subsequent behaviours. Similar to findings by Van der Werff et al., (2013, 2014), I anticipate that environmental identity will mediate the effect between condition and both future intentions and subsequent behaviours. Specifically, I hypothesize that having participants consider their past pro-environmental behaviour will strengthen their environmental identity, thereby increasing their future environmental intentions and subsequent behaviours (Hypothesis 4).

Study 1

The purpose of this study is to examine the degree to which individuals perceive personal improvement over time in the realm of pro-environmental behaviours, and how this may potentially affect future intentions to engage in pro-environmental behaviours.

By having participants answer questions about different points in time, rating their past and current environmental behaviours, I attempt to establish whether participants perceived an improvement, and whether they believe they will engage in more or less behaviours in the future. As opposed to focusing on one specific behaviour (ex., Thøgersen & Olander, 2003; Van der Werff, et al., 2014), participants are asked about their engagement on a range of different environmental behaviours (ex., recycling, water conservation, sustainable purchases). As individuals generally engage in more than one environmental behaviour, I believe assessing a variety of environmental behaviours allows the opportunity to capture a more externally valid concept of overall "environmental behaviour". Further, each of the ten behaviours represented in the scale can be considered a relatively common and simple action that positively impacts the environment. As Gatersleben and colleagues (2012) found, future intentions to behave more sustainably were most strongly related to how easy participants thought the environmental behaviour was. Thus, more obscure or difficult (e.g., financially costly) behaviours were excluded from the scale. This allows the study to be more relatable to participants, as well as produce a scale that should have a relatively strong validity. Should the behaviours be significantly different from one another, the scale might show poor internal reliability, but would not affect the capability of this study to discover how often participants engaged in environmental behaviours in the past, and whether that engagement affects their future intentions.

After answering questions about their past and current engagement in environmental behaviours, I believe participants will indicate perceived improvement in

environmental behaviours from past to present (Hypothesis 1), as suggested by Wilson & Ross (2001).

Beyond this, reminding participants of the environmental behaviours they have completed in the past, and the improvement they have achieved, should encourage them to continue engaging in these behaviours into the future, maintaining a sense of improvement (upward trajectory) (Kanten & Teigen, 2008; Thørgersen & Olander, 2003; Van der Werff et al., 2014). Thus, I believe participants will also indicate that they expect to make further improvements to their environmental actions with regards to future intentions as a function of their past behaviour (Hypothesis 2). Further, the most motivating behaviour should be that which improves over time, therefore I believe that participants who have indicated *more* improvement from the past will also indicate relatively more expected improvement for the future. The greater the improvement from the past, the greater people's intention should be to improve in the future (Hypothesis 3).

To determine whether participants indicated improvement in environmental behaviours from past (10 years ago, 5 years ago, 1 year ago) to present (Hypothesis 1), a repeated ANOVA was run. Next, difference scores were calculated between each respective past and present time point. Correlations between calculated past time points and future intentions were then analyzed to determine whether reminding participants of their past environmental behaviours has the ability to predict their future environmental behaviours (Hypothesis 2 & 3). It was further separated by condition, to examine whether intentions are affected depending on whether past environmental behaviours are made salient or not. Separate multiple regression analyses were then run for each future time

point (tomorrow, 1 year from now, 10 years from now) to determine whether there is a significant difference in the links between the trajectories and environmental intentions.

Method

Participants

Using G*Power to determine required participants (80% power to detect a medium-sized difference between two groups), one-hundred and twelve participants completed this study. In this case, a medium effect size was expected based on findings from similar studies uncovering medium effect sizes (Ouellette & Wood, 1998; Kantan & Tieggen, 2008). This sample included 56 female, 53 male, and 1 'other' gender ($M_{\text{age}} = 37.89$, $SD = 13.97$). No participants were excluded from the analyses, however, there were participants who did not answer all questions, resulting in varying degrees of freedom in respective analyses. All participants were Canadian adults recruited from Crowdfunder. Upon completion, participants received \$0.50 as compensation, in line with the usual compensation amounts on the Crowdfunder platform.

Procedure

Participants completed the survey online and remained anonymous throughout. To observe potential differences in perceived improvement in pro-environmental behaviours from the past, and in future intentions, all participants were randomly assigned to one of two conditions, past salient condition or past not salient condition. Both conditions completed a brief demographics questionnaire before answering questions regarding the frequency of their pro-environmental behaviours. Participants in the past salient condition were first asked about their perceived improvement in pro-environmental behaviours. That is, they rated how often they performed various pro-

environmental behaviours at three time points in the past, followed by how often they currently engaged in more specific pro-environmental behaviours, and lastly, how often they intended on performing pro-environmental behaviours at three time points in the future. Oppositely, participants in the past not salient condition were first asked to state how often they currently engaged in specific pro-environmental behaviours, then how often they intended on performing pro-environmental behaviours in the future, followed lastly by how often they performed various pro-environmental behaviours in the past.

All participants then proceeded to complete exploratory questions concerning their general beliefs on climate change, including whether they believed climate change was real, and whether they believed human behaviour (anthropogenic) could affect climate change. Finally, participants completed the Implicit Person Theories Scale - a measure of lay theories of personality (Dweck, Chiu & Hong, 1995) to identify whether they believed people were capable of change, and were provided with a debriefing form and compensation code to receive their payment. For the entire survey, please see Appendix A.

Demographics. This section included participants' age, gender, occupation, level of education completed and whether they currently resided in an urban or rural setting (as individuals residing in rural areas may not have access to some environmental resources).

Perceived improvement in Pro-Environmental Behaviours. In order to determine past levels of pro-environmental engagement, participants were required to list on a five-point scale ranging from *never* (1) to *always* (5), how often they performed ten different environmental behaviours (e.g., recycling, conserving water) at specific time points. In line with previous work (Busseri, Choma, & Sadava, 2009, 2012), the

time points chosen were ten years ago ($\alpha = .83$), five years ago ($\alpha = .77$), one year ago ($\alpha = .75$), and right now ($\alpha = .79$). Both past and current behaviours were required to determine whether a difference between past and present existed.

To assess current engagement in another way, participants were given a more specific list of nineteen pro-environmental behaviours (e.g., recycling paper, conserving water by turning off the tap, composting organic waste) ($\alpha = .85$). Using the same five-point-scale, participants were asked to indicate how often they performed each of these in their current life. These nineteen environmental behaviours were more exploratory in nature, investigating not only how often participants recycled in general, but how often they recycled specifically plastic, or specifically paper, or how often they ate sustainably by avoiding meat. This extended scale about 19 current behaviours correlated well with the shorter scale about 10 current behaviours, $r(106) = .65, p < .001$. This extended behaviour scale was exploratory and was not investigated further, as the shorter scale is more comparable to the scale assessed for the other time points.

Lastly, to determine future intentions towards pro-environmental behaviours, participants were asked to indicate on a scale ranging from *a lot less than now* (1) to *a lot more than now* (5) how often they would perform ten different environmental behaviours (these are the same behaviours as those given to determine past engagement). Similarly, based on time points used by Busseri and colleagues (2009, 2012), participants were asked about their intentions starting tomorrow ($\alpha = .92$), up to one year from now ($\alpha = .89$), and up to ten years from now ($\alpha = .90$). Although two different environmental behaviour questionnaires were used, the shorter ten item scale is the focus of the analysis. This scale is used to look at both perceived

improvement from the past, and intended subsequent behaviour. It is the scale used to determine to what extent past behaviours predict intended future environmental behaviours. The reliability indices for these particular scales were strong, indicating that people who do the listed behaviours will likely engage in other environmental behaviours.

Exploratory Questions. In this section, participants were asked to state how much they thought each of the previously listed environmental behaviours affected climate change (1 = *Not at all*, 2 = *A little*, 3 = *A lot*). These ratings were averaged ($\alpha = .91$) into one scale assessing average impact of the environmental behaviours.

The remaining questions involved the participants indicating their beliefs pertaining to climate change. Using a common scale (1 = *Yes*, 2 = *No*), participants were asked the following: *Do you think the world climate is changing? Do you think human behaviour could affect climate change? Do you think your own personal behaviour could affect climate change?* Following this, participants were asked *How important is acting environmental to you?* (1 = *Not at all*, 5 = *Very*) to assess importance of environmental behaviour.

Lastly, on a scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (7), participants were asked to complete the Implicit Person Theories Scale to identify whether they believed personality is malleable (e.g., *people can do things differently, but the important parts of who they are cannot really be changed; everyone, no matter who they are, can significantly change their basic characteristics*) (Dweck et al., 1995). The eight-item scale was aggregated into one index of incremental beliefs denoting the belief that personality is changeable ($\alpha = .82$).

Results

Does Making Past Behaviours Salient Increase Intended Environmental Behaviours?

I examined whether there were any differences between the two conditions (making past behaviour salient vs not) for participants' intended behaviours for the future. Independent t-tests showed that there was no main effect of condition on intentions for tomorrow, $t(107) = .12, p = .905$, 1 year from now, $t(104) = -.12, p = .902$, or 10 years from now, $t(105) = -.99, p = .324$. For a summary of means between conditions, please see Table 1.

Table 1
Future Environmental Behaviour Intentions

	Behaviour Tomorrow	Behaviour in 1 Year	Behaviour in 10 Years
Past Salient (N = 51)	3.21 _a (.56)	3.29 _b (.56)	3.35 _b (.70)
Past Last (N = 50)	3.20 _a (.54)	3.31 _b (.52)	3.47 _c (.54)

Note. Scores ranged from 1 (*A lot less than now*) to 5 (*A lot more than now*). Standard Deviation presented in parenthesis. In each row, the means with differing subscripts are significantly different from one another, $p > .05$

Does Extent of Past Behaviours Predict Intended Environmental Behaviours?

Past pro-environmental behaviour 1 year ago, and 5 years ago were significantly positively correlated with future pro-environmental predictions ($.33 \leq r^2 \leq .44$ and $.20 \leq r^2 \leq .35, p < .01, p < .05$, respectively). Behaviours 10 years ago were significantly positively correlated with future intentions tomorrow ($r = .28, p < .01$) and 1 year in the future ($r = .22, p < .05$), however not with future intentions 10 years in the future ($r = .13, p = .170$). Overall, the results show a strong association between past engagement in pro-

environmental behaviours and future intentions (Hypothesis 2). However, these responses might be driven simply by a tendency to respond highly on any scale or by overall more environmental activity in general rather than be an expression of extending a trajectory into the future.

Table 2
Correlations Between Future Intentions and Past Behaviour

	<i>M</i>	<i>SD</i>	Behaviour Intentions Tomorrow	Behaviour Intentions in 1 Year	Behaviour Intentions in 10 Years
Behaviour 10 Years ago	2.81	.77	.28**	.22*	.13
Behaviour 5 Years ago	3.08	.66	.33**	.35**	.20*
Behaviour 1 Year ago	3.36	.66	.44**	.44**	.33**
Behaviour Now	3.55	.67	.44**	.45**	.26**

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

What Are the Trajectories of Reported Environmental Behaviours Over Time?

A general linear model (repeated ANOVA) revealed a significant linear trend: participants reported increasing their level of engagement in these environmental behaviours as time progressed, $F(3, 104) = 114.20, p < .01, \eta^2 = .14$. This pattern confirmed Hypothesis 1 - that participants will indicate increased environmental behaviours from past to present. This trend was similar regardless of when past behaviour was reported – at the beginning or at the end of the survey. In other words, condition did not interact with the linear trend, $F(3, 103) = 2.59, p = .11, \eta^2 = .03$ (See Table 1). The

means and standard deviations of past behaviour at the four specific times points (10 years ago, 5 years ago, 1 year ago, and current) ($\alpha = .88$) are summarized in Table 3.

Table 3
Past and Present Environmental Behaviours

	Behaviour 10 Years Ago	Behaviour 5 Years Ago	Behaviour 1 Year Ago	Current Behaviour
Past Salient (N = 51)	2.98 _a (.68)	3.18 _b (.63)	3.44 _c (.61)	3.59 _d (.63)
Past Last (N = 50)	2.63 _a (.81)	2.97 _b (.66)	3.26 _c (.70)	3.49 _d (.70)

Note. Scores ranged from 1 (*A lot less than now*) to 5 (*A lot more than now*). Standard Deviation presented in parenthesis. In each row, the means with differing subscripts are significantly different from one another, $p > .05$

Do Trajectories of Past Behaviours Predict Intended Environmental Behaviours?

Next I examined participants’ perceived trajectory: their perceived improvement or the temporal comparison of the past self relative to the current self. I first computed difference scores expressing this comparison between the past point in time and the present time. Independent t-tests showed that there was no main effect of condition on any of the difference scores, $t_s < 1.73$, $p_s > .087$. I correlated the difference scores with all three indices of behavioural intentions. None of the correlations was significant (See Table 4).

Table 4
Correlations Between Future Intentions and Trajectory Difference Scores

	<i>M</i>	<i>SD</i>	Behaviour Intentions Tomorrow	Behaviour Intentions in 1 Year	Behaviour Intentions in 10 Years
Improvement since 10 Years ago (Difference score)	.74	.71	.11	.17	.10

Improvement since 5 Years ago (Difference score)	.47	.47	.15	.14	.09
Improvement since last year (Difference score)	.19	.37	0	.01	-.11

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

However, trajectories might predict intentions only if the trajectories were salient at the time (i.e., when past behaviours were rated before intention ratings). To test this, I examined correlations separately by condition. See Table 5 for results. These correlations suggest that trajectories mattered *if* they were salient: the greater the difference score to the past point in time (i.e., the greater the improvement), the greater the environmental intentions. If participants were not reminded of their past behaviour before rating intentions, improvement from the past was not linked to intentions. This demonstrates that reminding participants of their past environmental behaviour is essential when attempting to encourage future environmental intentions. This supports research by Thørgersen & Olander (2003) showing that completion of pro-environmental behaviours in the past is related to more pro-environmental behaviours in the future. Particularly, it seems that reminding participants of their *improvement* from the past is related to greater behaviour intentions. The greatest future environmental intentions were linked to participants expressed improvement from 10 years in the past.

Table 5

Correlations between improvement in environmental actions since 10 years, 5 years, and last year and behaviour intentions for environmental actions tomorrow, 1 year, and 10 years in the future by Condition

Behaviour Intentions for....	Past Behaviour Not Salient			Past Behaviour Salient		
	Tomorrow	1 Year	10 Years	Tomorrow	1 Year	10 Years
Improvement since 10 Years ago (Difference score)	-.05	.012	-.09	.34*	.40**	.30*
Improvement since 5 Years ago (Difference score)	-.01	.01	-.09	.34*	.29*	.26
Improvement since last year (Difference score)	.04	-.03	-.13	-.08	.08	-.15

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.001 level (2-tailed).

Next, multiple regression analyses were used to examine if the differences in links between trajectories and environmental intentions by salience condition were significant.

Intentions to Act Environmental Tomorrow. I first examined intentions to act environmentally tomorrow. In three separate interaction models, pro-environmental intentions were regressed on salience condition, the respective difference scores (10 years, 5 years, 1 year) and the respective interaction term using PROCESS (Hayes, 2012).

Results are summarized in Table 6.

Table 6

Regression Models Predicting Environmental Intentions for Tomorrow

	B	SE	t	p	f ²
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Model 1	Improvement compared to 10 years ago	-.03	.09	-.36	.72	.07
	Saliency condition	-.27	.15	-.18	.08	
	Interaction term	.38	.16	2.41	.018	
Model 2	Improvement compared to 5 years ago	-.01	.14	-.04	.97	.07
	Saliency condition	-.22	.14	-2.52	.13	
	Interaction term	.46	.22	2.07	.04	
Model 3	Improvement compared to last year	.04	.16	.26	.79	.005
	Saliency condition	.01	.12	.07	.95	
	Interaction term	-.21	.34	-.62	.54	

The interaction term of improvements in pro-environmental behaviour compared to 10 years ago and condition was significant, suggesting that the effect of seeing oneself improve on pro-environmental behaviour on intentions depended on the saliency condition. The interaction term of improvements in pro-environmental behaviour compared to 5 years ago and condition was significant, suggesting that the effect of seeing oneself improve on pro-environmental behaviour on intentions depended on the saliency condition. The interaction term of improvements in pro-environmental behaviour compared to last year and condition was not significant.

Intentions to Act Environmental in the More Distant Future. I also examined two alternative outcome variables: intentions to act environmental one year from now or ten years from now. The patterns of results were similar to intentions to act environmental tomorrow and 10 years from now, and are presented in Table 7 and Table 8.

Table 7
Regression Models Predicting Environmental Intentions for Next Year

		B	SE	t	p	f ²
Model 1	Improvement compared to 10 years ago	.01	.08	.08	.93	.10
	Saliency condition	-.29	.15	-1.97	.05	
	Interaction term	.41	.15	2.65	.009	
Model 2	Improvement compared to 5 years ago	.01	.14	.07	.94	.05
	Saliency condition	-.19	.14	-1.37	.17	
	Interaction term	.38	.22	1.72	.09	
Model 3	Improvement compared to last year	-.04	.08	-.22	.82	.01
	Saliency condition	-.07	.12	-.62	.54	
	Interaction term	.21	.34	.63	.53	

Table 8
Regression Models Predicting Environmental Intentions for 10 Years from Now

		B	SE	t	p	f ²
Model 1	Improvement compared to 10 years ago	-.05	.10	-.53	.60	.08
	Saliency condition	-.42	.18	-2.38	.02	
	Interaction term	.43	.19	2.33	.02	
Model 2	Improvement compared to 5 years ago	-.09	.17	-.53	.60	.06
	Saliency condition	-.36	.17	-2.13	.04	
	Interaction term	.52	.26	1.96	.05	

Model 3	Improvement compared to last year	-.15	.19	.77	.44	.03
	Saliency condition	-.11	.14	.78	.44	
	Interaction term	-.27	.39	.69	.49	

Exploratory Analyses

Participants were also asked a series of exploratory questions. In particular, participants were asked their personal beliefs pertaining to climate change – whether they thought the world climate was changing, whether they believed human behaviour could affect climate change, and whether they believed their own personal behaviour could affect climate change. The majority of participants believed that the world climate is changing (92.7%), that human behaviour affects climate change (88.9%), and that their own personal behavior can affect climate change (79.6%). Due to the high agreement among responses, these questions were not analyzed further.

Participants were asked the extent to which the environmental behaviours listed on the behaviour scales affected climate change. Average impact of behaviour positively correlated with behaviour intentions tomorrow, in one year, and in ten years (see Table 9). This suggests that, believing these specific environmental behaviours have an effect an impact on climate change is linked to greater intentions to perform these environmental behaviours in the future.

Participants were also asked how important acting environmental was to them personally. Importance of environmental behaviour also positively correlated with future behaviour intentions at all three time points (see Table 9). This suggests that future environmental intentions are related to believing in the importance of acting environmental.

Table 9
Correlations Between Future Intentions and Past Behaviours

	<i>M</i>	<i>SD</i>	Behaviour Intentions Tomorrow	Behaviour Intentions in 1 Year	Behaviour Intentions in 10 Years
Average Impact of Behavior (Scale: 1-3)	2.40	.49	.28**	.25*	.20*
Importance of Environmental Behaviour	4.11	1.00	.47**	.53**	.47**

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Lastly, the Implicit Personal Theories Scales was completed by participants to identify whether they believed personality is malleable (Dweck et al., 1995). The Implicit Personal Theories scale was not correlated with future environmental behaviour intentions for any future time point, indicating that believing personality is malleable is not linked with future environmental behaviour intentions. Refer to Table 10 for correlations results.

Table 10
Correlations Between Implicit Person Theories Scale and Future Intentions

	<i>M</i>	<i>SD</i>	Behaviour Intentions Tomorrow	Behaviour Intentions in 1 Year	Behaviour Intentions in 10 Years
Incremental Beliefs	4.36	.91	.09	.04	.10

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Discussion

Study 1 examined the potential impact of temporal comparisons on future environmental behaviour intentions. In line with previous research (Wilson & Ross, 2001), I hypothesized, and found, that when participants compared their present selves to their past selves, they indicated improvement from the past (Hypothesis 1). A significant linear trend showed that participants increased their level of engagement in environmental behaviours as time progressed, with the least amount of behaviours being completed 10 years in the past, and the most being completed at the current time point. This trend was similar regardless of whether past was made salient or not.

Furthermore, Study 1 revealed that participants were more likely to indicate a greater future intention to engage in environmental behaviours after considering their past pro-environmental behaviours (Hypothesis 2 and 3). The more environmental they acted in the past, the greater their intentions to act environmental in the future – but only when the past had been made salient to them. Particularly, reminding participants of their *improvement* from the past related to greater behaviour intentions. It is important to note that the more time that has passed – the greater the improvement, which in turn is related to greater behaviour intentions. Participants expressed improvement from 10 years in the past was linked to the greatest future environmental intentions. Thus, it seems a longer time point from past to present is crucial when attempting to influence future behaviour intentions, and possibly subsequent behaviours. This may be due to the longer time points allowing more change to take place. Many improvements may be made in 10 years, however, the number of behavioural changes that may take place in 1 year is limited, simply due to the time restrictions. Behaviour changes often take time. This reiterates the importance of including a longer time point in trying to affect intentions and behaviours.

Notably, seeing oneself improve on pro-environmental behaviours, thus indicating greater environmental intentions for the future, is dependent upon the salience condition. When participants listed their past environmental behaviours *prior* to indicating their future intentions, the improvement from the past was linked to environmental intentions. This is in line with previous research by Thørgersen & Olander (2003) suggesting that completion of pro-environmental behaviours in the past is related to more pro-environmental behaviours in the future. The exploratory analyses also revealed that the majority of participants believed that the world climate was changing, and that both human behaviour as well as their own personal behaviour can affect climate change. Further, impact of environmental behaviour, as well as the importance of acting environmental, positively correlated with future environmental behaviour intentions at all three time points. These results suggest that, intending to engage in more environmental behaviours in the future is related to believing that environmental behaviours (such as disposing food waste in a green bin) make a difference against climate change. As well as believing in the importance of acting in an environmentally positive way.

Interestingly, belief in change (Dweck et al., 1995) was not linked with future environmental behaviour intentions at any time point. One explanation for this may be that belief in the malleability of personality simply does not have a relationship with future environmental intentions. However, it may be that subsequent environmental behaviours rather than intentions do have a relationship with belief in change.

This initial study provides some insights into what motivated people to act pro-environmental, and to the importance of making past behaviour salient. However, there is still much left to uncover. Study 1 focused on improvement in pro-environmental

behaviours, rather than investigating other possible trajectories of past environmental behaviour (e.g., behavior might stay consistent or even decline). This study was also limited to future intentions, rather than actual behaviours. Study 2 was designed to address some of these issues.

Further, despite the ten-item scale created for Study 1 having good reliability, I believed a scale with more concrete behaviours may be beneficial for Study 2. Asking participants whether they '*recycle*' could be a bit vague as individuals may tend to recycle, for example, aluminum but not paper. Thus, Study 2 will use a scale that contains more concrete examples of environmental behaviour. Similar to the scale used in Study 1, this concrete scale will again include a range of environmental behaviours as opposed to focusing on a single behaviour, to improve the likelihood of capturing the more general concept of environmental actions performed by participants.

Study 2

Study 2 aimed to expand on Study 1 in two ways. First, by separating participants into four separate conditions (improvement, decline, consistency and control), I will be able to establish whether there is a difference between the type of trajectories of past behaviours. Participants will be randomly assigned to list a behaviour matching their assigned trajectory. For instance, participants in the improvement condition will be asked to list a behaviour that they have improved in from the past, whereas participants in the decline condition will be asked to list a behaviour they have done less of since the past. Those in the consistency condition will be asked to list a behaviour they have consistently performed since the past, and those in the control condition will simply be

asked to list any environmental behaviour, regardless of trajectory. Doing so will allow me to determine whether one type of temporal comparison is more advantageous in terms of promoting behaviour change. Having discovered in Study 1 that past behaviours must be made salient to elicit meaningful future intentions for further environmental behavior, all four conditions required participants to list behaviours they had completed in the past. Second, where Study 1 focused solely on future behaviour intentions, Study 2 will go beyond intentions and explore reports of actual behaviour as a consequence of considering past environmental behaviours. To accomplish this, Study 2 will use a new, more concrete scale of pro-environmental behaviour to capture true environmental actions. This concrete scale consists of specific, yet common behaviours that positively impact the environment. For example, rather than asking participants how often they intend to recycle, participants will be asked how often they intend to recycle specifically bottles and cans.

I hypothesize participants will indicate varying levels of future intentions based on the condition they were assigned to. Specifically, I believe that those participants instructed to focus on improvement in their behaviours from the past will intend to engage in more environmental behaviours in the future continuing their upward trajectory, as found in Kanten and Teigen (2008). Further, I expect to find an effect of condition on actual behaviours at the time of the follow-up to the extent that, individuals conditioned to focus on improvement from their past behaviours will perform more actual environmental behaviours during the week after the initial session (Hypothesis 2). Lastly, similar to findings by Van der Werff et al., (2013, 2014) I believe that environmental identity will mediate the affect between condition and future

intentions/actual behaviours. Specifically, I hypothesize that participants who reflect on improvements (vs consistent or declining behaviours) from the past will have a strengthened environmental identity. This increased environmental identity will thus increase future environmental intentions and subsequent behaviours (Hypothesis 4).

Method

Participants

Using G*Power to determine the required number of participants (80% power to detect a medium-size difference between 4 groups), two-hundred and forty participants completed this study. Consistent with expectations from Study 1, and previous research (Ouellette & Wood, 1998; Kanten & Tieggen, 2008), a medium effect size was expected. The sample included 168 female, 70 male, and 2 other participants ($M_{\text{age}} = 19.86$, $SD = 3.14$). No participants were excluded from the analyses, however, there were participants who did not answer all questions, resulting in varying degrees of freedom in respective analyses. All participants were students recruited from Carleton University using the Department of Psychology Participant Pool system (SONA). Upon completion, participants received 0.50% course credit – 0.25% for the initial study and 0.25% for the follow-up.

Procedure

All participants were asked to partake in two separate sessions, part one and part two, in order to identify differences between the two time points. In the first session, participants reported on their current environmental behaviour, wrote about changes in their environmental behaviour according to one of four conditions (increasing, decreasing, consistent behaviour, or control group), completed an environmental identity

scale, and indicated their intentions for future environmental behaviour. In the second session, participants indicated how often they performed the same specific environmental behaviours as were listed in part one in the last week, along with repeating the environmental identity scale. The unabridged materials are listed in Appendix B and C.

Session 1

After creating a unique identifying code intended to link the data for the two sessions together, participants completed an online survey.

Demographics. This section assessed participants' age, gender, and whether they currently reside in an urban or rural setting.

Current Behaviour Engagement. After completing a brief demographics questionnaire, participants then indicated how often they currently performed ten specific environmental behaviours. To determine current levels of pro-environmental engagement, participants were required to list on a five-point scale ranging from *never* (1) to *always* (5) how often they performed ten different pro-environmental behaviours. The behaviours were: Take public transit (when driving is an option), use a re-usable travel mug, use re-usable shopping bags instead of standard plastic ones, drink tap water rather than bottled water, dispose of food waste in a green bin, turn off lights when leaving the room, recycle used plastic bottles and cans, encourage friends to recycle, eat vegetarian rather than meat, wash clothes in cold water (rather than warm or hot). Responses were aggregated into a single scale indicating mean current environmental behaviours ($\alpha = .59$). The reliability of the behaviour scale was poor - this indicates that people who perform one behaviour may not perform other behaviours included in the scale. For example, individuals who drink tap water rather than bottled water may not

turn the lights off when they leave the room. For the purpose of this study we will use the aggregate scale as intended to capture intentions for a variety of environmental behaviours.

Impact. They were also asked how much each behaviour impacted the environment on scales ranging from 1 = *a great deal* to 5 = *not at all*. These items were reverse coded and aggregated into a single scale indicating mean perceived impact ($\alpha = .80$).

Conditions. All participants were randomly assigned to one of four conditions, an improvement condition, a consistent condition, a decline condition, and a control group. Each participant was asked to list an environmental behaviour they had done more of (improvement condition), less of (decline condition), performed consistently (consistent condition), or simply any behaviour they had performed over the past couple (control condition). In the improvement conditions, some of the listed behaviours included: “Over the past couple of years, I have become more conscious as to when to off the lights in a room. Now, each time I leave a room I ensure that all the lights and appliances, such as the fan or AC are switched off as they are not in use”. The decline condition included behaviours such as: “Ever since I got my drivers license, I find I am more lazy so I drive everywhere instead of walking even when its close distance”. Within the consistent condition, participants listed: “Drinking from a reusable water bottle rather than bottled water”. Participants in the control condition listed environmental behaviours such as: “I consistently use my own bags to get groceries or other items from stores, only taking store plastic bags when absolutely necessary. When I do take these bags, I reuse them to achieve the maximum use before discarding”.

Having discovered in Study 1 that past behaviours must be made salient to elicit meaningful future intentions, all four conditions required participants to list behaviours they had completed in the past. The separate conditions were used to explore whether one type of trajectory was better at promoting climate mitigating intentions and behaviours, as well as whether the condition had an effect on environmental identity. Then participants described what they had completed in the past, how they performed that behaviour in the past and how they performed it now. Nine participants did not complete the writing instructions. However, these were retained in the analysis (excluding them made no difference in the results).

Manipulation check. A single item assessing the perceived behaviour trajectory was included as manipulation check. Participants were asked "*How has that behaviour changed*" and rated it according to whether they perceived improvement (1), consistency (0) or decline (-1).

Environmental Identity. Participants were next given an environmental identity scale (adapted from Soliman, Buehler, & Peetz, 2017). They were given a list of eight statements (E.g., "I value environmental causes"), and asked to what extent they agree or disagree with those statements on scales ranging from 1 = *strongly disagree* to 7 = *strongly agree*. These items were aggregated into a single scale indicating the mean environmental identity ($\alpha = .91$).

This will be used to examine whether environmental identity has a mediating effect on either intentions, or follow-up behaviour.

Intentions. Lastly, participants were shown the same list of ten specific environmental behaviours and asked how often they intended on performing those

behaviours over the next week. Responses included 1 = *not at all*, 2 = *once in the next week*, 3 = *several times in the next week*, 4 = *every day in the next week*, 5 = *several times every day in the next week*. These items were aggregated into a single scale indicating mean environmental intentions ($\alpha = .62$). These intentions were then examined, along with the follow-up behaviour to identify whether intentions influence subsequent behaviour.

Session Two

Seven days after the initial session, participants were emailed by the researcher with a link for the second survey. This timeline was chosen to allow observable behaviour changes to take place, without participants forgetting about the study. Participants completed the second part on average 10.28 days after session 1 (range = 7 – 28 days, $M = 10.28$, $SD = 3.27$). After inputting their unique participant code again, participants completed a brief survey.

Environmental Behaviours. Participants were given the same list of ten specific environmental behaviours they had seen in Session 1. They were asked to indicate how often they performed each behaviour in the past week. Responses ranged from 1 = *not at all*, 2 = *once in the next week*, 3 = *several times in the next week*, 4 = *every day in the next week*, 5 = *several times every day in the next week*. These items were aggregated into a single scale indicated mean environmental behaviours ($\alpha = .55$). These behaviours were then examined to discover whether participants' previous intentions and assigned condition affected their follow-up behaviour.

Environmental Identity. Lastly, participants were again asked to complete the environmental identity scale (adapted from Soliman, Buehler, & Peetz, 2017; $\alpha =$

.92). Correlations between environmental identity at Session one and environmental identity at Session two show adequate test re-test reliability, $r(119) = .77$, meaning participants who had strong environmental identities at Session one, also had strong environmental identities at Session two.

Results

Do Intentions Affect Behaviour?

A paired-samples t-test was conducted to compare participants' intentions during the initial session and their actual environmental behaviours following that session. A significant difference was found between intentions ($M = 3.06$, $SD = .55$) and actual environmental behaviours ($M = 2.90$, $SD = .54$), $t(120) = 3.67$, $p < .001$. This test demonstrates that participants fell short of their intentions, they did significantly less than they had intended. Intentions and behaviours also correlated, $r(121) = .61$, $p < .001$. The correlation demonstrates that intentions do influence actual environmental behaviours, specifically, participants who intended on performing more environmental behaviours actually performed more environmental behaviours during the time in between session one and follow-up. A second paired-samples t-test was conducted revealing no significant difference in scores of environmental identity at the time of the initial study ($M = 4.17$, $SD = 1.20$) and environmental identity at follow-up ($M = 4.20$, $SD = 1.16$), $t(120) = -.42$, $p = .673$. Evidently, taking part in the study did not seem to change participants' environmental identity.

Is There an Effect of Condition?

A one-way between subjects ANOVA was conducted to compare the effects of the writing exercise condition on intentions, environmental identity and actual

environmental behaviours. Results revealed no significant effects on any of the three outcomes; intentions [$F(3, 236) = .88, p = .450, \eta^2 = .01$], environmental identity at the initial session [$F(3, 236) = .59, p = .623, \eta^2 = .01$], actual behaviour between the initial session and follow-up [$F(3, 117) = .64, p = .591, \eta^2 = .02$], and environmental identity at follow-up [$F(3, 117) = .53, p = .658, \eta^2 = .01$]. Contrary to my hypothesis, there was no effect of condition on intention, environmental identity, or actual behaviours. It did not matter whether participants perceived improvement, decline or consistency from their past, no condition was better at increasing future intentions or subsequent environmental behaviour.

Interestingly, regardless of condition, participants indicated improvement from their past to their present in terms of environmental behaviours. The majority indicated an improvement from their past behaviour on the manipulation check item despite separate instruction: 69.4% of participants in the decline condition, 65.5% in the consistent condition, 55% in the control condition and 86 % in the improvement condition. This demonstrates the strength of people's desire to maintain an upward trajectory in their lives, and the tendency to indicate improvement from past to present (Hypothesis 1), but also makes it impossible to examine the effect of different trajectories in this study.

Using the item from the manipulation check ("*How has that behaviour changed*"), a one-way between-subjects ANOVA was conducted in an effort to discover any differences in between participants who had perceived improvement, no change, or decline in their behaviours, regardless of condition. However, no significant difference was found between groups for intentions $F(2, 234) = 2.24, p = .108$, or behaviours $F(2,$

116) = .59, $p = .133$. Pairwise contrasts were run to further investigate any slight differences between groups. Results show that participants who perceived improvement in their behaviour did not report more intentions, ($M = 3.14$, $SD = .55$) $t(71.81) = -.160$, $p = .114$, or behaviours ($M = 2.90$, $SD = .53$), $t(33.80) = .99$, $p = .331$. Similarly, participants who perceived no change did not report significantly more intentions ($M = 2.99$, $SD = .60$) $t(32.09) = -.151$, $p = .140$, or behaviours, ($M = 2.77$, $SD = .56$) $t(17.79) = 1.56$ $p = .135$. Participants who perceived in a decline in their environmental behaviour did not report more intentions ($M = 2.96$, $SD = .60$) $t(51.51) = .240$, $p = .815$, interestingly however, it seemed as participants did list slightly more behaviours ($M = 3.14$, $SD = .53$) $t(28.98) = 2.10$, $p = .054$.

What Does Predict Environmental Behaviour?

To gain a better understanding of the data, a series of exploratory correlations were run. Refer to Table 11 for a list of correlations.

Table 11

Correlations Between Environmental Opinions and Intentions/Behaviours – Study 2

	Current Behaviour	Intentions	Follow-up Behaviour
Behaviour has Environmental Impact	.30**	.38**	.25**
Environmental Identity (Session 1)	.45**	.43**	.28**
Environmental Identity (Follow-up)	.54**	.48**	.39**

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Environmental identity at the time of the initial session ($M = 4.18$, $SD = 1.17$) and at the time of follow-up ($M = 4.20$, $SD = 1.15$) was also positively correlated with intentions and follow-up behaviours, suggesting that those with a higher environmental

identity are more likely to intend on performing environmental behaviours, as well as actually performing environmental behaviours.

Environmental Identity as a Mediator

Having found that there was no effect of condition on intentions, behaviour, or environmental identity, any mediation analyses would not have produced positive results. Therefore, no analyses with environmental identity as a mediator were conducted. However, an exploratory analysis was run to investigate the importance of environmental identity as a predictor of intentions or behaviours. Results revealed that environmental identity positively correlated with participants' current behaviours ($r = .45$), their future behaviour intentions ($r = .43$), as well as their actual subsequent behaviours ($r = .28$).

However, this may be due to the tendency of current behaviour to increase future intentions and subsequent behaviours. To rule out this confound, pro-environmental intentions were regressed on both current behaviours and environmental identity simultaneously. Both the effect of environmental identity ($B = .09$, $SE = .03$, $t = 3.36$, $p = .001$) and the effect of current behaviour was significant ($B = .56$, $SE = .06$, $t = 9.60$, $p < .001$). These results suggest that environmental identity does account for individuals intending to do more in the future, beyond their current behaviour.

Discussion

Study 2 attempted to expand on Study 1 in a couple of ways. First, different temporal trajectories were studied to identify potentially different effects of past behaviour trajectories on future behaviour. Rather than looking solely at the improvement of environmental behaviours, Study 2 also investigated the possible effects of declined and stagnant environmental behaviour on behavioural intentions and subsequent action.

Second, rather than focus solely on intentions, Study 2 used a more specific behaviour scale to investigate actual performed behaviours at the time of follow-up.

The concrete ten-item scale used to measure environmental behaviours in this study proved to have poor reliability ($\alpha = .55$) and failed to represent a homogenous selection of environmental behaviours individuals perform. Specifically, this indicates that individuals who perform one behaviour may not perform other behaviours included in the scale. For instance, participants who drink tap water rather than bottled water may not turn the lights off when they leave the room.

The ten-item scale used in Study 1 was better than the ten-item scale used in Study 2 in terms of identifying environmental behaviours that go together (i.e., it had a higher reliability). The scale used in Study 1 comprised more general environmental behaviours (e.g., "*recycle*"), allowing them to hang together much better. The environmental behaviours used in the Study 2 scale were a lot more specific (e.g., "*recycle used plastic bottles and cans*"), making them more challenging to group together. However, the ten-item scale used in Study 2 did seem to have a stronger impact on the environment than the scale used in Study 1. In both studies, participants were asked the extent to which the environmental behaviours listed on the scales impacted the environment. Both scales positively correlated with intending to engage in more environmental behaviours in the future, however the scale used in Study 2 resulted in stronger correlations ($r = .28$, $r = .25$, and $r = .20$ for the three time points in Study 1 versus $r = .38$ in Study 2). This may be due to the same reason that made the scale less homogenous, the fact that the environmental behaviours used in Study 2 were more specific and concrete.

Moreover, the scale in Study 2 used to measure subsequent behaviours included: “*Several times every day in the next week*”, however, some of the environmental behaviours listed on that scale (e.g., *encourage your friends to recycle, wash your clothes in cold water (rather than warm or hot)*) are behaviours that are not typically performed multiple times a day, every day. In the future, the behaviours should be adjusted to include more suitable actions that match this scale.

Further, as Study 1 showed that the greater improvement in environmental behaviours over time related with higher future behaviour intentions, I hypothesized that participants in the improvement condition would intend to do more environmental behaviours in the future, as well as actually perform those behaviours, compared to the other trajectories (Hypothesis 2). Contrary to my hypothesis, results determined that there was no effect of condition on either intentions nor actual behaviours. Essentially, it did not matter whether participants perceived improvement, decline or consistency from their past when it came to subsequent behaviour intentions and actions. This could be due to a few reasons. One explanation could be that asking participants to report on a single behaviour, while the specific ten item scale listed a range of other behaviours, was not enough to elicit a true effect. It may be that, in order to reveal a true effect of condition, participants would have needed to focus on one single behaviour – recall how they performed this behaviour in the past, their intention to perform this behaviour in the future, and whether the actual behaviour was performed following the manipulation. The downside of this would be less generalizability of any findings, however.

Another explanation may be that the wording of the conditions themselves was confusing for participants. For instance, the manipulation asked participants to either list

a behaviour they had done more of over the past couple years to help the environment (improvement condition) or a behaviour they had performed less over the past couple years to help the environment (decline condition). The purpose of the decline condition was for participants to list an environmental behaviour that they had performed less of, perceiving a decline in their environmental contribution. However, participants may have interpreted this as an opportunity to list an environmentally harmful behaviour that they had performed less, in order to help the environment. Doing so would result in participants perceiving improvement in their environmental behaviours due to a decline in their environmentally harmful behaviours. This may have led to the two conditions becoming too similar in nature to reveal any significant difference. Perhaps had the wording between conditions been clearer, an effect of condition may have been seen on intentions or behaviours.

Further, based on previous research (Van der Werff et al., 2013, 2014) I hypothesized that environmental identity would mediate the effect between condition and future intentions/actual behaviours (Hypothesis 4). I proposed that, considering past environmental behaviours would strengthen environmental identity, thus increasing subsequent behaviour intentions and actual behaviours. This could not be tested, because no effect of condition was found on intentions, behaviour, or environmental identity. Rather, an exploratory analysis investigating the importance of environmental identity as a predictor of intentions for behaviours was conducted. Results suggested that environmental identity does play an important role as a predictor of intentions for environmental behaviour. This corresponds well with previous research that has found environmental identity to be important for environmental action (Van Der Werff, Steg, &

Keizer, 2013) or, more generally, research that has found moral identity to be important for moral action (Gatersleben, et al., 2012).

General Discussion

Two studies were conducted to discover whether reflections on past environmental behaviour can influence subsequent environmental behaviour. In Study 1, participants indicated that they had improved in their environmental behaviour from past (10 years ago, 5 years ago, 1 year ago) to present, with the most pro-environmental behaviours being completed at the current time point. This shows participants making downward comparisons with their past self, similar to research on temporal comparisons in other domains (Wilson & Ross, 2001). Further, after considering their past environmental behaviours, participants were more likely to intend on pursuing more environmental behaviours in the future. It appears that once people are reminded of their past environmental behaviours, the trajectory of performing these behaviours more or less over time may actually impact their intentions to act environmentally in the future. For example, an individual being reminded that they recycled a lot in the past may intend on recycling more in the future.

However, Study 1 only looked at the effect of perceiving improvement on environmental behaviours from past to present. What if, rather than improving, an individual declined in their environmental behaviours, for example, recycling less in the present than they had in the past. Would this affect subsequent environmental intentions and behaviours? Study 2 attempted to answer this question by randomly separating participants into thinking of improvement, decline, consistency in pro-environmental behaviour, or simply thinking of past environmental behaviour without specifying a type

of change. What I found was that the type of trajectory of behaviour that participants recalled did not affect future intentions or actual environmental behaviours. Essentially, no one trajectory was better at increasing intentions and actual subsequent behaviours.

This could be due to a few reasons. First, there may not have been enough distinction between groups. For instance, participants in the consistency condition were asked to list a behaviour they had consistently performed over the years, while participants in the control condition were asked to simply list a past behaviour without a specific type of change. These instructions may have been too alike to expose any real differences. Further, participants in the decline condition may have misinterpreted the instructions to list an environmental behaviour they had performed less, and rather, listed an environmentally harmful behaviour they performed less. This would again eliminate any kind of distinction between the conditions, and effect the ability of the study to find any effect of trajectory on environmental intentions or subsequent behaviours.

Second, it may be that past environmental behaviours simply do not promote subsequent environmental actions. There has been some research indicating past pro-environmental behaviour does not lead to more pro-environmental behaviour, and may even result in less environmentally friendly behaviour. In their study on consumer behaviour, Thøgerson and Olander (2003) found that there was no, or even a negative relationship between some environmentally friendly behaviours in one year and pro-environmental actions in the following years, suggesting that engaging in some environmental behaviours in one year does not promote, or possibly even inhibits subsequent environmental actions. Third, as research on moral licensing suggests, past environmental behaviour may inhibit rather than promote future environmental actions,

as people may feel licensed to act immorally after their good deed (Mazar & Zhong, 2010). For instance, upon thinking of their past recycling habits, individuals may be more inclined to partake in other environmentally harmful behaviours as they believe they've already done their part to mitigate climate change through recycling. All of these reasons may have contributed to the discrepancy between my hypotheses and the outcomes of the study.

Study 2 also looked at the affect environmental identity plays regarding future intentions and actual behaviours. I hypothesized that environmental identity would mediate the effect between condition and future intentions and behaviours, such that considering past environmental behaviours would strengthen an individual's environmental identity, thus increasing future behaviour intentions and actual behaviours. As no effect of condition was found on intentions, behaviour or environmental identity, no mediation analysis was run as findings would not have produced any positive results. However, some explanations as to why environmental identity may not have mediated the effect of trajectory on future intentions or subsequent behaviours in this study are still discussed. One explanation could be that the manipulation may not have been enough to elicit a sense of environmental identity strong enough to affect behaviours and intentions. Van der Werff et al. (2014), found that environmental identity was stronger when the initial pro-environmental behaviours were difficult and unique, or when a large range of behaviours were being considered. It could be that the list of behaviours used in my manipulation were not unique or difficult enough to sufficiently strengthen participants' environmental identity to impact future intentions and behaviours. Future research could test which specific pro-environmental behaviours are more likely to strengthen

environmental identity and, test whether a strengthened environmental identity mediates subsequent environmental behaviours. It is also important to keep in mind that environmental identity not only depends on an individuals' previous actions, but also their personal values (Van der Werff et al., 2013, 2014). Thus, reminding people of their previous environmental behaviours may only have the ability to slightly affect their environmental identity, not to the extent needed to affect intentions and behaviours.

However, exploratory analyses were conducted to investigate whether environmental identity played any role as a predictor of intentions for environmental behaviour. Results revealed that, in fact, environmental identity does play an important role as a predictor of intentions for environmental behaviour.

Limitations

The present research provides preliminary evidence concerning temporal comparisons and their influence on environmental behaviours, however there are some limitations that should be noted. First, both studies in this research relied on self-reports in response to questionnaire items. Although some studies deem self-reports to be adequate indicators of actual behaviour (e.g., Warriner, McDougall, & Claxton, 1984; Fuj, Hennesey, & Mak, 1985), others have reported relatively low correlations between self-reported measures and observed behaviour. (e.g., Corral-Verdugo, 1997). Future research on this subject may attempt to observe actual behaviours.

Second, while Study 1 consisted of a wide range of adults from multiple areas, Study 2 consisted strictly of university students from a local institution, leading to a possible issue with generalizability. Future studies should look at a wider demographic to achieve a more generalizable sample. Lastly, although the environmental behaviours used

in the two studies were behaviours that have been widely used in other research (Burn, 1991; Schultz et al., 1995; Kollmuss & Agyeman, 2002; Thøgerson & Olander, 2003), these particular behaviour scales were created for the function of this study, and have not been previously validated by other research.

Both Study 1 and Study 2 made use of newly developed environmental behaviour scales. The general ten-item behaviour scale used in Study 1 to measure past behaviours had moderate reliability ($\alpha < .83$) while the same scale used to measure future intentions had good reliability ($\alpha < .92$). The more concrete 10-item behaviour scaled used to measure intentions, ($\alpha = .62$) and subsequent behaviours ($\alpha = .55$) in Study 2 was less reliable. Low reliability often makes it more difficult to explain any variances, thereby making it more difficult to find any true effects. Any future research should perhaps use a more reliable behaviour scale, or focus strictly on one behaviour rather than many, to increase the chances of uncovering effects.

Further, the scales used in both Study 1 and Study 2 are considered ordinal, and are treated as such (rather than continuous). However, doing so may complicate the interpretation of results. Although it is possible to rank the levels (*never*, *always*), values cannot be placed upon them. For example, on a five-point scale ranging from *never* to *always*, it is incorrect to say that “*sometimes*” is twice as positive as “*never*”. Therefore, when interpreting the results, it becomes difficult to truly identify whether an improvement in fact took place. Because the spacing between the levels of behaviour engagement are uneven, the meaning of any average obtained would be questionable.

Contributions to Existing Research

Although not all hypotheses were confirmed, this research still lends valuable insight into the domain of temporal selves, past behaviour, and their effect on environmental behaviours. Study 1 demonstrated the importance of making past actions salient when encouraging individual to pursue future environmental behaviours. When the past was made salient, the more environmental individuals acted in the past, the greater their intentions to act environmental in the future. It also supported previous research that suggested individuals prefer making downward comparisons (Wilson & Ross, 2001). Study 2 suggested that no one direction of thought is better than another when it comes to influencing future intentions and behaviour, although future research is required to determine if that is truly the case. This research also supported previous research that demonstrated how current behaviour predicts environmental identity (Van der Weff et al., 2013, 2014).

Practical Implications

These findings may have practical implications for those attempting to persuade individuals to increase their environmental behaviours. For instance, companies selling environmental products may want to look at investing in advertising focused on reminding consumers of their past behaviour. There may also be positive implications in maintaining downward comparisons with the past-self. Busseri et al. (2009) mention that this type of comparison may allow individuals to hold positive and motivated feeling about their future, and maintain a sense of well-being. The finding that current behaviour may predict environmental identity may hold positive implications as well. Although in this particular study, environmental self-identity did not influence intentions or actual behaviour, other research has determined that particular self-identities do influence

behaviours (Whitmarsh & O'Neill, 2010; Gatersleben et al., 2012; Van der Werff et al., 2013, 2014). If this is the case, highlighting certain current environmental behaviours may have the ability to encourage future environmental intentions and behaviours – something that would be crucial to altering the course of climate change.

Future Directions

Much research suggests there is a link between intentions and actual behaviour (Ajzen, 1985; Taylor & Todd, 1995; Fielding, McDonald, & Louis, 2008), thus the preliminary findings of this research offer a promising direction for future studies to pursue within the domain of environmental behaviours. For instance, to what extent does past environmental behaviour need to be made salient to encourage environmental intentions? Do some past environmental behaviours influence intentions greater than others? Future research could determine which specific behaviours influence intentions and actions, and why. Further, considering the results of Study 2, are there particular behaviours which should be focused on to elicit a strong sense of environmental identity, thus increasing future intentions and actions? Possible directions for future research could involve determining which specific environmental behaviours have the ability to strengthen environmental identity. It may be that reminding individuals of these specific actions they performed in the past, in addition to making the past salient, will be enough to encourage them to pursue those and other environmental behaviours in the future.

Conclusions

In sum, a change in human behaviour is needed to alter the course climate change is taking. Many of the issues faced today, such as air pollution and water shortages, can be mitigated by changing the necessary behaviour. Research by psychologists into the

ways environmental behaviour may be changed is crucial to the solution. This research, and future research conducted within this domain is necessary to resolve the environmental problems we are experiencing today.

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Appendices

Appendix A

Thank you for deciding to participate in our study!

Demographics

Please answer the following questions.

- 1) In the box below, state your age in years
 - a. *type age*

- 2) Please select the gender you identify with
 - a. Male
 - b. Female
 - c. Other

- 3) In the box below, please state your current occupation
 - a. *occupation*

- 4) Please indicate whether you live in a Rural or Urban setting
 - a. Urban
 - b. Rural

- 5) Please state the level of education you have completed
 - a. None
 - b. High School
 - c. University/College
 - d. Graduate School/higher

Perceived Improvement in Pro-Environmental Behaviours Scale

- 6) Please indicate how often you performed these behaviours
 Scale: Never, Rarely, Sometimes, Often, Always

	10 Years Ago	5 Years Ago	1 Year Ago	Now
Recycle				
Conserve water				
Conserve electricity				
Use re-usable grocery bags				

Use re-usable travel mugs and water bottles				
Eat sustainably				
Compost organic waste				
Buy local products				
Buy products made from recycled materials				
Travel by public transit				

7) Please indicate how often you currently engage in these specific behaviours

Scale: Never, Rarely, Sometimes, Often, Always

- a. Recycle plastic
- b. Recycle paper
- c. Recycle metal (including batteries, cans)
- d. Conserve water by turning off tap
- e. Conserve water by reducing lawn care
- f. Conserve electricity by turning lights off when not needed
- g. Conserve electricity by reducing heat/AC use
- h. Purchase energy conserving products/appliances
- i. Use re-usable grocery bags
- j. Use re-usable travel mugs and water bottles
- k. Eat sustainably by avoiding meat
- l. Eat sustainably caught fish
- m. Eat local food
- n. Buy products made from recycled materials
- o. Compost organic waste
- p. Use compostable garbage bags
- q. Travel by public transit
- r. Use hybrid/electric car
- s. Use cruise control while driving

8) Please indicate how often you intend on performing these behaviours in the future

Scale: A lot less than now, A little less than now, Same as now, A little more than now, A lot more than now

	Starting Tomorrow	Up to 1 Year From Now	Up to 5 Years From Now	Up to 10 Years From Now
Recycle				
Conserve water				
Conserve electricity				
Use re-usable grocery bags				

Use re-usable travel mugs and water bottles				
Eat sustainably				
Compost organic waste				
Buy local products				
Buy products made from recycled materials				
Travel by public transit				

Concluding Questions

9) Please state how much this behaviour affects climate change.

Scale: Not at all, A little, A lot

- a. Recycle
- b. Conserve water
- c. Conserve electricity
- d. Use re-usable grocery bags
- e. Use re-usable travel mugs and water bottles
- f. Eat sustainably
- g. Compost organic waste
- h. Buy local products
- i. Buy products made from recycled materials
- j. Travel by public transit

Please answer the following questions.

10) Do you think the world climate is changing?

- a. Yes
- b. No

11) Do you think human behaviour could affect climate change?

- a. Yes
- b. No

12) Do you think your own personal behaviour could affect climate change?

- a. Yes
- b. No

13) How important is acting environmental to you?

- a. Not at all
- b. Very Little
- c. Neutral
- d. Somewhat
- e. Very

14) Please indicate the extent to which the following statements are in line with what you believe about people in general.

Scale: Strongly Disagree, Disagree, Somewhat Disagree, Neither Agree nor Disagree, Somewhat Agree, Agree, Strongly Agree

- a. The kind of person someone is, is something very basic about them, and it can't be changed very much.
 - b. People can do things differently, but the important parts of who they are can't really be changed.
 - c. Everyone, no matter who they are, can significantly change their basic characteristics.
 - d. As much as I hate to admit it, you can't teach an old dog new tricks. People can't really change their deepest attributes.
 - e. People can always substantially change the kind of person they are.
 - f. Everyone is a certain kind of person, and there is not much they can do to really change that.
 - g. No matter what kind of person someone is, they can always change very much.
- All people can change even their most basic qualities.

Appendix B

Because this study consists from two parts (today and the brief follow-up), I will need to match the responses at both times. Rather than asking your name, I am asking you to enter the unique code below. This will help maintain anonymity because no-one would be able to identify you per this code. I will ask you this code today and at the follow up and use it to match your responses.

In order to maintain confidentiality, please complete the following to create your unique participant code.

Please type the first letter of your city of birth.

Type the first letter of your own first name.

Type the first letter of your mothers first name.

Type your own day of birth (e.g., if your birthday is January 4th type "04").

Combine all these characters into your unique code and write it here _____

Demographics

Please answer the following questions.

- 1) In the box below, state your age in years
- 2) Please select the gender you identify with.

- Male
- Female
- Other

- 3) Please indicate whether you live in an urban or rural setting.
 - Urban
 - Rural

Please indicate how often you currently engage in these specific behaviours.	Never	Rarely	Sometimes	Often	Always
Take public transit (when driving is on option)	<input type="radio"/>				
Use a re-usable travel mug	<input type="radio"/>				
Use re-usable shopping bags instead of standard plastic ones	<input type="radio"/>				
Drink tap water rather than bottled water	<input type="radio"/>				
Dispose of food waste in a green bin	<input type="radio"/>				
Turn off lights when leaving the room	<input type="radio"/>				
Recycle used plastic bottles and cans	<input type="radio"/>				
Encourage friends to recycle	<input type="radio"/>				
Eat vegetarian rather than meat	<input type="radio"/>				
Wash your clothes in cold water (rather than warm or hot)	<input type="radio"/>				

How much does this behaviour impact the environment?	A great deal	A lot	A moderate amount	A little	Not at all
Take public transit (when driving is on option)	<input type="radio"/>				
Use a re-usable travel mug	<input type="radio"/>				
Use re-usable shopping bags instead of standard plastic ones	<input type="radio"/>				
Drink tap water rather than bottled water	<input type="radio"/>				
Dispose of food waste in a green bin	<input type="radio"/>				
Turn off lights when leaving the room	<input type="radio"/>				
Recycle used plastic bottles and cans	<input type="radio"/>				
Encourage friends to recycle	<input type="radio"/>				
Eat vegetarian rather than meat	<input type="radio"/>				
Wash your clothes in cold water (rather than warm or hot)	<input type="radio"/>				

Answer If Condition Is Equal to More

We all change our behaviour from time to time, whether for better or worse. Think of a behaviour you've done more of over the past couple years to help the environment. What was that behaviour?

Answer If Condition Is Equal to Less

We all change our behaviour from time to time, whether for better or worse. Think of a behaviour you've done less of over the past couple years to help the environment. What was that behaviour?

Answer If Condition Is Equal to Consistent

We all change our behaviour from time to time, whether for better or worse. Think of a behaviour you've done consistently over the past couple years to help the environment. What was that behaviour?

Answer If Condition Is Equal to Control

Think of a behaviour you have done over the past couple years to help the environment. What was that behaviour?

- 4) Please describe how you used to perform that behaviour.
- 5) Please describe how you currently perform that behaviour.
- 6) How has that behaviour changed?
 - a. Less Environmental
 - b. No Change
 - c. More Environmental

To what extent do you agree or disagree with the following statements?	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I value environmental causes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caring about the environment is central to who I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caring about the environment is an important part of my self-worth.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to let others know that I care about the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to associate myself with people who care about the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I define myself as an environmentalist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that others think that I am an environmentalist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Behaving responsibly toward the environment -- living a sustainable lifestyle -- is part of my moral code.	○	○	○	○	○	○	○
--	---	---	---	---	---	---	---

Please indicate how often you intend on performing each of these behaviours in the next week (i.e., next 7 days)	Not at all	Once in the next week	Several times in the next week	Every day in the next week	Several times every day in the next week
Take public transit (when driving is on option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use a re-usable travel mug	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use re-usable shopping bags instead of standard plastic ones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drink tap water rather than bottled water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dispose of food waste in a green bin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Turn off lights when leaving the room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recycle used plastic bottles and cans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourage friends to recycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat vegetarian rather than meat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wash your clothes in cold water (rather than warm or hot)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for doing this first session! You will be contacted in the next few weeks regarding the Follow-up survey. Please don't forget to complete it!

Appendix C

Because this study consists from two parts (last week's survey and this follow-up), I will need to match the responses at both times. Rather than asking your name, I am asking you to enter the unique code below. This will help maintain anonymity because no-one would be able to identify you per this code. I asked you this code last time you did the survey and will ask you this code today to use it to match your responses.

In order to maintain confidentiality, please complete the following to create your unique participant code.

Please type the first letter of your city of birth.

Type the first letter of your own first name.

Type the first letter of your mothers first name.

Type your own day of birth (e.g., if your birthday is January 4thm type "04").

Combine all these characters into your unique code and write it here _____

Please indicate how often you engaged in these specific behaviours in the previous week	Not at all	Once in the last week	Several times in the last week	Every day in the last week	Several times every day in the last week
Take public transit (when driving is on option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use a re-usable travel mug	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use re-usable shopping bags instead of standard plastic ones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drink tap water rather than bottled water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dispose of food waste in a green bin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Turn off lights when leaving the room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recycle used plastic bottles and cans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourage friends to recycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat vegetarian rather than meat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wash your clothes in cold water (rather than warm or hot)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what extent do you agree or disagree with each of the following statements?	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I value environmental causes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caring about the environment is central to who I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caring about the environment is an important part of my self-worth.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to let others know that I care about the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to associate myself with people who care about the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I define myself as an environmentalist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that others think that I am an environmentalist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Behaving responsibly toward the environment -- living a sustainable lifestyle -- is part of my moral code.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for participating!