

**Increasing Individual Engagement in Pro-Environmental Behaviour: The Influence of
Groups on Behavioural Spillover Effects**

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Abstract

Individuals must immediately increase their engagement in multiple pro-environmental behaviours to mediate the detrimental effects of human induced rising temperatures. Therefore, it is important to acquire a deeper understanding of the influence of previous environmental behaviour on subsequent environmental behaviour. This study examined whether past pro-environmental behaviour positively or negatively related to future pro-environmental action (i.e. if sustainable engagement leads to positive or negative behavioural spillover). Previous literature identified environmental identity as a crucial element promoting environmental behavioural spillover into positive direction. Individuals derive an environmental self-identity from observing their own past behaviour, and from their affiliation with social groups that prioritise environmental well-being. Therefore, by implementing Social Identity Theory, this study additionally examined the potentially greater influence of group behaviour on future pro-environmental behaviours compared to the influence of individual behaviour. Data from hundred and twenty eight participants were used to conduct an online questionnaire study. In the individual condition, as well as the group condition, past pro-environmental behaviour positively spills over to future pro-environmental behaviour. However, we find no indication of groups being more influential on positive behavioural spillover within the environmental domain compared to individuals themselves. Interventions to promote sustainable behaviour should therefore remain focused on appealing to individuals on both an individual, and a group level.

Keywords: Pro-environmental behaviour, behavioural spillover effects, Social Identity Theory, environmental self-identity

Increasing Individual Engagement in Pro-Environmental Behaviour: The Influence of Groups on Behavioural Spillover Effects

Scientists warn that the world is expected to exceed a dangerous temperature threshold within the next 10 years, emphasising the urgent need of immediate action to mitigate rising temperatures (IPCC, 2023; Kaplan, 2023). Unfortunately, regardless of this urgency, many individuals, governments and organisations still fail to act on climate change today as the major concern that it is (Fielding et al., 2023). Increasing environmental awareness was initially thought of as the solution to change behaviour, but despite a spike in knowledge and awareness about climatic problems, little change was observed regarding the amount of people displaying pro-environmental behaviours (Kollmuss & Agyeman, 2002). Individuals are possibly still reluctant to change their lifestyle out of doubt their behavioural changes have perceptible impact (Pelletier et al., 1999). Contrary to their reluctance, data implies individual-level behavioural change can make a difference in reducing carbon emissions (Dietz et al., 2003). In fact, climate change can't be achieved without individual behavioural change (Capstick et al., 2014). Thus, individuals urgently need to engage in various pro-environmental behaviours (Kollmuss & Agyeman, 2002; IPCC, 2018).

Behavioural spillover effects

When engaging in past behaviour increases the likelihood of engaging in future behaviour, this is referred to as positive behavioural spillover, and inversely when engagement in past behaviour decreases the likelihood of engaging in future behaviour, it's referred to as negative behavioural spillover (Nilsson et al., 2016; Maki et al., 2019). Numerous studies found that acting pro-environmental is related to a person's likelihood to perform other pro-environmental behaviour, a phenomenon often referred to as the spillover effect (Thøgersen & Ölander, 2003; Thøgersen & Ölander, 2006; Whitmarsh & O'Neill, 2010; Nilsson et al., 2016). Therefore, stimulating people to act pro-environmental could be useful to foster environmental outcomes, as engagement in one pro-environmental behaviour could positively spillover to more engagement in multiple different types of pro-environmental behaviour, resulting in an overall increase in pro-environmental behaviour in the future. However, if negative behavioural spillover occurs frequently, stimulating people to act pro-environmental might in fact have the opposite outcome, leading to a decrease of overall

pro-environmental behaviour (Truelove et al., 2014; Maki et al., 2019). For this reason it is important to gain more insight into when either positive or negative behavioural spillover in the environmental domain occurs.

Most studies show positive behavioural spillover effects in the environmental domain (Scott, 1977; Frey, 1993; Thøgersen, 1999; De Young, 2000; Lauren et al., 2016). For example, recycling has been shown to operate as a first step towards adopting other pro-environmental behaviours, such as energy conservation, water conservation, composting and usage of reusable bags (Berger, 1997). Thereupon, sustainable consumers were more likely to make sustainable decisions concerning transport and food (Penz et al., 2019). Nonetheless, some studies provide results indicating negative behavioural spillover. For example, Sachdeva et al. (2015) found that households which consciously saved water, used more energy, and contrary to Berger (1997), their results indicate people that often recycled were less likely to reuse shopping bags. Thus so far, it remains unclear when either positive or negative spillover might be expected, as studies on behavioural spillover effects in the environmental domain have led to mixed and even contradicting results. Therefore, this study aims to examine whether past pro-environmental action positively or negatively associates with future pro-environmental action.

Self-identity

Based on previous literature, one possible explanation for the behavioural spillover effect is self-identity (Truelove et al., 2014; Van der Werff et al., 2014). According to Self-perception theory, individuals derive a sense of their self-identity from observing their own behaviour (Bem, 1972). Consequently, individuals who perceive they have acted environmentally-friendly in the past, tend to report a stronger environmental self-identity (Chaiken & Baldwin, 1981; Poortinga et al., 2013; Van der Werff et al., 2014), which refers to the extent to which one sees oneself as someone who acts environmentally friendly (Balundè et al., 2019).

Previous research has identified an environmental self-identity as an important element promoting behavioural spillover effects within the environmental domain into positive direction (Van der Werff et al., 2014; Whitmarsh & O'Neill, 2010). This means, the stronger an individual's environmental self-identity becomes, the more probable it is for them to participate in various

pro-environmental behaviours (Cornelissen et al., 2008; Whitmarsh & O'Neill, 2010; Lacasse, 2016). This finding might be explained considering that people are motivated to exhibit behaviour consistent with their self-identity (Van der Werff et al., 2013). For example, identifying as a 'recycler' predicts more recycling behaviour (Terry et al., 1999; Nigbur et al., 2010), and identifying as 'pro-environmental' predicts more engagement in energy conservation and eco-friendly consumption (Whitmarsh & O'Neill, 2010; Gatersleben et al., 2012).

Because previous engagement in pro-environmental behaviour enhances the environmental self-identity, and an environmental self-identity in turn increases engagement in multiple pro-environmental behaviours, this study expects to find a positive behavioural spillover from past individual engagement in pro-environmental behaviour to future individual engagement in pro-environmental behaviour (Hypothesis 1).

Previous research on behavioural spillover effects mainly focused on understanding how individuals influence their own future behaviours (Chaiken & Baldwin, 1981; Thøgersen, 1999; Thøgersen & Ölander, 2003; Thøgersen & Ölander, 2006; Truelove et al., 2014; Van der Werff et al., 2014). However, group memberships also play an important role in predicting behaviours (Hornsey et al., 2006; Bouman & Steg, 2019, 2020). Therefore, this study also investigates groups as a possible explanation for the behavioural spillover effect.

Groups

According to Social Identity Theory, individuals define their own identities in regard to social groups they belong to (Tajfel & Turner, 1979). This part of the self-identity, that is derived from people's affiliation with different social groups, is referred to as social identity (Fielding & Hornsey, 2016). Self-categorisation within a group causes the self-identity to incorporate the beliefs and behaviours held by other group members (Hogg & Abrams, 1988; Terry et al., 1999), driven by a desire for recognition from the group as being part of that group (Kelman, 1958; Field et al., 2023). Thus, individuals form a part of their self-identity, known as social identity, from their perception of their group's identity (Islam, 2014).

Group memberships also play an important role in predicting pro-environmental behaviours, because individuals are more likely to make sustainable decisions when their social identity is derived

from a group that prioritises environmental well-being (Fielding & Hornsey, 2016). Perceived environmental group identities thus promote pro-environmental behaviour (Fielding & Hornsey, 2016; Bouman et al., 2021; Wang et al., 2021). The more people see their group as a group that acts environmentally friendly, the greater the extent to which they see themselves as environmental, which results in adopting an environmental social identity themselves (Owen et al., 2010; Wang et al., 2021). In turn these derived environmental social identities promote individuals' engagement in pro-environmental behaviours (Fritsche et al., 2018; Blankenberg & Alhusen, 2019). Moreover, environmental group identities particularly seem to support uptake of pro-environmental actions, if individuals have not endorsed strong pro-environmental values before (Bouman et al., 2020). Thus, people also derive an environmental self-identity from their affiliation with groups that behold an environmental identity, and in turn this environmental group identity increases engagement in pro-environmental behaviours.

Based on this reasoning, we predict that perceiving group members engaged in sustainable behaviours strengthens the environmental group identity, which in turn strengthens the self-identity as pro-environmental, which subsequently leads individuals to engage in more pro-environmental behaviours. In other words, we expect to find a positive spillover effect from past group engagement in pro-environmental behaviour to future individual engagement in pro-environmental behaviour (Hypothesis 2).

Thus far, this study has hypothesised a positive behavioural spillover effect from past individual, and past group behaviour to future individual engagement in pro-environmental behaviour. In addition, this study aims to compare the influence of these past behaviours on intentions to behave sustainable in the future, to determine whether past individual or past group behaviour is more influential on future pro-environmental behaviour.

Difference between Groups and Individuals

The difference between explaining behavioural spillover effects based on the individual, or based on group memberships, lies in the fact that groups meet additional needs that individuals cannot meet on their own, namely social acceptance and the need to belong (Baumeister & Leary, 1995). The need to belong refers to the universal, intrinsic motivation to connect with others and to be socially

accepted (Leary, 2022). Need to belong and social acceptance are pervasive motivators to influence individual behaviour, because failing to meet these needs can lead to negative consequences on psychological well-being (Baumeister & Leary, 1995). Therefore, people often behave in ways that increase the likelihood of being socially accepted by the group, and lower the likelihood of being rejected (Leary, 2022).

Following that groups provide acceptance and fulfil the need to belong, this study proposes that individuals might rely more on their past group behaviours than on their own past behaviours. Hence, this study expects to find that past group behaviour is more influential on future pro-environmental behaviour, compared to past individual behaviour (Hypothesis 3). If our reasoning is correct, enhancing pro-environmental behaviour of in-group members, or even creating the idea that in-group members have engaged in pro-environmental behaviours in the past, would be an effective solution to increase overall sustainable behaviour. To our understanding this is the first time research focused on the effect of groups on positive behavioural spillover in the environmental domain.

To summarise, in this study the following hypotheses will be tested:

H1. Participation in past individual pro-environmental behaviour is positively related to engagement in future pro-environmental behaviour.

H2. Perceiving that in-group members participated in pro-environmental behaviour in the past is positively related to individual engagement in future pro-environmental behaviour.

H3. Compared to past individual pro-environmental behaviour, past group pro-environmental behaviour is more influential on future pro-environmental behaviour.

Knowing that an increase in pro-environmental behaviour is required to reduce human influence on the environment (IPCC, 2021; Lacasse, 2017; Lawson, 2021), it is highly relevant to understand how engagement in previous pro-environmental behaviours relates to future pro-environmental activity, since this knowledge can be used to implement the most effective interventions to promote pro-environmental behaviours.

Therefore, in the current study we conduct an online experiment in which we measure circular economy behaviours as an indicator of pro-environmental behaviour. We assess 'past pro-environmental behaviours' in an individual and a group condition. In the individual setting,

participants reflect on their own past behaviour, while in the group condition, they focus on their friend's past behaviour. We included easy and difficult items in the questionnaire to measure 'future pro-environmental behaviour'.

Methods

This study tested whether past pro-environmental behaviour positively or negatively related to future pro-environmental behaviour, and compared the effect of reflecting on individual past behaviour (i.e., what I have done) with reflecting on past group behaviour (i.e., what my friends have done) on intentions to engage in circular economy behaviours. This study concentrated on friends within the group condition, emphasising in-group norms due to limited impact of normative information from an outgroup on behaviour (Smith & Louis, 2008). Qualtrics was used to collect data. In the questionnaire, items about past individual and past group behaviour are based on the 9 R's of circular economy by Kirchherr et al. (2017), as consumers must engage in multiple types of circular behaviour (e.g., buying second-hand clothes, recycling old clothes) to facilitate a sustainable circular economy. Items measuring future pro-environmental behaviour are divided into easy and difficult items, because ease of adoption to sustainable behaviour influences an individual's likelihood to engage in that particular behaviour in the future (Lauren et al., 2016). Easy items target promoting, and difficult items focus on organising an hypothetical clothes swap event.

Participants

The students of the research team recruited a population sample of 149 students by approaching people in their personal network, and in study spaces at the University of Groningen, and asking them if they wish to fill in a short questionnaire as part of our research project. To take part in the questionnaire, participants are required to be older than 16 years, and to be a current student at the University of Groningen. Participants are not compensated for their participation. The survey is completed online on people's own personal device (e.g., phone, laptop, or tablet). To access the Qualtrics hosted questionnaire, participants type a link into their browser or scan a QR code. All items on the questionnaire are presented in English. We had to exclude 21 participants for not completely finishing either the past behaviours, or the future behaviour part of the questionnaire, leaving a sample of 128.

Design and procedure

This study was fast-tracked for ethical approval by the ethical committee at the University of Groningen; due to the low risks the study received ethical approval. Before the start of the study, research documents describing the study were registered, but not reviewed. This study conformed to the guidelines set by the ethical committee for low-risk studies, and was carried out in accordance with the corresponding codes and regulations. This experiment used a between-subjects design, with past pro-environmental behaviour as independent variable, and future pro-environmental behaviour as dependent variable. Before starting the questionnaire, participants actively gave their informed consent on participation and data processing. Participants could withdraw at any moment, without penalty.

First, participants report the extent to which they see themselves as an environmentally friendly person on the environmental self-identity scale (Van der Werff et al., 2013). Secondly, they are randomly assigned to one of two conditions of the independent variable. In the individual condition (n=58) participants are asked about their (sustainable) clothing consumption over the past three months. In the group condition (n=66) participants are asked the same questions, but about how often their friends in the past 3 months conducted environmentally aware clothing consumption. Subsequently, for the final part of the questionnaire, all participants answer the same questions on their willingness to engage in a hypothetical circular economy event. In this final part we alternated easy questions with difficult questions that require more time and effort. Easy items regard sharing about the event on social media, and difficult items regard actively participating in the organisation of the event. Overall participation in the survey study takes approximately 5 minutes.

Measures

Past circular behaviour

We measured past circular behaviour in regard to the fast fashion industry, because consumption of past fashion has widespread negative environmental impacts to such an extent that the fast fashion industry is considered one of the most environmentally destructive production systems (Nguyen & Johnson, 2020; Patti et al., 2020). We gave participants a list of seven past circular behaviours they could have behaved in, and we asked participants to report on a scale from 1 (never)

to 7 (always) how often they had acted in these consumption behaviours over the last three months. We report the descriptive statistics for the past circular behaviour scale in Table 1. We took the mean of these items to calculate a past circular behaviour score in the individual condition ($M = 4.39$, $SD = 0.96$), and in the group condition ($M = 3.96$, $SD = 0.85$). Cronbach's alpha of .71 in the individual conditions indicates an acceptable internal reliability for the past behaviours scale. The internal reliability of the past behaviours scale in the group condition was also acceptable, $\alpha = .71$.

Table 1

Descriptive statistics past circular behaviour items and scale.

	M	SD
Refusing to buy fast fashion clothing	3.98	1.70
Choosing organic materials	3.24	1.33
Choosing recycled materials	3.17	1.29
Choosing from sustainable shops or brands	3.59	1.35
Buying second hand	4.60	1.66
Only buying what needed	4.95	1.45
Not buying different sizes to find the right size and return the other sizes (R)	5.63	1.66
<i>Past circular behaviour scale</i>	4.16	0.93

Note. Reverse-coded items are denoted with an (R).

Circular economy intentions

We asked participants to imagine an event where students can meet to swap clothes, because swapping clothes helps to reduce the amount of new clothes people buy (Farrant et al., 2010). With this in mind, we first asked people if they would share information about the hypothetical event on their social media channels, followed by a question to report on how this would make them feel. Secondly, we asked participants if they would actively participate in the organisation, running, and management of the hypothetical event (e.g. organising a venue, ensuring it runs smoothly, cleaning up afterwards), again followed by a question to report on how this would make them feel. Participants report how strongly they agreed on statements to engage (i.e. promoting or organising) in the hypothetical event on a seven-point likert scale, ranked from 1 ('strongly disagree') to 7 ('strongly

agree'). The follow-up questions on how this type of engagement would make them feel are reported on a scale from 1 ('strongly negative') to 7 ('strongly positive').

The two questions about promoting the event are considered as easy items, while the two questions about organising are considered as difficult items, since organising is a more time consuming behaviour compared to promoting. The mean score for the easy future pro-environmental behaviour items was 4.33 (SD = 1.67). Cronbach's alpha of .82 indicates a good internal consistency for this scale assessing easy behaviours. The scale formed from averaging the scores (M = 4.51, SD = 1.52) of the two difficult future pro-environmental behaviour items also demonstrates a good level of internal consistency, $\alpha = .88$.

Results

We found a positive correlation between past individual behaviour and easy items of future behaviour, $r(58) = .47$, LLCI = 0.25, ULCI = 0.65, $p < .001$. We also found a positive correlation between past individual behaviour and difficult items of future behaviour, $r(58) = .28$, LLCI = .02, ULCI = .50, $p < .001$. Thus in support of Hypothesis 1, we found an overall positive correlation between past individual and future behaviour. This means the more people engaged in pro-environmental behaviours in the past, the more likely they were to engage in pro-environmental behaviours in the future.

In support of Hypothesis 2, we found a positive correlation between past group behaviour and easy items of future behaviour, $r(66) = .40$, LLCI = .18, ULCI = .58, $p < .001$. In addition, the relationship between past group behaviour and difficult items of future behaviour is also positive, $r(66) = .24$, LLCI = .01, ULCI = .45, $p < .05$. Thus, the more individuals perceived their in-group members engaged in pro-environmental behaviours in the past, the more likely they were to engage in pro-environmental behaviours in the future themselves.

The third hypothesis anticipated that willingness to contribute to a hypothetical clothing sharing event would be higher in the group condition than in the individual condition. This was analysed with an independent sample t-test. On easy future behaviour items, the mean in the individual condition (M = 4.24, SD = 1.71, N = 60) and the mean in the group condition (M = 4.40, SD = 1.64, N = 68) did not indicate a significant difference, $t(126) = .55$, $p = .58$. The effect was

small ($d = 0.10$), suggesting a relatively minor practical significance. Therefore, this data does not provide evidence to presume a difference in the influence of group behaviours compared to individual behaviours on engagement in easy future behaviours.

On difficult future behaviour items, the mean in the individual condition ($M = 4.44$, $SD = 1.52$, $N = 60$) and the mean in the group condition ($M = 4.56$, $SD = 1.53$, $N = 68$) did not indicate a significant difference either, $t(126) = .46$, $p = .65$. The effect was small ($d = 0.08$), suggesting a relatively minor practical significance. Therefore, this data does not provide evidence to presume that either group or individual behaviour has a greater influence on engagement in difficult future behaviours. Thus contrary to Hypothesis 3, no significant difference was found between the mean of individual past behaviour with future behaviour, and the mean of group past behaviour with future behaviour.

Overall, we found a positive correlation between past individuals' pro-environmental behaviour and future behaviour. The more individuals engaged in pro-environmental behaviours in the past, the more willing they were to act pro-environmental in the future. Also, we found an overall positive correlation between past group pro-environmental behaviour and future behaviour. Thus, the more individuals perceived their in-group members engaged in pro-environmental behaviours in the past, the more willingness they had to act on pro-environmental behaviours in the future. On both easy and difficult future items, the mean in the group condition appears to correlate higher with future behaviour than the mean in the individual condition, but since these results were not significant, this data does not support the idea that positive spillover from past behaviour to participating in a hypothetical clothing sharing event was more influenced by groups than by individuals.

Discussion

It is important for individuals to uptake their engagement in pro-environmental behaviours, since today's climate actions are insufficient to reach the set climate targets (IPCC, 2023). However, there are contradictory findings regarding the question of whether acting in a pro-environmental way increases or decreases a person's likelihood to perform pro-environmental behaviour in the future (Berger, 1997; Sachdeva et al., 2015; Penz et al., 2019). Previous research has shown that an individual's behaviour significantly impacts their tendency to engage in pro-environmental behaviour

in the future (Berger, 1997; Cornelissen et al., 2008; Lanzini & Thøgersen, 2014; Lacasse, 2017).

However, the social groups individuals associate with, and the resulting group identities, also play an important role in shaping future pro-environmental behaviour (Fielding & Hornsey, 2016). Therefore, we compare the influence groups have on intentions to behave sustainably in the future, with the influence individual behaviour has on future pro-environmental behaviour. This study was conducted to contribute to a better understanding on when either positive or negative behavioural spillover in the environmental domain occurs, as well as to obtain insight into the potential influence of group variables on individual engagement in pro-environmental behaviours.

Theoretical implications

In support of our reasoning, in both the individual and the group condition, we found a positive behavioural spillover effect from past pro-environmental behaviour to future pro-environmental behaviour, in which we used easy and difficult items to measure future behaviours. Thus, our findings support the idea that groups have an impact on people's intentions to act pro-environmental in the future. Nevertheless, our research showed no evidence that either individual behaviour or group behaviour had a greater influence on intentions to engage in pro-environmental behaviour in the future.

In line with our expectations, we found a significant positive behavioural spillover effect from past individual pro-environmental behaviour to future pro-environmental behaviour on both easy, and difficult future behaviours. The more individuals engaged in pro-environmental behaviours in the past, the more willingness they had to share about, or engage in the organisation of a hypothetical clothing swap event. This is a result in line with the findings of Lanzini & Thøgersen (2014), in which past sustainable behaviour also influences future sustainable behaviour. Self-perception theory offers reason for these outcomes, as it suggests that people form their attitudes by deducing them from observations of their own past behaviours (Bem, 1972). Likewise, engagement in past behaviour fosters an individual's environmental self identity (Van der Werff et al., 2013, 2014), and consequently, a strong environmental self-identity is associated with subsequent pro-environmental actions (Whitmarsh & O'Neill, 2010; Gatersleben et al., 2012; Stets and Burke, 2014). Future research could build on our findings by conducting a longitudinal study to investigate whether the

time passed since an individual last engaged in pro-environmental behaviour impacts the strength of their intention to engage in similar actions in the future.

We also expected to find a positive spillover effect from past group engagement in pro-environmental behaviour to future individual engagement in pro-environmental behaviour on both easy and difficult items. Our data confirmed our expectations, demonstrating that individuals were more inclined to share about, or participate in the organisation of a hypothetical clothing swap event if they perceived their in-group members to have done so in the past. Social Identity Theory provides reason for these outcomes, suggesting that an individual's desire for a positive social identity within a group can lead to patterns of behaviour that are consistent with those of the group. Hence, past pro-environmental group behaviour influences environmental social identity, and environmental social identities in turn promote individual pro-environmental action (Owens et al., 2010; Fielding & Hornsey, 2016; Wang et al., 2021).

The finding that people tend to align their identities with their group identities, provides an additional explanation for these outcomes (Owens et al., 2010; Wang et al., 2021). In essence, the influence of past group behaviours extends to promoting more environmentally friendly behaviours at the individual level, because individuals derive their environmental social identity from their group memberships. Building on these results, future research can conduct a longitudinal study to determine the extent to which past group behaviour increases an environmental identity over time, as well as whether inheriting an environmental self-identity through past group behaviour is durable and contributes to an increase in individual sustainable behaviour over time.

Looking at the descriptive data, higher means in the group condition on both easy and difficult future behaviour items would suggest a small influence of group factors. However, as these values do not significantly differ from each other, there is no reason to assume a greater effect of groups on engagement in future circular economy behaviours. Therefore, against our expectations, our data does not indicate past group pro-environmental behaviour to be more influential on future pro-environmental behaviour than past individual pro-environmental behaviour. The lack of significant difference may be due to the fact that an individual's self-identity and group-identity correlate with each other. In other words, the extent to which one sees oneself as someone who acts

environmentally friendly might be strongly related to their affiliation with sustainable social groups, and therefore, regarding pro-environmental behaviour, the influence of groups is not stronger than the influence of the individual.

To develop a deeper understanding of the influence of group factors on individuals' engagement in environmental behaviour, future studies must further investigate the relationship between an environmental self-identity and environmental social identity. This could be done by replicating the current study, and adding a measure on environmental social identity, to examine the extent to which environmental self-identity and environmental social identity correlate with each other. Insights from such studies are important, because understanding of the dynamics between personal and social environmental identities is required to develop pro-environmental interventions that appeal to individuals on both personal, and collective levels.

Practical implications

The finding of positive spillover effects in the context of circular behaviours related to the fast fashion industry in both the individual, and group condition, presents an opportunity for policymakers to design and implement targeted interventions to promote pro-environmental behaviours. However, we found no evidence indicating that past group behaviour influences future behaviour to a greater extent than past individual behaviour. Based on these results, there is no need for policymakers to limit their attention to policies that exclusively target the individual or the group. For instance, policymakers could promote and support initiatives (e.g. workshops to educate individuals and groups on sewing techniques) that encourage both individual and group participation in circular behaviours, and introduce structures to reward individuals that encouraged their friends to engage in circular behaviour as well.

Limitations

Although this study contributes to the current literature on environmental behavioural spillover by reaffirming positive behavioural spillover, and by finding results that suggest an influence of groups on environmental intentions, it is not without limitations. Because the scope of this bachelor thesis did not allow for the measurement of real-life behaviours, this experiment employed a survey to measure future environmental behaviours. Therefore, future behaviours are measured by future

behavioural intentions, instead of directly observed behaviour individuals actually acted on. Despite this, interventions are proximal predictors of behaviour (Fishman, 2020), and therefore intentions are nevertheless valuable tools to guide the development of strategies to promote pro-environmental behaviour. Keeping in mind that past behaviour does influence future intentions, future research could build on these results and measure real life behaviours by organising an actual clothing swap event and ask individuals to share about the event or to take part in the organisation.

Another limitation considers the fact that the observed positive behavioural spillover effects in the individual and the group condition may be limited in duration. Our experiment might not have captured intentions on longer-term uptake of pro-environmental behaviours, as future environmental intentions were only measured on the base of one hypothetical event set at only one time point. Future research on positive behavioural spillover could therefore address the sustained effects of past environmental behaviour on engagement in future environmental behaviour, through conducting a longitudinal design.

Conclusion

In summary, we found that individuals who acted pro-environmental in the past, are more willing to engage in pro-environmental behaviours in the future. Likewise, we found that individuals who perceived their in-group members acted pro-environmental in the past, are more willing to engage in pro-environmental behaviours in the future too. Against expectations, we find no indication of groups being more influential on positive behavioural spillover within the environmental domain compared to individuals themselves. Therefore, future research on positive behavioural spillover within the environmental domain should remain focused on both the individual and the group path.

References

- Balundė, A., & Perlaviciute, G. (2019). The relationship between people's environmental considerations and pro-environmental behavior in Lithuania. *Frontiers in Psychology, 10*.
<https://doi.org/10.3389/fpsyg.2019.02319>
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529.
<https://doi.org/10.1037/0033-2909.117.3.497>
- Bem, D. J. (1972). Self-Perception Theory. In *Advances in Experimental Social Psychology* (pp. 1–62). [https://doi.org/10.1016/s0065-2601\(08\)60024-6](https://doi.org/10.1016/s0065-2601(08)60024-6)
- Berger, I. E. (1997). The demographics of recycling and the structure of environmental behavior. *Environment and Behavior, 29*(4), 515–531. <https://doi.org/10.1177/001391659702900404>
- Blankenberg, A., & Alhusen, H. (2019). On the Determinants of Pro-Environmental Behavior: A literature review and Guide for the Empirical Economist. *Social Science Research Network*.
<https://doi.org/10.2139/ssrn.3473702>
- Bouman, T., & Steg, L. (2019). Motivating society-wide pro-environmental change. *One Earth, 1*(1), 27–30. <https://doi.org/10.1016/j.oneear.2019.08.002>
- Bouman, T., & Steg, L. (2020). Engaging city residents in climate action: Addressing the personal and group Value-Base behind residents' climate actions. *Urbanisation, 7*(1_suppl), S26–S41.
<https://doi.org/10.1177/2455747120965197>
- Bouman, T., Van Der Werff, E., & Perlaviciute, G. (2021). Environmental values and identities at the personal and group level. *Current Opinion in Behavioral Sciences, 42*, 47–53.
<https://doi.org/10.1016/j.cobeha.2021.02.022>
- Capstick, S., Whitmarsh, L., Poortinga, W., Pidgeon, N. F., & Upham, P. (2014). International trends in public perceptions of climate change over the past quarter century. *WIREs Climate Change, 6*(1), 35–61. <https://doi.org/10.1002/wcc.321>
- Chaiken, S., & Baldwin, M. W. (1981). Affective-cognitive consistency and the effect of salient behavioral information on the self-perception of attitudes. *Journal of Personality and Social Psychology, 41*(1), 1–12. <https://doi.org/10.1037/0022-3514.41.1.1>

- Cornelissen, G., Pandelaere, M., Warlop, L., & Dewitte, S. (2008). Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental. *International Journal of Research in Marketing*, 25(1), 46–55.
<https://doi.org/10.1016/j.ijresmar.2007.06.002>
- De Young, R. (2000). New ways to promote proenvironmental behavior: Expanding and evaluating motives for environmentally responsible behavior. *Journal of Social Issues*, 56(3), 509–526.
<https://doi.org/10.1111/0022-4537.00181>
- Dietz, T., Остром, Э., & Stern, P. C. (2003). The struggle to govern the Commons. *Science*, 302(5652), 1907–1912. <https://doi.org/10.1126/science.1091015>
- Farrant, L., Olsen, S. I., & Wang, A. (2010). Environmental benefits from reusing clothes. *The International Journal of Life Cycle Assessment*, 15(7), 726–736.
<https://doi.org/10.1007/s11367-010-0197-y>
- Field, N. H., Choukas-Bradley, S., Giletta, M., Telzer, E. H., Cohen, G. L., & Prinstein, M. J. (2023). Why adolescents conform to high-status peers: associations among conformity, identity alignment, and self-esteem. *Child Development*. <https://doi.org/10.1111/cdev.14038>
- Fielding, J. E., Brownson, R. C., & Green, L. W. (2023). The urgency of addressing climate change. *Annual Review of Public Health*, 44(1), v–vi.
<https://doi.org/10.1146/annurev-pu-44-013023-100001>
- Fielding, K. S., & Hornsey, M. J. (2016). A Social Identity Analysis of climate change and environmental attitudes and behaviors: Insights and opportunities. *Frontiers in Psychology*, 7.
<https://doi.org/10.3389/fpsyg.2016.00121>
- Fishman, J., Лушин, В., & Mandell, D. S. (2020). Predicting implementation: comparing validated measures of intention and assessing the role of motivation when designing behavioral interventions. *Implementation Science Communications*, 1(1).
<https://doi.org/10.1186/s43058-020-00050-4>
- Frey, B. S. (1993). Motivation as a limit to pricing. *Journal of Economic Psychology*, 14(4), 635–664.
[https://doi.org/10.1016/0167-4870\(93\)90014-c](https://doi.org/10.1016/0167-4870(93)90014-c)

- Fritsche, I., Barth, M., Jugert, P., Masson, T., & Reese, G. (2018). A Social Identity Model of Pro-Environmental Action (SIMPEA). *Psychological Review*, *125*(2), 245–269.
<https://doi.org/10.1037/rev0000090>
- Gatersleben, B., Murtagh, N., & Abrahamse, W. (2012). Values, identity and pro-environmental behaviour. *Contemporary social science*, *9*(4), 374–392.
<https://doi.org/10.1080/21582041.2012.682086>
- Hogg, M. A., & Abrams, D. (1988). *Social identifications: A Social Psychology of Intergroup Relations and Group Processes*. Psychology Press.
- Hornsey, M. J., Blackwood, L., Louis, W. R., Fielding, K. S., Mavor, K. I., Morton, T. A., O'Brien, A., Paasonen, K., Smith, J. R., & White, K. M. (2006). Why do people engage in collective action? Revisiting the role of perceived effectiveness. *Journal of Applied Social Psychology*, *36*(7), 1701–1722. <https://doi.org/10.1111/j.0021-9029.2006.00077.x>
- Intergovernmental Panel on Climate Change. (2018). Global warming of 1.5 °C. <https://www.ipcc.ch/sr15/>.
- IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.
- IPCC, 2023: Summary for Policymakers. In: *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001
- Islam, G. (2014). Social Identity Theory. In *Springer eBooks* (pp. 1781–1783).
https://doi.org/10.1007/978-1-4614-5583-7_289
- Kaplan, S. (2023, 21 maart). World is on brink of catastrophic warming, U.N. climate change report says. *Washington Post*.

<https://www.washingtonpost.com/climate-environment/2023/03/20/climate-change-ipcc-report-15/>

- Kelman, H. C. (1958). Compliance, identification, and internalization three processes of attitude change. *Journal of Conflict Resolution*, 2(1), 51–60.
<https://doi.org/10.1177/002200275800200106>
- Kirchherr, J., Reike, D., & Hekkert, M. P. (2017). Conceptualizing the Circular Economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232.
<https://doi.org/10.1016/j.resconrec.2017.09.005>
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260. <https://doi.org/10.1080/13504620220145401>
- Lacasse, K. (2016). Don't be satisfied, identify! Strengthening positive spillover by connecting pro-environmental behaviors to an “environmentalist” label. *Journal of Environmental Psychology*, 48, 149–158. <https://doi.org/10.1016/j.jenvp.2016.09.006>
- Lacasse, K. (2017). Can't hurt, might help: examining the spillover effects from purposefully adopting a new Pro-Environmental behavior. *Environment and Behavior*, 51(3), 259–287.
<https://doi.org/10.1177/0013916517748164>
- Lanzini, P., & Thøgersen, J. (2014). Behavioural spillover in the environmental domain: an intervention study. *Journal of Environmental Psychology*, 40, 381–390.
<https://doi.org/10.1016/j.jenvp.2014.09.006>
- Lauren, N., Fielding, K. S., Smith, L., & Louis, W. R. (2016). You did, so you can and you will: Self-efficacy as a mediator of spillover from easy to more difficult pro-environmental behaviour. *Journal of Environmental Psychology*, 48, 191–199.
<https://doi.org/10.1016/j.jenvp.2016.10.004>
- Lawson, E. (2021). Climate Change Action and Individual Responsibility. *British Journal of General Practice*, 71(711), 435-435. <https://doi.org/10.3399/bjgp21X717377>
- Leary, M. R. (2022). The Need to Belong. *Psychology in the Real world*.
<https://doi.org/10.4324/9780367198459-reprw57-1>

- Maki, A., Carrico, A. R., Raimi, K. T., Truelove, H. B., Araujo, B., & Yeung, K. L. (2019). Meta-analysis of pro-environmental behaviour spillover. *Nature Sustainability*, 2(4), 307–315. <https://doi.org/10.1038/s41893-019-0263-9>
- Nigbur, D., Lyons, E., & Uzzell, D. (2010). Attitudes, Norms, Identity and Environmental behaviour: Using an expanded theory of planned behaviour to predict participation in a kerbside recycling programme. *British Journal of Social Psychology*, 49(2), 259–284. <https://doi.org/10.1348/014466609x449395>
- Nilsson, A., Bergquist, M., & Schultz, W. (2016). Spillover Effects in Environmental Behaviors, Across Time and Context: A review and research agenda. *Environmental Education Research*, 23(4), 573–589. <https://doi.org/10.1080/13504622.2016.1250148>
- Nguyen, N., & Johnson, L. W. (2020). Consumer behaviour and environmental sustainability. *Journal of Consumer Behaviour*, 19(6), 539–541. <https://doi.org/10.1002/cb.1892>
- Owens, T. J., Robinson, D. T., & Smith-Lovin, L. (2010). Three faces of identity. *Annual Review of Sociology*, 36(1), 477–499. <https://doi.org/10.1146/annurev.soc.34.040507.134725>
- Patti, A., Cicala, G., & Acierno, D. (2020). Eco-sustainability of the textile production: Waste recovery and current recycling in the composites world. *Polymers*, 13(1), 134. <https://doi.org/10.3390/polym13010134>
- Pelletier, L. G., Dion, S. C., Tuson, K. M., & Green-Demers, I. (1999). Why do people fail to adopt environmental protective behaviors? toward a taxonomy of environmental amotivation1. *Journal of Applied Social Psychology*, 29(12), 2481–2504. <https://doi.org/10.1111/j.1559-1816.1999.tb00122.x>
- Penz, E., Hartl, B., & Hofmann, E. (2019). Explaining consumer choice of low carbon footprint goods using the behavioral spillover effect in German-speaking countries. *Journal of Cleaner Production*, 214, 429–439. <https://doi.org/10.1016/j.jclepro.2018.12.270>
- Poortinga, W., Whitmarsh, L., & Suffolk, C. (2013). The introduction of a single-use carrier bag charge in Wales: Attitude change and behavioural spillover effects. *Journal of Environmental Psychology*, 36, 240–247. <https://doi.org/10.1016/j.jenvp.2013.09.001>

- Sachdeva, S., Jordan, J., & Mažar, N. (2015). Green Consumerism: Moral Motivations to a Sustainable future. *Current Opinion in Psychology*, 6, 60–65.
<https://doi.org/10.1016/j.copsyc.2015.03.029>
- Scott, C. A. (1977). Modifying Socially-Conscious Behavior: The Foot-in-the-Door Technique. *Journal of Consumer Research*, 4(3), 156. <https://doi.org/10.1086/208691>
- Smith, J. R., & Louis, W. R. (2008). Do as we say and as we do: the interplay of descriptive and injunctive group norms in the attitude–behaviour relationship. *British Journal of Social Psychology*, 47(4), 647–666. <https://doi.org/10.1348/014466607x269748>
- Stets, J. E., & Burke, P. J. (2014). Self-Esteem and identities. *Sociological Perspectives*, 57(4), 409–433. <https://doi.org/10.1177/0731121414536141>
- Tajfel, H., & Turner, J. (1979). „An integrative theory of inter-group conflict“, Austin, W.— S. *The Social Psychology of Inter-group Relations*. Monterey, CA: Brooks/Cole.
- Terry, D. J., Hogg, M. A., & White, K. M. (1999). The Theory of Planned Behaviour: self-identity, social identity and group norms. *British Journal of Social Psychology*, 38(3), 225–244.
<https://doi.org/10.1348/014466699164149>
- Thøgersen, J. (1999). Spillover processes in the development of a sustainable consumption pattern. *Journal of Economic Psychology*, 20(1), 53–81.
[https://doi.org/10.1016/s0167-4870\(98\)00043-9](https://doi.org/10.1016/s0167-4870(98)00043-9)
- Thøgersen, J., & Ölander, F. (2003). Spillover of environment-friendly consumer behaviour. *Journal of Environmental Psychology*, 23(3), 225–236.
[https://doi.org/10.1016/s0272-4944\(03\)00018-5](https://doi.org/10.1016/s0272-4944(03)00018-5)
- Thøgersen, J., & Ölander, F. (2006). The Dynamic Interaction of Personal Norms and Environment-Friendly Buying Behavior: A panel study1. *Journal of Applied Social Psychology*, 36(7), 1758–1780. <https://doi.org/10.1111/j.0021-9029.2006.00080.x>
- Truelove, H. B., Carrico, A. R., Weber, E. U., Raimi, K. T., & Vandenberg, M. P. (2014). Positive and Negative spillover of pro-environmental behavior: An Integrative review and theoretical framework. *Global Environmental Change*, 29, 127–138.
<https://doi.org/10.1016/j.gloenvcha.2014.09.004>

- Van Der Werff, E., Steg, L., & Keizer, K. (2013). I am what I am, by looking past the present. *Environment and Behavior*, *46*(5), 626–657. <https://doi.org/10.1177/0013916512475209>
- Van Der Werff, E., Steg, L., & Keizer, K. (2014). Follow the signal: when past pro-environmental actions signal who you are. *Journal of Environmental Psychology*, *40*, 273–282. <https://doi.org/10.1016/j.jenvp.2014.07.004>
- Wang, X., Van Der Werff, E., Bouman, T., Harder, M. K., & Steg, L. (2021). I am vs. we are: How biospheric values and environmental identity of individuals and groups can influence pro-environmental behaviour. *Frontiers in Psychology*, *12*. <https://doi.org/10.3389/fpsyg.2021.618956>
- White, K. M., Smith, J. R., Terry, D. J., Greenslade, J., & McKimmie, B. M. (2009). Social influence in the theory of planned behaviour: the role of descriptive, injunctive, and in-group norms. *British Journal of Social Psychology*, *48*(1), 135–158. <https://doi.org/10.1348/014466608x295207>
- Whitmarsh, L., & O'Neill, S. (2010). Green Identity, Green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, *30*(3), 305–314. <https://doi.org/10.1016/j.jenvp.2010.01.003>