Social Identity and the Environment: The Influence of Group Processes on Environmentally Sustainable Behaviour

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

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– ABSTRACT –

The state of the natural environment is a topic of increasing concern, with climate change, loss of biodiversity, and diminishing natural resources all posing eminent threats to the well-being of the planet and its inhabitants. Much of this environmental degradation is caused by human behaviour that can be changed. Psychologists have realised their role in understanding and influencing pro-environmental behaviours to help (see Chapter 1). Most psychological research of environmental behaviour has focused on the individual person as the unit of analysis. While this has been helpful, less attention has been given to how group memberships, and the social influences these create, affect environmental behaviour. Because environmental behaviour often occurs within a social context, understanding the social element may be critically important to promoting environmentally sustainable behaviour (see Chapter 2). Using the social identity approach, this research investigates how various aspects of social group membership interact with individual attributes to influence environmental behaviour. Three related strands of research explore this issue (see Chapter 3 for an overview).

In Chapter 4, two studies (Studies 1 and 2) examined how group feedback in the form of social comparisons affect individual behaviour. Based on social identity theory, it was predicted that positive social comparisons would lead to more positive behaviour, and less positive comparisons to less positive behaviour, especially among individuals who identified strongly with the target ingroup. Results from both studies found some support for these hypotheses on certain (but not all) behavioural dependent measures, both at the time of manipulation and one week later. This supports the notion that individual social identification strength can moderate behavioural response to group-level feedback on environmental topics.

In Chapter 5, Study 3 considered how interaction within groups via discussion might induce group norms about environmental behaviour that over-ride the effects of intergroup comparisons. A design similar to Study 1 was used, with the addition of a small-group discussion following the feedback manipulation. Discussion content was hypothesised to predict environmental behaviour, with the feedback manipulation having less impact than in Study 1. Results found that the more participants discussed environmental behaviours, the more they engaged in them one week later. This effect was independent of pre-existing environmental values, suggesting that the effects of group interaction were not merely a reflection of existing individual orientations. Following the discussion, values were also found to be very strong predictors of behaviour, a result not found in Study 1, suggesting that group interaction not only shapes individual behaviour but also reduces the classic value-action gap. Together, these findings point to the powerful role that intra-group interaction can play in forming norms of environmental behaviour and shaping individual responses.

In Chapter 6, two studies (Studies 4 and 5) explored how comparisons within a group over time (i.e., intra-group comparisons) may function differently to comparisons between groups (i.e., inter-group comparisons), which were explored in Chapter 4. Based on the findings in Chapter 4, positive intergroup comparisons were predicted to result in more positive individual intentions, whereas negative intergroup comparisons were expected to result in reduced intentions. With respect to intra-group comparisons, however, the opposite pattern of effects was predicted. The results of Study 4 did not support these hypotheses. However, feedback from participants suggested that the experimental design may have produced reactance. To address this, Study 5 made use of a revised design, and the results of this study indicated support for the hypotheses. Importantly, in addition to negative and positive comparisons having opposing effects depending on whether these were intra- or inter-group, the processes behind these

effects also differed. The effects of intra-group comparisons were mediated by shared responsibility whereas the effects of intergroup comparisons were mediated by environmental value centrality.

These results are integrated and discussed in Chapter 7. The recurring theme of these results is that group-level feedback can interact with individual-level variables in subtle but powerful ways, leading to differing outcomes of environmental behaviour. These findings highlight the socially imbedded nature of individual environmental actions, and suggest new avenues for theoretical and practical work in the environmental domain. In particular, on the basis of the studies included in this thesis it is recommended that psychologists who are interested in understanding and changing individual environmental behaviour should incorporate an understanding of intra- and inter-group processes into their theorising and future research.

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– PUBLICATIONS RELEVANT TO THE THESIS –

Study 5 forms the basis for part of the following book chapter:

> Rabinovich, A., Morton, T., & Duke, C. C. (in press). Collective self and individual choice: The role of social comparisons in promoting public engagement with climate change. In L. Whitmarsh, S. O'Neill, & I. Lorenzoni (Eds)., *Engaging the public with climate change: Behaviour change and communication*. Earthscan.

A manuscript based on Study 5 was submitted for publication in the British Journal of Social Psychology, and has been invited for revision and resubmission:

> Duke, C. C., Morton, T. A., & Smith, J. R. (under review). *Better or worse than who? Different types of comparisons lead to different paths of environmental behaviour.*

Both of these publications draw on the same study, which was designed, conducted, and analysed by the candidate under the supervision of Thomas Morton and Joanne Smith. While the book chapter was authored by Anna Rabinovich, making reference to the data from this thesis, the manuscript reporting the study was authored primarily by the candidate, as indicated by first authorship.

– STATEMENT OF THE SUPERVISORS' CONTRIBUTIONS TO CO-AUTHORED PAPERS –

As outlined in the candidate's statement above, published work to date has focussed on the data reported in Study 5. In the manuscript that reports this study (currently under review), the candidate took the lead role. This includes preparing the literature review, designing and executing the study, statistical analysis and interpretation of the data, and the ultimate write-up for publication. The first supervisor contributed to the papers by advising on statistical analysis and interpretation, relevant literature, and writing style. The second supervisor also read and commented on drafts of the manuscript. The candidate is also listed as a co-author on a chapter prepared by Anna Rabinovich. This chapter summarises the results of a larger project on social identity processes on environmental behaviour, one section of which summarises key findings from the candidate's work. Co-authorship on this work acknowledges the candidate's contribution to this larger research project and their role in preparing the summary of their specific findings. Moreover, the theoretical framing of the empirical work presented in this thesis and the arrangement of the papers was a product of concerted discussions of the thesis content between the candidate and the supervisors.

Dr. Thomas Morton

Dr. Joanne Smith

– CHAPTER 1 –

The Environmental Dilemma:

A review of environmental threats and psychological research of environmentally sustainable behaviour

> Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfactions, our ego satisfactions, in consumption. The measure of social status, of social acceptance, of prestige, is now to be found in our consumptive patterns. The very meaning and significance of our lives today expressed in consumptive terms. The greater the pressures upon the individual to conform to safe and accepted social standards, the more does he tend to express his aspirations and his individuality in terms of what he wears, drives, eats- his home, his car, his pattern of food serving, his hobbies. … We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing pace.
>
> Victor Lebow (1955, p. 5)

Humans are well adapted to deal with immediate and personal threats, such as a hostile person, a potentially dangerous animal, or other localised hazards. These are the threats with which, historically, we have the most experience, and both our minds and bodies are well-suited to dealing with them. As human society has developed and stabilised, these immediate, short-term threats have become less common; few readers will have been chased by a bear or confronted with life-threatening violence. Over time, these historical risks have been supplanted with more long-term, less visible risks, such as cancer from smoking and heart disease from sedentary lifestyles. In Europe as a whole, violence is rare enough that it accounts for less than 1 in 100 deaths (WHO, 2004). While this partly represents a societal triumph over humanity's ancient afflictions, another threat is rising in place of the old; degradation of the natural

environment, often invisible and slow beyond perception, has the potential to impact life in profound ways for which our societies are ill-prepared.

This chapter reviews the research literature on environmental degradation, beginning with a number of historical cases of environmental collapse followed by a review of some of the most pressing environmental risks today. Following that, the chapter discusses why responding to environmental threats is often a challenge and then reviews several different theoretical approaches to understanding environmentally-relevant behaviours. Finally, the chapter concludes with a discussion of attempts at theoretical integration of models of environmental behaviour.

Environmental Collapse: Historical Lessons

However unlikely it may seem, catastrophic environmental collapse has occurred before, and is a reality for which modern societies should be prepared. Today, many people believe environmental threats are exaggerated and that the risk of environmental collapse is low (BBC/Populus, 2010; Eurobarometer, 2009; Ipsos MORI, 2008; Gallup, 2009; Pew, 2009), which can present a barrier to taking pro-environmental action (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007). Although it is less familiar to us today, our ancestors experienced environmental collapse at several points, often contributing to the societal decline or collapse of the people who lived in that environment. In most cases, the state of the environment was not the only cause of societal decline; rather, environmental change was a distal factor contributing to more proximal factors such as famine or warfare over scarce resources (see Diamond, 2005 for a thorough review of several societies, including those discussed below).

A classic example of long-term environmental damage which crippled a nation is the case of medieval Iceland. Vikings settled in the late 9th century, and began farming as they had in Scandinavia, pleased to find Iceland had deep and fertile soil. However, Iceland's soil and climate were not suitable to supporting livestock, and once

the grass was over-grazed, the rich but light-weight volcanic soil blew away in the wind (Maizels & Caseldine, 1991). Within a few generations, much of Iceland's once rich soils were gone and its woodlands deforested, leading Iceland to become one of Europe's poorest countries through the middle ages, suffering from frequent famines (Karlsson, 2000). To this day, Iceland has little soil and few trees one thousand years after the environmental damage occurred (Vésteinsson, McGovern, & Keller, 2002). Like in Iceland, the 10th century Vikings of Greenland degraded the fragile ecosystem through over-grazing livestock and deforestation (Amorosi et al., 1997; Jakobsen, 1991), ultimately leading to wide-spread poverty and starvation (Arneborg et al., 1999). Unlike the Icelandic Vikings, who at least survived, the Vikings of Greenland disappeared completely by the early 15th century (Seaver, 1996).

Other civilizations that declined in part through environmental collapse include the Classic Maya civilization (Webster, 2002; Culbert & Rice, 1990), the Anasazi of the American southwest (Betancourt & Van Devender, 1981; Samuels & Betancourt, 1982), and the ancient Mycenean Greeks of Homer the poet, whose collapse led Greece into a non-literate dark age for 300 years (Redman, 1999). Similarly, the Easter Islanders eventually deforested their island and extirpated most of the wildlife for which they depended on for food (Flenley & King, 1984; Steadman, 1995). The loss of all trees and large animals led to hunger, increased warfare, and the loss of most of their population (Flenley & Bahn, 2003; Loret & Tancredi, 2003).

One may wonder, "surely these societies did the best they could in a difficult situation and managed their resources as best they could." However, archaeological findings suggest these collapsed societies often dedicated a significant portion of their limited critical resources to support the prestige and status of individuals. The Maya deforested their land and depleted their soil to add ever-thicker layers of socially-desirable lime plaster to their houses and temples (Webster, 2002). The most opulent

Anasazi jewellery, including a single hoard of 56,000 turquoise pieces, was produced just before the Anasazi collapse (Pepper, 1909, as cited in Mathien, 2001) at a time of high civil unrest and famine (Turner & Turner, 1999; White, 1992). The Easter Islanders used the islands' last trees to erect the largest of the *moai* statues, which weigh as much as 270 tons (245,000 kilograms), representing a colossal effort for a society short of both food and building materials (Flenley & Bahn, 2003; Flenley & King, 1984). Many of these societies were advanced for their time, and made impressive achievements; societal collapse may have seemed unlikely at their peak of power and pride. That sense of invulnerability, which eventually crumbled, is captured in the final lines of the poem *Ozymandias*:

And on the pedestal these words appear—
'My name is Ozymandias, king of kings:
Look on my works, ye Mighty, and despair!'
Nothing besides remains. Round the decay
Of that colossal wreck, boundless and bare
The lone and level sands stretch far away."

Shelley (1826)

The decisions of collapsed societies may seem foolish in hindsight, but upon reflection, one may ask if our global society is any wiser in using non-renewable oil to make plastic that is discarded almost immediately or by damaging the long-term health of soil to grow huge quantities of food, much of which is never eaten. As quoted at the start of this chapter, Lebow (1955) writes in the *Journal of Retailing* that the pace of modern consumption of resources is not required to meet our physical needs, but is designed to satisfy social acceptance and short-term economic gains. Like many ancient collapsed societies, people today are using scarce resources not for necessities, but for luxuries and frivolities. The parallels between our present way of life and that of the ancient collapsed societies are disquieting.

However, our society is different from those of the past in two important ways: our improved technology and ability to learn and communicate. Technology may in fact help prevent environmental collapse, but present technology is also the *source* of much environmental degradation. Future advancements may not be environmentally benign, and as technology develops, so does our potential to degrade the earth. Our short-term success in using technology does not guarantee our long-term success. Each one of the collapsed societies discussed above succeeded for hundreds of years, longer than the age of the United States, or the time since the industrial revolution. As with King Ozymandias, our sense of power and mastery is tempered by the humility of historical perspective.

Modern methods of learning and communication far outreach that of our ancestors, and this, perhaps more than anything, is a reason for optimism. In addition to researching the chemistry, physics, and biology of how the natural environment functions, modern societies also possess the ability to learn about human behaviours. However, the psychological influences of what leads to human behavioural choices that harm the environment are still under-researched. Better understanding what leads people to engage in pro-environmental behaviour and communicating that knowledge is a critical element of preventing environmental degradation.

Environmental Collapse: The Present Dilemma

Even today, environmental problems can be major factors in what appear to be societal problems. The recent 1994 genocide in Rwanda was fuelled in part by conflict over scarce environmental resources. In Rwanda in 1993, the population was so dense that in a typical area the average farm was less than one acre in size with only one seventh of an acre of overburdened land to support each person (André & Platteau, 1998). This contributed to chronic malnourishment, inflaming old ethnic conflict over

control of land and resources. The location and severity of violence was directly related to the scarcity of environmental resources (André & Platteau, 1998).

Fortunately, few environmental crises have boiled over into societal collapse recently. However, many other global environmental risks have been growing and have major implications for the way of life for people and ecosystems in the coming decades. While too great and intertwined to fully enumerate here, a few of the most pressing aspects of global environmental degradation include climate change, loss of biodiversity, the dwindling supply of natural resources, and pollution.

The first major environmental threat is climate change, caused by carbon-based gasses and water vapour that trap heat within the earth's atmosphere. Carbon-based gases are caused by many human activities, such as the burning of carbon-based fuels like coal and oil, which are primary sources of the energy used for electricity production and transportation. While pre-industrial levels of carbon dioxide were about 284 parts per million (ppm) in 1832 (Etheridge et al., 1998), they are now 387 ppm and increasing (Tans, 2010). During the 20th century, temperatures increased by 0.74 °C ± 0.18 °C (IPCC, 2007). Predicting the specifics of how and when the climate will change is complex and entails some uncertainty. However, high-certainty predictions by the Intergovernmental Panel on Climate Change include an increase in mean global temperatures, rising sea levels, and more frequent droughts, making food production more difficult. According to the Stern Review (2006) and IPCC (2007) an increase of 2 °C is likely to cause severe disruptions in the way of life for people throughout the world, while 4 °C is considered to be the "tipping point" for the stability of many meteorological and ecological systems, when equilibrium is no longer maintained. Currently, global mean temperatures are predicted to rise by between 1.1 °C and 6.4 °C by 2100, depending upon future carbon emission levels (IPCC, 2007). The flooding of

coastal cities accompanied by increased scarcity of food and clean water is expected to cause extensive human suffering and death (IPCC, 2007).

The second major environmental threat is the loss of biodiversity, both in terms of loss of wildlife habitat and species extinction. Since 1970, animal populations have declined by 30% and coral reefs by 40% (Secretariat of the Convention on Biological Diversity, 2010). Functioning ecosystems are the ultimate source of breathable air, clean water, food, and raw materials necessary for survival. Deforestation is currently estimated to cost 2 to 5 trillion dollars per year in additional costs, such as erosion and air quality, than if the forests were kept intact and managed sustainably (Secretariat of the Convention on Biological Diversity, 2010). This loss of biodiversity damages productivity and threatens the sustainability of human societies. The rate at which species are becoming extinct is between 100 and 1,000 times the historical background rate, leading some scientists to conclude we are experiencing earth's sixth major extinction event (Kingsford et al., 2009; Lawton & May, 1995; Pimm, Russell, Gittleman, & Brooks, 1995; Sala et al., 2000). The most recent period in which extinctions were as common was at the end of the Cretaceous in the final days of the dinosaurs. The effects of climate change are expected to exacerbate the extinction rate, and appear to be currently doing so for many species (Sinervo et al., 2010). Although exact predictions are still uncertain, biologists expect that as many as 20% of all species may be extinct by 2028 (AMNH, 1998), and as many as 50% by 2100 (Wilson, 2002). In addition to the ethical issues of widespread extinction, the unintended consequences of mass extinction could have strong impacts on human life, such as increases in pest populations, disease vectors, and the loss of pollinating insects (Sinervo et al., 2010).

The third environmental dilemma presented here is the depletion of fossil fuels, particularly oil. Oil is the primary fuel for transportation of both people and cargo and is the source of most plastics. Even the fertilizer and insecticides used to produce most

food are derived from fossil fuels. Aside from all the environmental reasons to find alternatives to fossil fuels, a more mundane reason is that their supply is finite, that supply is dwindling, and our societies are currently dependent upon them for mobility, food production, and other goods. While demand for oil is increasing, the supply is expected to decrease soon. Oil production in the US peaked in 1970, while Saudi Arabia, the largest exporter of oil, is expected to reach peak production within the next few years (Deffeyes, 2006). Predictions vary as to how soon global peak oil will occur, with academic reports claiming within a decade (Owen, Inderwildi, & King, 2010), and oil companies such as Shell claiming a date of 2025 or later, but most assessments agree peak oil will occur within the lifetimes of adults today (Hirsch, Bezdek, & Wendling, 2005). If people do not conserve more fuel, and find alternative fuels soon, the standards of living throughout the world could change dramatically.

Finally, the negative effects of environmental change are not reserved for plants and animals, or future generations of humanity. The World Health Organization estimates that in 2002, about 4 million people died because of air and water pollution (WHO, 2007), nearly twice as many deaths as those attributed to drugs, alcohol, road traffic accidents and violence combined (WHO, 2004). Regardless of future risks, environmental degradation already kills millions of people throughout the world each year.

While these problems may appear hopelessly large, there are some reasons for cautious optimism. Historically, most societies have not degraded their environments to the tipping point; environmental collapse is not inevitable. Even when collapse has occurred in the past, societies have lived side-by-side while one declines and the other thrives. While the last Greenlander Vikings starved to death after deforesting and exhausting the fertility of their land, the Inuit were able to survive in the same lands by living through more sustainable means (Berglund, 1986). While Haiti has suffered

because of its deforestation, overpopulation, and pollution, the neighbouring Dominican Republic has enjoyed relative prosperity in part because of its strict environmental protections (Wucker, 2000). Environmental degradation, while common, is preventable; it is ultimately caused by controllable human choices which can be researched and understood.

Environmental Degradation as a Behavioural Choice

While the current environmental problems present a grim picture, the environment has its share of success stories, brought about by intentional human decisions. When Rachel Carson's book *Silent Spring* (1962) documented how pesticides such as DDT were killing off wildlife populations, it converged with other factors to help inspire the modern environmental movement. Within ten years, and after a widespread cultural shift in perceptions of how people live within the natural environment, DDT use was restricted in the USA and many other countries. Species which had been on the verge of extinction, such as the bald eagle, have recovered as a result. As a continuing legacy, environmental awareness is still high amongst the public, even if those values do not always translate into action. A similar environmental victory was achieved in removing lead from fuel and consumer products. As a result, atmospheric lead pollution in the US has stopped almost completely, and the level of lead in American blood has dropped 78% since the 1970s (Landrigan et al., 1975; Landrigan et al., 1976; Pirkle et al., 1994). Likewise, the international removal of ozone-destroying CFCs (Molina & Rowland, 1974) has been described as the "single most successful international agreement to date" by Kofi Annan and the ozone layer is expected to be restored by the mid-21st Century (NOAA, 2006). Similarly, the problem of deforestation has mostly been stabilised within most developed nations (Secretariat of the Convention on Biological Diversity, 2010). Japan, despite having one of the

highest population densities in the world, has retained 80% of its forests through a tradition of careful woodland management (Richards, 2003).

These success stories remind us that our actions toward the environment are behavioural choices. While people have made mistakes, they are also capable of getting it right. Though people may feel powerless as individuals in the face of global environmental threats (Lorenzoni et al., 2007), human actions are still an aggregate of individual behavioural choices. Even top-down decisions, such as governmental regulation of toxins or carbon emissions, are only a few steps removed from bottom-up processes, like the strength of voters' environmental priorities; each of the top-down environmental victories reviewed above was only achieved after years of pressure from the bottom-up. The technology to address most of our environmental dilemmas exists today; relatively simple measures like home insulation, energy-efficient travel and appliances, and lower-impact diets have a greater environmental impact than many more high-profile environmental actions. For example, cavity wall insulation pays for itself in about 2 years in Britain, while photovoltaic solar panels can take decades (Energy Savings Trust UK, 2010). Many environmental optimists point to future technologies that will solve our environmental problems, and likewise, many governmental initiatives are focussed on researching and developing new technologies. These advancements are important, and improved technology will undoubtedly help the environment, but technology alone is an incomplete solution. Most technological advancements still require intentional human behaviours to implement them and, as a whole, people are already struggling behaviourally to make the pro-environmental choices that are already available. How then can people be influenced to engage in more environmentally sustainable behaviours?

The Challenge of Responding to Environmental Threats

Researchers have considered many reasons why humans appear to respond mal-adaptively to threats to the natural environment (e.g., Hanski, 2008). The three broadest reasons for why many environmental threats are difficult to solve are discussed here: environmental threats can be difficult to see, the cost is often externalised to people who did not cause the degradation, and the consequences of environmental destruction can be so unfamiliar that catastrophic outcomes seem unlikely. Each of these reasons will now be considered in turn.

First, many types of environmental degradation, such as species extinction or toxic contamination, are not easily visible. Similarly, evidence of climate change can be difficult for humans to perceive because year-to-year changes are small, and the high level of natural variation in the weather masks the "signal" of long-term climate trends with the "noise" of short-term variability. Ironically, the most visible damage to the environment, such as litter, is often the least damaging in global terms. Likewise, many environmentally damaging behaviours, such as energy use, can be difficult for consumers to measure or even visualise (Aronson, 1990; Coltrane, Archer, & Aronson, 1986; Kurz, Donaghue, & Walker, 2005); there is little visible indication that a home electric oven typically requires hundreds of times the electricity to operate as a low-energy lightbulb. Without specialist knowledge, people may not know the natural environment around them is being harmed and that their everyday behaviours may be contributing to that harm. Even if people know this in the abstract, the causal link between actions and behaviour may not appear to be direct. This can lead to a divergence between pro-environmental intentions and actual environmental impacts, as well-placed intentions do not materialise into environmentally-meaningful behavioural outcomes (Stern, 2000; Whitmarsh, 2009).

Second, environmental resources can be extracted in such a way that the party benefiting from the resources does not pay the ecological cost of doing so. This is known as externalisation and occurs across distance as well as time. In the case of distance, chemical effluent from a factory may travel downstream and contaminate land and water far from the original site. In the case of time, externalisation occurs when normally renewable resources, such as fisheries, are exhausted through over-extraction, or when carbon gases are released from energy production today at the cost of a stable climate for future generations. One striking example of externalisation is the contamination of the Arctic, where airborne pollutants are carried by long range air currents, similar to a whirlpool in the global atmosphere. As a result, native Inuit and Nunavik people ingest high levels of toxic PCBs, pesticides, and other pollutants originating in countries far away. Inuit breast milk is heavily contaminated (Sandau et al., 2000; Solomon & Weiss, 2002), causing disorders of the immune system, neurological impairment, and higher risk of cancer in Inuit children (Carpenter, 2006; Dewailly et al., 2000). Because many of these toxic compounds degrade very slowly, the Arctic will continue to be contaminated long after emissions stop. In cases of externalisation, even if people are aware of the environmental damage they are causing, they may be less motivated to prevent it because they do not pay the cost while still retaining the benefit. This situation highlights the mismatch between individual interests and group interests. Garrett Hardin (1969) described this as the "tragedy of the commons," referring to the environmental destruction that occurs when common resources are over-exploited by individuals acting in their own self-interest.

Finally, environmental crises such as climate change may seem so extreme and unfamiliar that many people reject the possibility of environmental calamity as improbable or at least exaggerated, a fallacy termed the normalcy bias (Omer & Alon, 1994). After all, when the sun is shining and the grass is green, ecological disaster seems

remote. This barrier to perceiving threats is similar to the first one, in that threats are difficult to see, but even when acknowledged they can be difficult to perceive as "real." The reasons that people are often sceptical of environmental destruction are likely to be complex. Extreme environmental damage implies moral wrong-doing, which may provoke feelings of guilt, anxiety, or denial. In support of this, while the scientific evidence for the severity of climate change has been *increasing* (IPCC, 2007), public belief in climate change has been recently *decreasing* (BBC/Populus, 2010; Eurobarometer, 2009; Ipsos MORI, 2008; Gallup, 2009; Pew, 2009). In controlled experiments, people have been found to be more willing to engage in pro-environmental behaviours when climate change is portrayed as moderate rather than extreme (Ferguson & Branscombe, 2010). The reasons for this are likely to be complex, but Ferguson and Branscombe implicate the role of collective guilt. Alternatively, Dickinson (2009) suggests that awareness of massive environmental destruction might elicit anxiety over individual mortality that in turn prompts environmentally-damaging terror management strategies to deal with this anxiety (Arndt, Solomon, Kasser, & Sheldon, 2004; Kasser & Sheldon, 2003). However, this latter possibility remains untested.

Psychological Research and Environmental Behaviour

The study of psychology and the prevention of the degradation of the natural environment may initially seem like an odd pairing. However, if the psychologist's goal is to understand human thought and behaviour, and the present environmental threats are rooted in human thoughts and behaviours, then that pairing seems essential for progress. Curiously, the field of psychological study of environmentally-relevant behaviours has been relatively small and has not always been appreciated as having a role to play in confronting environmental threats. Even within the APA, a 2000 survey revealed not one of the 52 divisions had an environmental policy, and respondents

replied to the survey with statements like "This seems not to be a psychological issue, and thus not within our sphere" and "It is virtually impossible to understate the importance of APA divisions [in regard to protecting the environment]" (Clayton & Brook, 2005, p 88). Likewise, environmental professionals have rated psychology as one of the least important domains to their work, rating the study of psychology within their discipline at 1.5 on a 1 to 5 scale (Clayton & Brook, 2005).

These attitudes are changing, however, as more researchers have explicitly called for psychologists to lend their efforts to studying, understanding, and influencing how people engage in environmentally-relevant behaviours (e.g., Clayton & Brook, 2005; Mascia et al., 2003; McKenzie-Mohr, 2000; Oskamp, 2000; Saunders, 2003). The research literature has grown, and an APA Task Force recently published a lengthy report summarising the interface between psychological research and climate change (Swim et al., 2009). Over the past ten years, environmental behaviour has grown from being the research interest of a scattered few to the new sub-domain of "conservation psychology." Environmental behaviour can take many forms, but its defining feature as used in this thesis and by other conservation psychologists (Stern, 2000) is that it is a behaviour which impacts the natural environment either relatively positively or negatively. This can take the form of public-sphere behaviours, such as volunteering or petitioning for more sustainable government policies or private-sphere behaviours, such as recycling, conserving energy, or making more sustainable personal consumption choices. Research of environmental behaviours is diverse in methodology and theoretical perspectives, having attracted the interest of social psychologists, geographers, sociologists, economists, governmental organisations, and environmental campaigners; perhaps the most shared feature of this research is its lack of unifying theory. The diversity of research has been a strength as well as a weakness, offering many angles and explanations of behaviour, but communication of these theories is

often confined within the original discipline's journals and conferences. Below is a review of traditional perspectives within psychology to understanding why people engage in environmental behaviours. These theoretical groupings are not always clearly demarcated, and many practicing researchers and campaigners today take an ecumenical approach. As discussed here, the theoretical perspectives are informational, rational-economic, attitudinal, habitual, social dilemmas, and normative. Notably, most of these perspectives focus on the individual person as the primary unit of analysis, leaving out details of social processes. I believe this individually-focused approach does not reflect actual human decision-making, and this theoretical limitation accounts for the limited predictive power of most traditional theories.

Informational Models of Environmental Behaviour

As the environmental movement awakened in the 1960s, many early approaches assumed that if people learned about the environmental impact of their behaviours and how to change them, people would choose to live more sustainably. Although the simplicity of this logic is appealing, its empirical support has been disappointing. As with many complex behaviours, providing information alone tends to produce little behavioural change, as health psychologists learned long ago (Hyman & Sheatsly, 1947). In one series of workshops on home energy conservation, knowledge was found to increase substantially, but conservation behaviours did not change (Geller, 1981). Similar results were found in a 10-week longitudinal study of water conservation where participants received comprehensive informational materials (Geller, Erickson, & Buttram, 1983). These same non-results for information-only strategies have been observed in many other experiments and case studies (Ester & Winett, 1982; Hirst, Berry, & Soderstrom, 1981; McDougall, Claxton, & Ritchie, 1983).

This is not to say that education about environmental issues is unimportant, but rather that education *alone* is rarely enough to bring about behavioural change. A deficit

of environmental information can be a barrier to pro-environmental action at many levels, such as realising an environmental problem exists, knowing which behaviours are problematic, and which alternative behaviours would be beneficial (Lorenzoni et al., 2007; Whitmarsh, 2009). In this respect, knowledge is similar in concept to a hygiene factor in organisational psychology (Herzberg, 1968); its absence may present a barrier, but increasing it further once already present does not necessarily provide increased motivation. The typical inefficacy of purely educational interventions has not been fully communicated beyond academia as attested by the enduring popularity of fact-filled leaflets as a primary form of behavioural intervention by campaigners, organisations, and local governments.

Rational-Economic Models of Environmental Behaviour

Rational-economic models assert that people engage in environmental behaviours according to what will give them the most individual economic benefit. This model has been popular with economists and many incentive-based environmental programmes. Applications of this model include grants for home insulation and increased taxation on polluting fuels. In surveys, more people claim they conserve for economic benefit than out of environmental concern (DEFRA, 2002), and simple conservation measures can be very lucrative for both organisations and individuals; for example, cavity wall insulation in the UK costs about £250 for a home and provides about £115 in savings each year indefinitely (Energy Saving Trust UK, 2010). Few investment opportunities provide a consistent 46% annual return on a one-time expense. While the initial cost can be a barrier to conservation (Lorenzoni et al., 2007), grants and subsidised loans are offered in both the US and UK that cover some or all of the installation cost. These types of conservation measures can be a guaranteed way of saving hundreds of pounds each year. However, surprisingly few people take

advantage of these offers, suggesting economics alone offer an inadequate account of decision-making.

While economics certainly plays a role in behaviour, the immediate drawback of rational-economic models is that people are not purely rational and do not make their everyday behaviours after an exhaustive cost-benefit analysis. In one field study, few people requested a free energy-audit, and of those who did, few followed the money-saving advice they received (Hirst, Berry, & Soderstrom, 1981). In a review of several public programmes from the US, Stern et al. (1986) found that most offers of grants and low-interest loans for conservation measures were taken up by only a small percent of the population, with the average consumer uptake of these offers ranging from 0.5% to 5% by region. Even a programme that offered totally free home weatherisation was used by only 6% of possible users (Miller & Ford, 1985). In another field experiment, residential energy users were assigned to one of three pricing tariffs for peak and off-peak energy pricing of either 2:1, 4:1, or 8:1 pricing ratios. This difference in cost accounted for only 2 percent of the variance in energy consumption behaviour (Heberlein & Warriner, 1983). The most interesting finding of incentive-based programmes is not that economic incentives can motivate behavioural decisions, but that they rarely appear to do so. While people often claim economic rather than social reasons for conserving, research suggests social norms are actually more influential than economic incentives (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008).

The successfulness of incentive programmes often appears to be independent of the economic advantage offered by the programme. Using principles from advertising and social psychological research, rational-economic incentives were packaged with frequent reminders and more comprehensive information about the savings that were available (Heberlein & Baumgartner, 1985, as cited in Stern, 1999). In another set of programmes, Gonzales, Aronson, and Costanzo (1988) used vivid imagery and

persuasive messaging to compel users to take part in the programme. Stern et al. (1986) intervened in another set of programmes by reducing the number of steps for users to take advantage of the programme. In all cases, uptake of the programmes increased substantially and energy use decreased. The combination of information, incentives, and persuasion appear to explain conservation success better than any of these methods alone (Stern, 1999).

One drawback to economic incentives is that as efficiency increases a "rebound effect" may occur where users relax their prior conservation efforts (Gonzales, Aronson, & Costanzo, 1988), similar to a dieter who eats twice as much food because it has half the calories. Incentive programmes still achieve some overall savings, but often not the same level as the raw efficiency savings. In some cases, fining problem behaviour has the effect of *increasing* it, because the problem has been commodified at a price people are willing to pay (Gneezy & Rustichini, 2000). Another drawback to rational-economic interventions is they require a continuous external economic pressure, such as the provision of grants for efficiency upgrades or higher taxation on damaging behaviours. If funding sources decline or taxation becomes unpopular, the economic incentive to influence behaviour also disappears. In summary, rational-economic interventions are not always successful, and they have their limitations, but they can work well when complemented by other measures, such as comprehensive information, persuasive messages, vivid imagery, and convenience of use.

Attitudinal Models of Environmental Behaviour

In a broad sense of the word "attitudes," attitudinal models encompass several individual-level types of beliefs such as attitude toward the natural environment itself, attitudes toward specific environmentally-relevant behaviours, and paradigms of humanity's role within the environment, such as the New Ecological Paradigm (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000). Attitudinal research has

been popular within psychology, and Kaiser, Wölfing, and Fuhrer (1999) estimate that most psychological publications investigating environmental behaviour incorporate some type of attitude measure.

Early research into general attitudes found them to be poor predictors of specific behaviour (Wicker, 1969). Further research found specific, concrete attitudes improved predictions substantially over generalised attitudes (Fishbein & Ajzen, 1975). Thus, knowing someone's general attitude toward nature is unlikely to reveal how much they drive a car, but knowing their specific attitude toward driving a car is more informative. Attitude prediction of behaviour was incorporated into the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), which claims attitudes and norms predict intentions, which then predict behaviour. The Theory of Planned Behaviour also includes perceived control as a predictor of behavioural intentions (Ajzen, 1991). A meta-analysis of 185 studies across many behavioural domains found that the theory of planned behaviour accounts for about 39% of the variance in intentions and 27% of behaviour (Armitage & Conner, 2001). However, most of these studies did not concern environmentally-relevant behaviours, and predicting behaviour is not the same as the ability to influence behaviour. A meta-analysis of environmental behaviours in particular found attitudes to predict about 12% of the variance in environmental behaviour (Hines, Hungerford, & Tomera, 1986/87).

One application of attitudinal concepts predicting behaviour is the New Environmental Paradigm (Dunlap & Van Liere, 1978), which goes beyond simple attitudes and attempts to measure the worldview in which people see humans fitting into the natural world. According to Dunlap and Van Liere (1978), the NEP measures the transition from an old societal paradigm of nature as a resource to exploit to a new paradigm of humans as aware of adverse consequences toward nature, fitting within nature rather than outside it, and acting as environmental stewards. The NEP has since

been revised into a new scale, updating some questions and replacing "Environmental" for "Ecological," but its purpose remains the same (Dunlap et al., 2000). The NEP has been widely used within research, and is predictive of awareness of environmental consequences, personal environmental norms, behavioural intentions, and actual behaviours (Cordano, Welcomer & Scherer, 2003; Schultz & Zelezny, 1998; Tarrant & Cordell, 1997). However, the NEP is a much stronger predictor of environmental awareness and personal norms than actual behaviours (Stern, Dietz, Abel, Guagnano & Kalof, 1999).

One drawback of attitudinal models is that as attitudes become more narrowly defined and specific to the behaviour they predict, they become less informative about the broader psychological process that may lead to behavioural change. Attitudes about driving a car to work may partially predict whether one does drive a car to work, but this analysis by itself is limited in theoretical scope, reveals little about how attitudes arise, and ignores the social environment in which behaviours occur. Second, given how attitudes might appear to be obvious and direct predictors of behaviour, psychologists have been surprised at their low predictive power, even when they are targeted at specific, concrete behaviours. As will be discussed, these two drawbacks of isolation of theory and low predictive power are rooted in the same problem; these paradigms do not account for the social determinants of behaviour. Increasing theoretical scope to incorporate social variables dramatically increases the usefulness of attitudinal models.

Habitual Models of Environmental Behaviour

Given the relatively low predictive power of the three types of models described above, the reader may surmise that environmental behaviour seems to live a life of its own, independent of the factors that one might expect to be most influential. Indeed, individual behaviour can be particularly intractable even in the face of concerted efforts

to promote change, a point that has been demonstrated in a variety of domains including drug abuse prevention (Derzon & Lipsey, 2002; West & O'Neal, 2004), sexual health (Albarracín et al., 2005; Brückner & Bearman, 2005; Hauser, 2004; Trenholm et al., 2007), and conservation behaviour (Gardner & Stern, 1996; Kollmuss & Agyeman, 2002; Stern, 1999; Stern et al., 1986). Although the UK government has spent many millions of pounds promoting conservation behaviour through behavioural intervention programmes, environmentally destructive behaviour like CO2 emissions continues to rise (DEFRA, 2006). Despite the poor performance of many behavioural change campaigns, these approaches are still commonly relied upon by governments and NGOs (Owens, 2000).

Habitual models view many behaviours as entrenched and automatic rather than deliberative and planned. The defining feature of habits is not the frequency of an action, but its automaticity (Verplanken, 2006). As people perform the same actions repeatedly, they link cues within their lived environment with associated actions, such as sofas and snacking. This finding has been recorded in many behavioural outcomes (Verplanken & Wood, 2006), but has also been observed at the neurological level; habitual behaviours decrease the involvement of goal-related neural structures like the prefrontal cortex (Daw, Niv, & Dayan, 2005). One implication of this work is that "downstream" interventions that occur after habituation has set in are unlikely to be successful in influencing behaviour, even if they do influence attitudes and intentions.

In support of this, behavioural intentions for driving cars (Verplanken, Aarts, van Knippenberg, & Moonen, 1998), taking the bus, and eating fast food (Ji & Wood, 2007) were strong predictors when the behaviour was not habituated, but intentions did not predict behaviour when habits were strong. While these results may seem almost fatalistic, they offer insight into how habituated behaviours may be influenced. Because habits are often context dependent, they are best suited to change when the situational

context has also changed. For example, people are most likely to switch from a car to public transportation when they move to a new city; providing new residents with free bus passes takes advantages of a time when habituated behaviours are vulnerable to change, and allows more positive habits to develop. When combined with additional features, such as enhanced information and economic incentives, these "downstream plus context change" interventions have the potential to be more successful than typical campaigns (Bamberg, Ajzen, & Schmidt, 2003; Fujii & Kitamura, 2003).

"Upstream" interventions, which address harmful habits preventatively rather than curatively, have considerable potential. These types of interventions disrupt negative habits by altering the structure of the lived environment in which they might occur. Successful examples include congestion charges for over-crowded roads and optimising recycling collection to make the behaviours as easy as possible (Schultz, Oskamp, & Mainieri, 1995). The limitation of upstream interventions is that they typically need to occur in a top-down way, organised carefully by a sufficiently supportive and skilled authority. A combination of downstream and upstream interventions show much promise in promoting environmental behaviour, but only fairly common behaviours are likely to become automatic and habituated. Occasional behaviours like buying a car or boiler can have as much environmental impact as daily behaviours, but these would be unlikely to become automatic.

Social Dilemma Models of Environmental Behaviour

Social dilemmas, made famous by Garrett Hardin's (1968) "tragedy of the commons" example, are defined as situations where there is a mismatch between private and collective interests (Dawes, 1980). Many environmental issues can be viewed as social dilemmas, such as fishing, logging, and the release of greenhouse gasses. While it may benefit individual actors to engage in these behaviours as much as possible, if too many people do so, everyone loses as resources diminish to

unsustainable levels. The research literature on social dilemmas is vast, spanning beyond psychology, with many researchers coming from economic and political science perspectives. In contrast to many of the other perspectives reviewed in this chapter, social dilemmas accounts for group-level processes more explicitly. An underlying assumption behind most social dilemma research is that actors operate through rational self-interest, but their decisions are also influenced by situational context and others' actions (Weber, Kopelman, & Messick, 2004). The dominant experimental paradigm in social dilemma research involves a resource management game that simulates a social dilemma played by a small number of participants. Cooperation rates within these groups are influenced by a large number of factors, such as past experience with other actors, awareness of the social dilemma, central governance, individual-level attributes, and within-group dynamics (Gifford, 2007). The fate of the resources these groups manage can vary widely, but under the right conditions, responsible and sustainable choices can emerge (Ostrom, 2000).

Perhaps one of the most valuable findings from the social dilemma research literature is the importance of social variables in determining individuals' decisions. The level of trust between actors has a strong impact on how cooperative their decisions will be (Sato, 1989), but this effect decreases as the number of actors increases (Komorita & Lapworth, 1982). Sharing a collective identity also boosts cooperation in social dilemmas (Brewer & Kramer, 1986; Edney, 1980; Kramer, 1991; Kramer & Brewer, 1984). Brewer (1979) proposes that this occurs because the group is seen as an extension of the self, and group welfare is incorporated into individual welfare. Empirical results support the notion that a strong shared identity transforms actors' goals into a desire for mutual well-being in social dilemmas (De Cremer & Van Vugt, 1999).

Some social dilemma theorists have criticised laboratory-based experimental findings as not being generalisable to real-world environmental scenarios, particularly regarding climate change. First, while experimental results show both trust and prior experience with dilemma partners increase cooperation (Messick et al., 1983; Ostrom et al., 2002), the sheer number of actors in most environmental problems make trust and cooperation strategies less feasible (McGinnis & Ostrom, 2007). In simulation models, simply increasing the number of actors from three to seven significantly reduces cooperative and responsible decisions (Seijts & Latham, 2000). Still, social dilemma research applications have had some real-world success in creating sustainable local fisheries (Clayton & Myers, 2009). Exploiting a shared identity when there are a large number of actors may be a feasible strategy, because shared identity expands the sphere of concern for wellbeing from the individual-level to the social-level (De Cremer & Van Vugt, 1999).

However, strong social bonds are not a straightforward panacea for resolving social dilemmas. In one study of sustainability practices by three different Guatemalan tribal groups, the group with the strongest social interconnections between members was also the worst at making environmentally-sustainable choices. The researchers found this was because of a shared cultural norm that minimised perceiving the reality of environmental degradation (Atran, Medin, & Ross, 2005). Thus, social influence may be helpful in resolving social dilemmas, but social context is important in determining the outcome, as social influence can also exacerbate dilemmas.

Another complication in practical applications of social dilemma findings is that for many environmental behaviours, such as energy use, people are often unaware of their own personal impact because both energy use and its environmental impact are difficult to see. Most social dilemma research operates on the assumption that actors are aware of and can measure their own impact; without these prerequisite conditions,

social dilemma research applications are unlikely to be successful (Weber, Kopelman, & Messick, 2004). Thus social dilemma based strategies may need to be accompanied by additional approaches to make users more aware of environmental problems and their own behavioural impacts. In summary, social dilemma research has produced compelling research findings, and applications have been used successfully for some local environmental problems. Importantly, social dilemma research shows how social processes can influence what superficially may appear to be individual-level decisions.

Normative Models of Environmental Behaviour

Subjective norms, defined as social pressures people feel from those around them, have been incorporated into both the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and Planned Behavior (Ajzen, 1991). However, they are often the weakest predictor compared to attitudes and perceived control (Armitage & Conner, 2001), leading some theorists to conclude individual-level factors are more predictive of behaviour than social factors (Ajzen, 1991).

In contrast to this, other researchers have argued that prior conceptualisations of norms have been too unitary, and that norms have been poor behavioural predictors of behaviour because of theoretical and methodological confounds. Cialdini, Reno, and Kallgren (1990) describe norms as including a descriptive element (what people *are* doing) and an injunctive element (what people *should* be doing), a theoretical nuance prior researchers had not taken into account in their experimental manipulations or measurements. Cialdini and colleagues demonstrated that when these norms are mismatched, normative messages are less persuasive. This is often the case for environmental issues, where pro-environmental attitudes are valued (injunctive norm) but pro-environmental behaviours are not (descriptive norm). This kind of mismatch can eventually propagate a norm of inconsistency, perpetuating the problem (McKimmie et al., 2003). Reinforcing both types of norms together has a more

beneficial effect than either norm alone (Smith & Louis, 2008). Normative influence also has the most impact when people are consciously aware of them (Kallgren, Reno, & Cialdini, 2000). Even so, many normative approaches provide relatively low predictive power (Armitage & Conner, 2001). However, norm theorists have recently developed models that provide a more integrative account of social influences that have achieved much higher predictive power in explaining behaviour than traditional individually-focused models. These theories are discussed in further detail in Chapter 2.

Attempts at Theoretical Integration

Although the theoretical paradigms of environmental behaviours are diverse in their grounding, they can all account for some proportion of behaviour, and the most effective predictions tend to take aspects of many models into account. This has led some pro-environmental intervention designers to take an ecumenical approach, using complementary elements from several of the models above to focus more on practical results rather than theoretical conceptualisation. Social marketing approaches use traditional advertising methods to spread information and shift attitudes, but also use community representatives to work with their neighbours to establish social influence and the creation of new habits and group norms (McKenzie-Mohr, 2000; McKenzie-Mohr & Smith, 1999). While social marketing can be effective at promoting environmentally sustainable behaviours, these efforts also require time and money and may not be scalable with current resources.

Other researchers have pursued a more theoretical integration of why people engage in pro-environmental behaviours. Kurz (2002) proposes a socio-ecological understanding of environmental behaviour, which incorporates aspects of several of the models above. Building on other theoretical developments (Baron & Misovich, 1993; Gibson, 1979; Hormuth, 1999), the socio-ecological approach adopts the concepts of affordances, attunements, and effectivities. Affordances refer to the multiple functions

of objects; for example, a car has the affordance of transportation, but also of status and pollution. When a particular affordance is salient in the mind, that person is said to be attuned to the affordance. Effectivities are the knowledge, skills, and resources that enable use of affordances, such as knowing how to apply for a grant to install loft insulation. The models above can be reinterpreted as fitting into the framework of affordances, attunements, and effectivities. While the socio-ecological approach does not theorise about social influences directly, each of the three elements are to be interpreted as socially embedded. In one field experiment using socio-ecological principles (Kurz, Donaghue, & Walker, 2005), interventions were designed to keep participants attuned to the environmental affordances of everyday behaviours, such as water used during showering. These interventions were successful for water conservation, but less so for energy conservation.

In another attempt at theoretical integration, Stern and colleagues (1991) draw upon several theoretical strands in their Value-Belief-Norm (VBN) theory to predict environmental behaviours. According to this theory, environmental values lead to beliefs such as the New Ecological Paradigm, leading to an increase in awareness of consequences and personal responsibility. This leads to a pro-environmental personal norm which leads to increased pro-environmental behaviours. The VBN model is primarily focused on the predictors of pro-environmental behaviour rather than how to influence people to engage in more pro-environmental behaviour. Based on telephone surveys, the VBN model accounts for about 20% of the variance in private-sphere pro-environmental behaviour, such as home energy conservation and recycling (Stern et al., 1999). Stern (2000) acknowledges that many other contextual variables may contribute toward pro-environmental behaviour, and theories of environmental behaviour change still need development.

More specifically, the VBN model was developed as "a theory of the basis of support for a social movement" of pro-environmentalism (Stern et al., 1999, p. 81). Although the theory describes a social movement, the VBN model is comprised only of individual-level factors without any formal accounting of social factors. The "norm" in VBN refers to personal norms, which are more akin to habits than to social or group norms. The authors explain that personal norms are a part of self-concept while social norms are not:

> Personal norms rather than social norms are central because to the extent that movements are forces for social change, they cannot build support on existing social norms. … nearly every strain of the environmental movement actively engages with the policy system and is not content to confine itself to the politics of identity. (Stern et al., 1999, pp 83, 92).

Stern et al. (1999) imply that identity processes are antagonistic to achieving policy goals. This understanding of norms and identity, as monolithic, static, and tangential to social movements, is fundamentally different from how they are conceptualised in the social identity approach. Although VBN theory does not address social factors directly, and appears to downplay their influence, Stern (2000) does identify gaps in theory regarding the context in which VBN occurs, and how people may be influenced to engage in pro-environmental behaviour.

Conclusion

Environmental degradation such as climate change, loss of biodiversity, and dwindling natural resources are unprecedented threats to the well-being of both people and eco-systems. This degradation is the result of preventable human behaviours. While both environmental professionals and psychologists have been slow to realise psychology's role in understanding these behaviours, psychology is increasingly being recognised as a necessary tool in preventing environmental destruction caused by human behaviours.

Psychological research into pro-environmental behaviour has been rooted in many different and sometimes overlapping theoretical models including informational, rational-economic, attitudinal, habituation, social dilemma, and normative models. With a few exceptions, most understandings of pro-environmental behaviour are focused on individual-level factors without accounting for social influences. Much of the research is focused on predictors of behaviour and behavioural outcomes rather than exploring the psychological process that leads to these outcomes. Despite attempts at theoretical integration, research into pro-environmental behaviour remains diverse in its theoretical background and psychological assumptions. The following chapter explores the utility of analysing environmental intentions as an interface between individual and social factors and then provides a review of the research literature of social identity theory and self-categorization theory.

– CHAPTER 2 –

Environmental Behaviour as a Group-Level Outcome:

The application of social identity and self-categorization theory

The previous chapter reviewed both environmental threats and several theoretical models for understanding environmental behaviour. A commonality of most prior research into environmental behaviour is that the primary unit of analysis focuses on the individual person. In this chapter, I propose that environmental behaviour can be understood from a group-level analysis, and start with a discussion of several reasons why environmental behaviour is particularly suited to be understood as embedded within social group processes. I then review social identity theory and self-categorization theory. These two complementary meta-theories provide a framework for understanding the interface between social groups and their individual members. Finally, I review studies that have examined environmental behaviour at the group level.

Environmental Behaviour as a Function of Social Group Processes

Psychologists have dedicated much research to understanding why people engage in particular behaviours, and generalised theories, such as the Theory of Planned Behaviour (Ajzen, 1991), have already been formulated to predict behavioural outcomes. Why do we need more specialised theorising for predicting environmental behaviour? First, these generalised theories leave the bulk of the variance unexplained in typical behaviours, about 73% for the TPB (Armitage & Conner, 2001), leaving considerable room for further psychological processes. Second, environmental behaviour is different from many other behaviours that psychologists have tried to predict and influence, such as wearing a seat-belt in a car. Unlike these examples, many aspects of environmental behaviour are socially embedded, which make it particularly suited for analysis from a perspective of social groups.

As reviewed in Chapter 1, attempting to influence public behaviours by changing individual attitudes or beliefs alone has had lacklustre success. Hornik (1989, 1997) argues in the field of health psychology that if social forces are structured to make individual behavioural change difficult, individual cognitive changes are unlikely to be productive in eliciting behavioural change. Public, social changes must occur to accommodate behavioural change. Similarly, Ockwell, Whitmarsh, and O'Neill (2009) argue that top-down policies to force pro-environmental behaviour need to be balanced with bottom-up grass-roots movements that can provide the social support necessary for accepting top-down regulation and enduring personal behavioural change. Expanding on these ideas, there are several theoretical reasons why environmental behaviour is particularly well-suited to group-level analyses.

Environmental Behaviour is Socially Relative

Humans have always had an impact on the natural environment, even from prehistoric times. As human technology and population has grown, our impact has become much greater. This impact varies widely by time and region and has no standard or baseline value. Thus, the primary definition of what is "environmentally-friendly" is often based on comparing one person's or group's impact to others. For example, in the UK, per capita CO_2 emissions are 9.4 metric tons per year. Whether this is a lot or a little depends upon the comparator. In the US, per capita CO_2 emissions are 19 metric tons, while only 5.6 per capita metric tons of CO_2 are released in Sweden (CDIAC, 2007).

In social identity theory, this concept is known as comparative context. The values and norms that group members ascribe to themselves depend in part upon the comparator that is available. According to social identity theory, groups typically seek positive distinctiveness, and contrast their ingroup stereotypes away from salient outgroups to achieve this (Tajfel & Turner, 1979). This was demonstrated empirically

when psychologists were asked to compare themselves to either dramatists or physicists, and then rate psychologists as a group as either artistic or scientific. When compared to dramatists, psychologists described themselves as more scientific, but when compared to physicists, psychologists claimed to be more artistic (Doosje, Haslam, Oakes, & Koomen, 1998). Thus, the stereotypes people hold about their own group depend upon the comparator.

These social comparisons were demonstrated in the environmental domain by Rabinovich and colleagues (2008), which will be reviewed in greater detail below. Simple national comparisons, which made no mention of environmental performance, resulted in shifts of environmental self-stereotypes, value centrality, and behavioural intentions. By making these social comparisons, participants not only moved the goal posts of what counts as pro-environmental, but they changed their own behavioural goals as well.

These types of social comparisons already occur on a regular basis, as the following recent newspaper headlines illustrate: "China overtakes US as no. 1 emitter of carbon dioxide"; "How China overtook the US in renewable energy"; and "The UK dumps more household waste into landfill sites than any other EU state." At higher institutional levels, the 2009 Copenhagen Summit failed to reach a treaty amidst mutual accusations between developed and developing countries that the other side was not pulling their own environmental weight. Because environmental impact can be difficult to measure on the individual level, feedback is often presented in reference to social groups. Research on comparative context suggests these types of comparisons, which are common in the media and from politicians, can have a very real impact on how people perceive themselves and how they act, but much is still unknown about the extent of these effects.

Environmental Issues are Already Integrated with Existing Identities

Many environmentally relevant issues are expressions of existing personal and social identities. For example, owning a large car can be an identity expression of independence, social status, and wealth. A hybrid electric car is another high-status expression of identity of a different kind. Some pro-environmental behaviours, such as drying clothes on a line, are associated with low-status identities, Other behaviours, such as buying local, muddy, cosmetically imperfect vegetables, have undergone a shift from low-status to high-status over time. If a particular behaviour is incompatible with existing values and identity, it is unlikely to be adopted even if attitudes are positive and economic incentives are available (Schultz & Zelezney, 2003).

In addition to being expressions of personal identity, environmental issues can become interwoven with social identities. Opotow and Brook (2003; Brook, Zint, & De Young, 2003) interviewed ranchers in Colorado and Wyoming about an endangered species of mouse, the protection of which had become a source of conflict between ranchers and urban environmentalists. Both ranchers and urban environmentalists thought of themselves as more environmentally friendly than the other, and viewed the other as hypocritical and untrustworthy. As the conflict grew, sound environmental messages were dismissed because they originated from the mistrusted outgroup (Brook et al., 2003; Opotow & Brook, 2003), putting an endangered species at greater risk because of conflict social groups. Since outgroup messages are typically not as trusted (Hornsey & Imani, 2004; Rabinovich & Morton, 2010), behavioural fragmentation along social lines can have real consequences for whether beneficial advice is followed and practices are implemented.

Perhaps the most well known convergence of environmental issues and social identities is the case of political parties in America today. Democrats and Republicans once had similar views on the environment and climate change. The Environmental

Protection Agency was started by a Republican president, and in 1997, equal numbers of Democrats and Republicans said the effects of global warming were beginning to occur (Gallup, 2008). As time went on, the environment became increasingly politicised, and Democrats are now three times as likely as Republicans to say the environment should be a national priority (Pew, 2009), and three times less likely to say climate change is exaggerated in the media (Gallup, 2009). As of 2008, 76% of Democrats believed global warming was occurring while only 41% of Republicans believed so (see Figure 2.1; Gallup, 2008). Thus, political party identity has facilitated not just a difference in environmental priorities, but a difference in the perception of the environmental reality itself, and belief in climate change is becoming a shibboleth of American partisan identity. This polarisation of the environment is not a simple aspect of liberalism or conservatism, as differences of this extremity did not occur in America's past and are not found in other nations today, such as the UK (Carter, 2006). However, as demonstrated by Rabinovich and colleagues (2008), British people are already integrating a certain standard of environmental behaviour into their national self-concept that, though malleable to context, has the power to shape values and behaviour. Considering the above, pro-environmental intervention approaches which do not acknowledge the contours of existing social identities are unlikely to be successful, while approaches which harness the power of existing social groups are more likely to be successful.

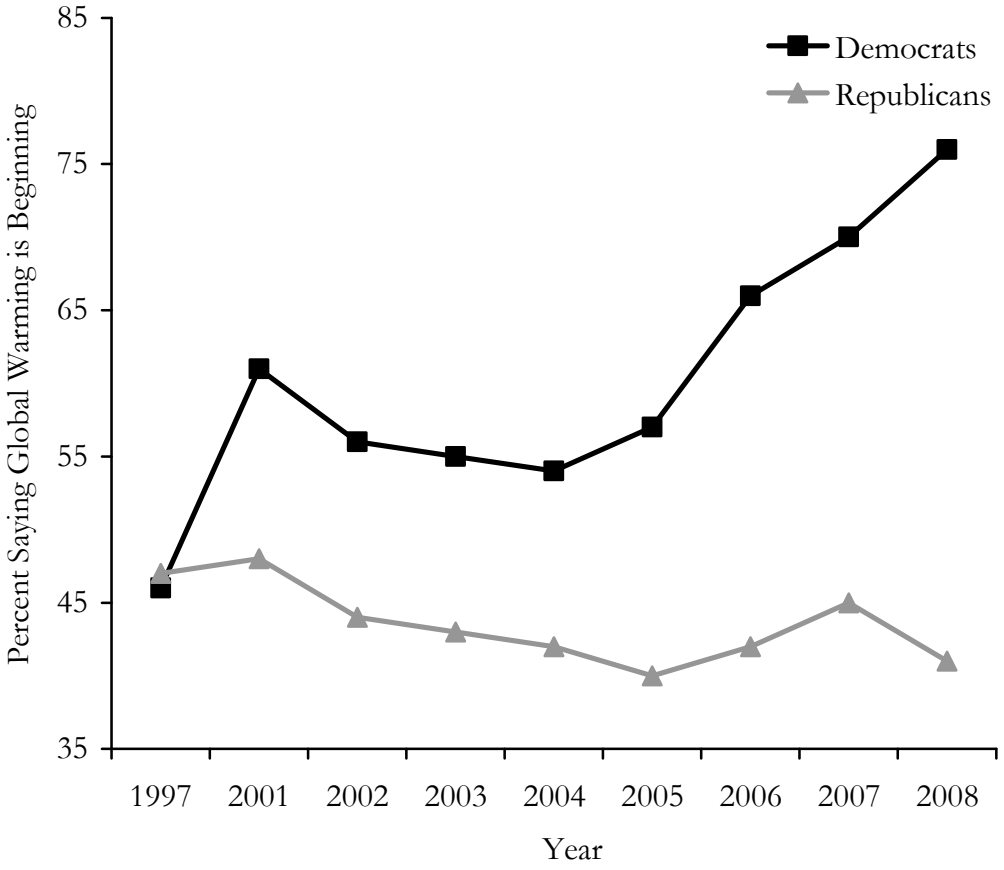

Figure 2.1. Percentage of Americans agreeing that "the effects of global warming have already begun" by political party and year from Gallup (2008). Data for 1998 to 2000 are not available.

Environmental Issues are Often Ambiguous, Making Them Susceptible to Group Norms

As the state of the natural environment has risen to public consciousness, so have an increasingly large number of environmentally relevant issues and behaviours. The public is now confronted with complex questions of climatology and ecology as well as what type of lightbulbs to buy and whether one should bring their own bags on shopping trips. To many, these questions are novel and the answers are ambiguous, an aspect of environmental issues that was discussed in Chapter 1. The interpretation of these ambiguous questions occurs in part through social reality testing. To help interpret this new information, people rely on the shared opinions of similar others,

derived through observation and social interaction. In other words, people rely on group norms.

Group norms facilitate behaviour by providing information about how to act. As people learn through observing and interacting with similar others, they learn the technical prerequisites of enacting behaviours, such as knowing how to install a low-flow shower head. People also learn which behaviours are expected within the group. This is referent informational influence, which communicates which actions are socially expected of group members and how to achieve them (Turner, 1991). Empirical testing suggests that when individual are uncertain, they rely on group norms to guide their behaviours even more than usual (J. Smith, Hogg, Martin, & Terry, 2007). Because the science of environmental issues is often beyond the lay public's experience, group norms may be especially informative in interpreting their validity. Likewise, as environmentally relevant behaviours are often unfamiliar, people rely on their peers to find out what they should be doing and how to do it. As many environmental issues are already embedded into social identities, the notion of which environmental beliefs and behaviours are appropriate can become stratified by social definitions.

Environmental Degradation is a Shared Problem Best Addressed Collectively

Environmental problems, by their global nature, suggest a group-level response. Individuals may choose to live more sustainably, but even a few people can have a large environmental impact through activities such as over-fishing, illegal logging, or toxic contamination. As discussed in Chapter 1, many environmental issues are challenging to resolve because they are social dilemmas, where individual gains can lead to collective losses (Hardin, 1968). Because of this, environmentally harmful behaviours may be beneficial to individuals while the costs are externalised to others. When too many people engage in these harmful behaviours, the collective losses accumulate to

outweigh the individual benefits. Only through cooperation do participants reach a mutually beneficial outcome.

In laboratory experiments, a strong sense of social identification can help to boost cooperation in social dilemmas (Brewer & Kramer, 1986; Edney, 1980; Kramer, 1991; Kramer & Brewer, 1984; Van Vugt & De Cremer, 1999). Social identity theorists suggest this occurs as self-concept expands from a concern for individual welfare to group welfare (Brewer, 1979; Tajfel & Turner, 1986). Empirical testing confirms that the increase in cooperation associated with strong social identification does occur through a process of goal-transformation as predicted, where a desire for individual well-being is expanded to a desire for collective well-being (De Cremer & Van Vugt, 1999).

Casting environmental problems within a framework of shared identity may be an effective strategy at encouraging pro-environmental behaviours, particularly in situations where environmentally harmful behaviour is personally rewarding. In support of this, people with a strong regional identity have already been found to engage in more pro-environmental behaviour to protect not only their local region (Carrus, Bonaiuto, & Bonnes, 2005; Stedman, 2002) but also the world as a whole (Pol, Moreno, Guàrdia, & Iniguez, 2002; Uzzell, Pol, & Badenas, 2002; Valera & Guàrdia, 2002; Vaske & Kobrin, 2001). Exploiting a shared sense of identity may be requisite to engaging with these types of shared problems.

To explore the social aspects of environmental behaviour further, two theories of social group processes are reviewed below. Social identity theory provides a theoretical analysis for how social groups interact with each other, while self-categorization theory provides an account of how individuals come to see themselves as group members. These broad theories offer a framework for group processes that allow

us to better understand how people come to identify with social groups, how groups perceive each other, and how groups guide individuals' values and behaviours.

Social Identity Theory

Social identity theory (SIT) was formulated out of a desire to better understand how group identities drive individual thoughts and behaviours. Prior theories of group psychology were not scientifically grounded (e.g., LeBon, 1895) and had become unpopular among many social psychologists. Prevailing theories of the time emphasised individual differences and did not view groups as different from individuals (Steiner, 1974). Influential psychologists like Floyd Allport (1924, 1962) flatly rejected the notion that social groups were psychologically different than the sum of their members, describing this approach as the "group fallacy." However, the extremes of prejudice and discrimination of the mid-twentieth century were not easily explainable by individual-level theories and psychologists were prompted to investigate group-level processes in greater depth.

Social identity theory research began with the "minimal groups" experimental paradigm, in which participants are arbitrarily assigned to groups that have little overt meaning. In these studies, participants were often observed to favour the ingroup, ensuring that the ingroup was better rewarded than the outgroup, even if that meant a loss in terms of the absolute reward the ingroup received (Tajfel, Flament, Billig, & Bundy, 1971). Participants prioritised doing better than the other group over maximising the ingroup's success, even when it meant the participants were losing real money. This same finding has been observed with employees who prefer to take a lower salary if it means making more than a competing group of employees (Brown, 1978).

In trying to understand participants' motivations in the minimal group studies, Tajfel (1974) theorised that when people are categorized as group members, they

internalise that membership as a part of their self-concept and form a shared group identity. People want their group to have positive distinctiveness, which acts as a source of self-esteem. In essence, the group's success becomes their own success. The desire to think positively about ingroups is supported by findings that participants rate members of their own minimal group as kinder and fairer than the outgroup, even when the group membership assignments are random and they do not know who they are rating (Brewer & Silver, 1978; Doise et al., 1972). Similarly, workers tend to rate their department's role as more valuable than the role of other departments (Ashforth & Mael, 1989; Brown, Condor, Mathews, Wade, & Williams, 1986).

Tajfel and Turner (1974) found that groups often engage in social competition, seeking to outdo each other on varying dimensions of success. Inevitably, groups do not always fare well in these competitions, and sometimes one's group will be a "loser." To balance psychological motives for positive identity with negative feedback about one's group, people often engage in a number of identity maintenance strategies. For example, when faced with lower group status, individual group members might engage in social creativity (Tajfel, 1974), a redefinition of success, by either comparing themselves on a more flattering metric or comparing themselves against an even lower-performing outgroup. Upon losing a sports game, a team captain may tell team members, "We may not have won, but we were better sportsmen and that is what *really* counts," shifting the metric of success. Another team member might say, "And, hey, we're nowhere near as bad as that other team we played last week," changing the comparison group to be more positive. If group boundaries are permeable, members may also pursue a strategy of individual mobility (Doosje & Ellemers, 1997; Spears, Doosje, & Ellemers, 1997); in the sports analogy, that would be trying out for a spot on the winning team.

Social identity theorists propose that social identity is much more than just a facilitator of ingroup bias or the rationalisation of group failures, but rather it is the mechanism through with organized group behaviour is made possible (Haslam, 2004; Haslam, Postmes, & Ellemers, 2003; Turner, 1991). Mutual social influence through shared identity allows group members to construct similar social realities and work toward common goals. Self-categorization theory, an extension of social identity theory, elaborates on how this process of social influence occurs.

Self-Categorization Theory

While social identity theory offers a comprehensive account of how social groups interact, it does not explain how individuals come to identify with particular social groups. Self-categorization theory (SCT) was developed to fill this theoretical gap (Turner, 1991; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). According to SCT, our self-concept occupies a movable point on a continuum from personal identity to social identity. When personal identity is salient, people act more in line with their individual self-concept. As self-concept moves closer to social identity and away from personal identity, people self-stereotype themselves more as an interchangeable group member and will begin to think and act more as a prototypical group member, a process called depersonalisation. As depersonalisation occurs, group members see both ingroup and outgroup members as more homogenous. Group norms are especially influential in intergroup contexts where depersonalisation is high (Hogg & Turner, 1987; Simon, Glässner-Bayerl, & Stratenwerth, 1991).

Many possible social identities are available to each person, but typically only one is salient at any given time. The salient identity is determined in part through the principle of meta-contrast, which proposes that categories form by cohering entities with the smallest differences relative to the largest differences, achieving comparative fit (Hogg, Turner, & Davidson, 1990; Oakes, Haslam, & Turner, 1994; Turner, 1991). For

example, when a Scottish person meets an English person, the Scottish identity may be most salient for the Scottish person, but if the two of them meet a Greek person, the two may both share a salient British identity (Hopkins, Regan, & Abell, 1997). If the three of them meet a Chinese person, the three may share a salient European identity, but if the four of them happened to meet a Vulcan, the human identity may be most salient. Thus, the type of identity that is salient and its level of abstraction depend upon the comparator, with outgroup comparisons designed to achieve maximal differentiation between groups (Jetten, Spears, & Manstead, 1997). While social identities have some enduring cognitive structure, their interpretation and salience shifts depending on context, and can include several complex, overlapping identities (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990; Roccas & Brewer, 2002).

Normative fit also plays a role in identity salience. When the content of group comparisons is compatible with existing identity stereotypes, the relevant identities are more likely to become salient. For example, if during a work break, an English worker has some tea and biscuits while their French co-worker has cheese and a baguette, their national identities are more likely to be salient than if they had both just had sandwiches. When the comparison content is counter-stereotypical, such as a deadpan drama teacher or a comedic physicist, these identities are less likely to be salient. Likewise, if the point of comparison is perceived to be irrelevant to a particular identity, such as comparing shoe sizes by employer, the salience of that social identity is likely to be low.

Irrespective of contextual variations in salience, some people will define themselves more in terms of a given identity. Strength of identification therefore plays a large role in how social identities will be interpreted. People who identify strongly with a group are more likely to think and act in terms of group norms (Jetten, Postmes, & McAuliffe, 2002; McAuliffe, Jetten, Hornsey & Hogg, 2003). Strength of identification

also moderates how people respond when their group is under threat, such as a threat of being outperformed (Tajfel & Turner, 1979), a threat to the group's moral integrity (Branscombe, Ellemers, Spears, & Doosje, 1999), or a threat to group distinctiveness (Tajfel & Turner, 1979). When group threat is absent, low-identifiers tend to be non-involved with that particular identity, while high-identifiers express their group identity (Spears, Doosje, & Ellemers, 1999; Doosje, Ellemers, & Spears, 1999). When a group threat confronts low-identifiers, they are likely to distance themselves from the group, emphasise the group's heterogeneity, and pursue individual mobility from the group (Doosje & Ellemers, 1997; Jetten et al., 2002; Spears, Doosje, & Ellemers, 1997; but see also Packer, 2008; Morton, Postmes, & Jetten, 2006). Conversely, high-identifiers typically respond to group threats by rallying and "digging in" to their group identity, affirming the group's cohesiveness and norms (Branscombe, Schmitt, & Harvey, 1999).

Since its development, the social identity approach has been explored in thousands of studies (e.g., Haslam, 2004). Because it explores group-level processes, it offers a theoretical perspective that is unique from dominant individual-level paradigms. The social identity approach has been used to study stereotyping, discrimination, politics, negotiation, organisational psychology, and other domains, providing practical applications to real-world dilemmas. However, to date, relatively little research has explored environmental behaviours from this perspective. Nonetheless, a number of areas of research have considered the role of group processes in environmental behaviour, specifically group norms and intergroup comparisons.

Prior Research into Social Groups and Environmental Behaviour

In Chapter 1's review of traditional approaches to conceptualising environmental behaviour, normative models of influence were discussed. In these models, norms are conceptualised as monolithic, external influences from society that

pressure individuals into conformity. A number of theorists consider this theorisation to be an inadequate conceptualisation of how norms influence behaviour. According to the social identity perspective, social influence primarily occurs internally as people identify with particular social groups, instead of through a notion of generalised societal pressure from outside sources (Turner, 1991). From this perspective, broad societal subjective norms are relatively unimportant, while group norms are important. One can easily think of several subcultures which are characterised by a simultaneous rejection of societal norms *and* conformity to group norms; for example, the punk rock counterculture of the 1970s shared a rejection of societal standards of appropriate appearance, language, and music, while also showing conformity to punk rock group norms among self-identified members. Outgroup norms are mostly ineffectual in influencing ingroup members (Jetten, Spears, & Manstead, 1996). Given that most early studies of norms took no account of these critical social nuances, the low predictive power of subjective norms is unsurprising.

Applying the social identity perspective to norms, and conceptualising them at the group level rather than societal level, has revealed them to have much more predictive power than once thought. Individual attitudes, which have long been considered as weak predictors of behaviour, become much better predictors when they are reinforced by a supportive group-level norm (Smith & Louis, 2009; Terry & Hogg, 1996; Terry, Hogg, & McKimmie, 2000). In respect to environmental behaviours, this effect has been demonstrated with recycling (Terry, Hogg, & White, 1999), sustainable farming methods (Fielding, Terry, Masser, & Hogg, 2008), and pro-environmental activism (Fielding, McDonald, & Louis, 2008). Group norms are particularly influential when subjective uncertainty is high (Smith et al., 2007) and when both group descriptive norms (what group members *are* doing) and injunctive norms (what group members *say* they should be doing) are consistent, while outgroup norms are ineffective

(Smith & Louis, 2008). Researchers have also realised that relying purely on self-report measures of normative influence is unreliable, as people routinely underestimate the extent that they are influenced by norms (Cialdini, 2005; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). These theoretical refinements have lifted normative influence from being considered a weak predictor to a powerful moderator of how individual- and group-level factors interact to predict behaviour. While norms at the broadest level have not been very predictive of behaviour, the interaction between specific norms *and* individual-level factors like attitudes has greatly improved the predictive power of normative models of behaviour.

While several studies have examined the effects of broad normative influence and individual comparisons on environmental behaviours (see Chapter 1), few have looked at comparisons of social groups. Comparisons are important because this is a mechanism through which group identity and norms are construed. Based on the social identity approach, the cognitive processes that occur for group comparisons may be different from individual comparisons. To investigate the effects of group comparisons, Siero, Bakker, Dekker, and van den Burg (1996) designed a 20-week longitudinal study to look at the effect of group feedback on energy-saving behaviour in two Dutch metallurgical factories. Both factories received feedback about their own performance, but one factory also received comparative feedback about the other factory. They theorised that receiving this comparative feedback would activate the group's social identity and encourage social competition. Although Siero and colleagues did not investigate any underlying processes that might drive behaviour, their results supported their predictions, and the group receiving comparative feedback saved significantly more energy. These savings continued for more than six months after the end of the study and the feedback, suggesting that the changes in behaviour had become internalised. Interestingly, the participants' pro-environmental attitudes were

unchanged, supporting the notion that group rather than individual processes led to the change in behaviour.

Siero and colleagues (1996) conclude that social competitions may be a promising way to encourage pro-environmental behaviour. Their results are supported by social identity theory; however, social identity theory also suggests an alternative outcome. Had the group been performing poorly, they may have engaged in social creativity instead of social competition, downplaying the importance of pro-environmental behaviours. In this case, competition can backfire, leading some to disengage from the desired behaviour. Unfortunately, Siero and colleagues' methodological constraints leave this possibility unexplored.

To examine social comparisons more thoroughly, Rabinovich, Morton, Postmes, and Verplanken (2008) designed an orthogonally balanced test of group comparisons. British participants compared themselves to either American or Swedish people, but were not given any environmental information about national groups. The authors reasoned that British self-stereotypes would be informed by differentiation from the outgroup, which would lead to a shift in environmental values and behavioural intentions. After comparing themselves to Americans, participants rated themselves as valuing the environment more and intending to engage in more pro-environmental behaviour. The reverse occurred when compared to the Swedish. Mediation analysis confirmed that the change in behavioural intentions was mediated by self-stereotyping and environmental value centrality. This negative effect on intentions is an important complement to Siero and colleagues' (1996) study, as it demonstrates that competition can lead to less of the desired behaviour rather than more. Participants appeared to be inferring the norms of their group by contrasting away from the outgroup and then engaging with those norms. This is a different process from individual-level comparisons; when Schultz and colleagues (2007)

provided people with descriptive comparisons about their energy usage, positive comparisons led to a *decrease* in behaviour, rather than the increase found with group comparisons. These diverging results underline the importance of differentiating between individual- and group-level processes.

Although prior research on social group comparisons and environmental behaviour has been limited, existing research demonstrates that social group-based comparisons offer the potential for real behavioural change. These studies, while promising in their results, leave open many new avenues of future research. In the following chapter, I expand on these ideas by providing a rationale and proposal for a series of research studies to further investigate the role of social influence in guiding environmentally-relevant behaviours.

Conclusion

This chapter began with a discussion of why environmental behaviour lends itself to a group-level understanding for several reasons: environmental impact is defined through social comparisons, environmental values are already integrated into existing social identities, environmental issues' complex and ambiguous nature mean that group norms may be especially influential, and because a collective, group-level effort may be necessary to overcome this type of collective problem. Following this, I reviewed social identity theory, which explains how social groups perceive and interact with each other, and self-categorization theory, which explains how particular social identities become salient to individuals, depending on context. I then reviewed experimental research that tested social identity principles in fostering pro-environmental behaviours through group norms and group comparisons. These studies were able to influence environmental behaviours or behavioural intentions as predicted. However, despite their success in achieving behavioural change, these studies leave many empirical questions open with ground for further research. The following chapter

presents a rationale for the present research, expanding on how social comparisons influence environmental behaviour, and outlines the structure of the empirical studies that will follow.

– CHAPTER 3 –

Rationale and Structure of the Thesis

Substantial research has been conducted to understand and predict environmental behaviour. The most common theoretical frameworks of understanding environmental behaviour include investigating individual knowledge, personal economic benefit, personal attitudes, habits, and personal/societal norms (see Chapter 1). While all of these approaches have contributed to the understanding of environmental behaviour, most studies have relatively low predictive power of pro-environmental behaviour, and even less power for influencing it. In most conceptualisations of these theories, psychological variables are understood primarily at the individual level (e.g., the attitudes of individual people). While social influences are often acknowledged as playing some role in environmental behaviour, with a few exceptions, they are rarely studied empirically or with robust theorising about nuanced social processes.

Advances in social identity theory and self-categorization theory have shown that social influences can be powerful determinants of behaviour (see Chapter 2). According to the social identity approach, when a self-defining group membership is salient, group members tend to think and act less as autonomous individuals and more in ways that are influenced by group norms and stereotypes. Thus, a salient sense of shared identity leads to coordinated, collective behaviour. When group membership is meaningful in an enduring, rather than simply situational, sense, group traits can also become internalised as individual traits. Applied to subjects like organisational psychology, prejudice, and politics, the social identity approach has provided a unique and valuable perspective.

Rationale for the Present Research

While prior understandings of environmental behaviour have been informative, they leave much to be explained, both theoretically and behaviourally. I believe applying a social identity perspective will help fill this research gap. For several reasons, environmental behaviour is a social behaviour. Because there is no baseline standard of behaviour, people look to similar others to determine what behaviours are "normal." Environmental attitudes and behaviours are already incorporated into many social identities, such as political parties in the United States. Because many environmental issues are novel and ambiguous, people may rely on group norms more than usual. Because environmental problems are often shared problems, a communal approach may be necessary to solving these problems effectively. While a few studies have applied social identity principles to understanding environmental behaviour and achieved promising results (Fielding, McDonald, & Louis, 2008; Fielding, Terry, Masser, & Hogg, 2008; Rabinovich, Morton, Postmes, & Verplanken, 2008; Terry, Hogg, & White, 1999), many aspects of environmental behaviour are still unexplored.

This gap in the research literature is fertile ground for an in-depth investigation of both the social determinants of environmental behaviour and social identity principles. The aim of this research is to understand how the interplay of both social group membership and individual attributes together affect environmental behaviour. Throughout this thesis, I will test several hypotheses to investigate this interplay, specifically focusing on how group comparisons work through social identity processes to guide individuals' behaviour. My overarching predictions are that 1) social group comparisons can be used to deduce the content of the group identity, implying particular environmental norms; 2) group members with high levels of social identification are more likely to assimilate toward the implied group norm than low-identifiers; 3) discussion within a group also works to guide behaviour, by inducting

group norms based on the content of the discussion; and 4) comparisons within a group over time also work to guide individuals' environmental behaviour, but through a different process than comparisons between groups. The empirical chapters of this thesis are outlined below. This thesis is designed so that the chapters can be read as stand-alone manuscripts and as an integrated whole. Consequently, there is some repetition in the content of the chapters, particularly in introducing the background research literature.

Chapter 4: Strength of Social Identification and Comparative Feedback

One of the primary assertions in this thesis is that comparative group feedback can alter individual intentions and behaviours. I believe this will occur because deductive comparisons give meaning to the content of a social identity, implying certain group norms (Doosje, Haslam, Oakes, & Koomen, 1998). A positive intergroup comparison implies that pro-environmental behaviour is defining of identity, while a negative intergroup comparison implies the opposite. According to the social identity approach, when a particular identity is salient, group members typically seek to act more like a prototypical group member, and are more likely to follow the norms of that group (Turner, 1991). Thus, in Chapter 4 I examine the effect of comparative group feedback on environmental behaviour over time. I predict that intergroup comparisons will lead members to assimilate their environmental behaviour toward the implied norm.

However, according to social identity theory, assimilation to the implied standards of a group should only occur to the extent that the individual identifies with the relevant group. If social identity processes guide individual responses to group-level comparative feedback, the effects of comparison should be moderated by individual differences in identification. Specifically, positive comparative feedback, which suggests that pro-environmental behaviour is defining of the group, should lead highly identified

group members to follow this implied norm by individually reporting more positive behavioural intentions. Conversely, negative feedback about one's group suggests that environmental concerns are less identity-defining and should result in highly identified group members following that implied norm by reducing environmental intentions. Less identified group members should be less likely to follow the group norms implied by comparative feedback, because such feedback does not connect to their sense of self. Through testing these predictions I aim to provide evidence that group-level comparisons guide individual environmental behaviour, and that these effects are guided by social identity processes (i.e., moderated by identification).

Chapter 5: Inductive Norm Formation Through Small-Group Interaction

While the deductive, or top-down, comparisons that are explored in Chapter 4 have been the backbone of much prior social identity research, newer theoretical models suggest inductive, or bottom-up, small-group interaction plays just as important a role in group norm formation (Postmes, Haslam, & Swaab, 2005). Discussing and reaching consensus about a topic is a way for people to interpret otherwise ambiguous realities, and serves to solidify group norms regarding the subject of discussion. In a number of studies, the content of small-group discussion has been found to play a powerful role in guiding behaviours such as discrimination (L. Smith & Postmes, 2009, L. Smith & Postmes, 2010a), overcoming stereotype threat (L. Smith & Postmes, 2010b), and pro-human rights activism (McGarty, Khalaf, Blink, Gee, & Stone, 2007; Thomas & McGarty, 2009). However, despite compelling results in other domains, the power of discussion to guide behaviour remains mostly untested in regard to pro-environmental behaviours.

In Chapter 5, I attempt to fill this gap in the research literature by examining how small-group discussion informs pro-environmental behaviour. I predict that interactive processes that occur within small groups can (a) override the deductive

effects of intergroup comparisons explored in Chapter 4, and (b) provide a stronger basis for individual action. To explore this, the design used in Chapter 4 is replicated, but participants interacted with each other following the comparative feedback. The expectation was that the content of these discussions would guide subsequent behaviour more strongly, and more enduringly, than the comparative feedback information. Through testing these predictions, previous insights into the effects of intergroup comparisons may be supplemented with an appreciation of the power of intragroup processes in shaping behaviour.

Chapter 6: Intergroup and Intragroup Comparisons

The social comparisons studied in Chapters 4 and 5 have all been targeted at other groups. However, intergroup comparisons are not the only form of comparative information that is relevant to defining social identity. Instead, social identity may be defined through comparisons within the group (e.g., with its past) as well as comparisons with other groups. Theory suggests that these two forms of comparison (intragroup versus intergroup) are likely to be very different psychologically. While comparisons between groups serve to distinguish and contrast the ingroup from others, comparisons within a group are informative about the group's own standards of performance. Chapter 6 investigates the unique consequences of these different comparisons. While intergroup comparisons are likely to lead to contrast away from the comparison standard (as tested in Chapter 4), intragroup comparisons might instead lead to assimilation toward the comparison standard. Furthermore, in addition to having different consequences, these different comparison types are likely to operate through different psychological processes. Comparisons between groups focus on the difference between the ingroup and outgroup, and contextually defines the ingroup's values in contrast to the outgroup's, resulting in influence via self-stereotyping (Rabinovich et al., 2008). However, comparisons to the ingroup's past behaviour are

likely to focus more on the ingroup itself, and any discrepancies between actual performance and the group's standards of performance, leading to influence via appraisals of shared responsibility for addressing behavioural discrepancies with past standards. In testing these predictions, I aim to explicitly compare the nature and effects of inter- versus intra-group processes in guiding individual environmental action.

Chapter 7: General Discussion

Throughout this research, I find support for each of the over-arching predictions in this thesis. In Chapter 7, I integrate and discuss the findings from across the three empirical chapters. The consistent theme from these results is that people respond to group-level feedback when forming their environmental intentions, but this occurs in a nuanced way that is moderated by the context of the feedback and the strength of identification with the social group. Some of these effects were relatively powerful, continuing to influence behaviour several days after the experimental manipulation. From these results, I suggest practical interventions to promote pro-environmental behaviour, using both group comparisons and within-group interaction. While social processes have the power to increase environmental behaviour, they can also decrease it, requiring careful attention for these techniques to be implemented successfully. Given that most approaches within conservation psychology have focused on individuals' attributes and have had only modest success in predicting environmental behaviour, I suggest that widening the theoretical scope to account for the interplay between individual and social factors will allow for a richer and more productive understanding of pro-environmental behaviour.

– CHAPTER 4 –

The Interaction of Environmental Group Feedback and Social Identification Strength

Prioritisation of care for the natural environment has become increasingly bound up with issues of identity. Newspaper headlines inform us of how much our nation pollutes compared to others and what kind of lifestyles use the most or least energy. Because producing feedback about the pro-environmental behaviours of individuals is often impractical, environmental feedback often targets the places we live and the social groups in which we are members. As this trend of associating environmental issues with social groups increases, people increasingly respond to environmental dilemmas through the lens of group membership.

Perhaps the most visible example of identity's influence upon environmental behaviour is political identity in the United States, particularly regarding climate change. In 2008, only 41% of self-identified Republicans believed climate change was starting to occur, compared to 76% of Democrats (Gallup, 2008). When considering whether the risks of climate change are exaggerated, Republicans say yes three times as frequently as Democrats, 66% and 22% (Gallup, 2009). Likewise, regarding the environment more generally, a 2009 poll found that citizens who identify as Democrats are nearly three times more likely than Republicans to say addressing environmental should be a top priority for the nation (Pew, 2009). Thus political identities clearly inform individual beliefs about environmental issues.

However, the political identity gap in environmental beliefs is only a recent development. The United States' National Park and National Forest systems were created by Republican president Theodore Roosevelt in 1916, a man known for his cowboy image, while Republican president Richard Nixon founded the Environmental Protection Agency in 1970. As recently as 1997, polls found no difference in belief in

climate change by political party, with 47% of self-identified Republicans and 46% of Democrats claiming climate change was beginning to occur (Gallup, 2008). Thus recent polarisation around environmental issues is not a simple aspect of the left-right political spectrum, and a corresponding political schism of this extreme is not apparent in other parts of the world, such as the UK (Carter, 2006).

Even when two social groups value the environment, their mutual antagonism can leave pro-environmental behaviour as the victim. In the case of rural ranchers and urban environmentalists in the western United States, both groups tend to see themselves as defenders of nature and the other as hypocritical and untrustworthy. Because of conflict between these two groups who both claim to care for the environment, particular pro-environmental behaviours have become stigmatised within one group because the other group endorses them, and the survival of a threatened species is at further risk as a result (Brook, Zint, & De Young, 2003; Opotow & Brook, 2003). Even when one group has a sound environmental message to deliver, it may be dismissed by people who consider the message source to be an outgroup (Louis & Smith, 2007 as cited in Smith & Louis, 2009). As such, identity can have very real consequences for the natural environment.

Identity and Pro-Environmental Behaviour

Identity has been a feature of research into pro-environmental behaviour, and has spurred a wide range of research, particularly regarding identity with the environment itself and identity with a particular place or region (see Clayton & Opotow, 2003 for a full review). Identity very often involves an extension of the individuals' concept of self beyond their physical person. Whether identity takes the form of extending the self to include a place, role, or social group, all of these have the power to promote pro-environmental behaviour because environmental issues often pit individual short-term interests against long-term or collective interests (Hardin, 1968).

Expansion of the personal self through various identities may be a particularly powerful motivator in influencing pro-environmental behaviour (Dickinson, 2009) because this should reduce the gap between individual and collective concerns. As the sense of self becomes broader and collective groups become more influential to the self, externalising environmental costs to others is no longer a viable strategy.

In support of this idea, a strong regional identity or place attachment is often related to pro-environmental behaviours aimed at protecting both their place of attachment (Carrus, Bonaiuto, & Bonnes, 2005; Stedman, 2002) and the world more generally (Pol, Moreno, Guàrdia, & Iniguez, 2002; Uzzell, Pol, & Badenas, 2002; Valera & Guàrdia, 2002; Vaske & Kobrin, 2001). However, having a strong sense of regional identity can also lead people to perceive existing environmental problems in their locality as being less severe, compared to those less strongly identified (Bonaiuto, Breakwell, & Cano, 1996). Strong identification with a place can lead people to be more concerned and vigilant to threats against it, but also blind to seeing its own blemishes.

Less studied in regards to pro-environmental behaviour is social identity. According to the social identity approach, (Tajfel & Turner, 1979; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), people belong to many different social groups, such as those defined by their place of work, school, or nationality. Social groups provide their members with information about the normative behaviour for group members. As people see themselves more in terms of group membership, they tend to act more in line with these group norms, stereotyping themselves as a group member and acting more as a prototypical group member would act. Prior research has found that social identity can play a facilitative role in encouraging pro-environmental behaviour. When social group norms complement individuals' environmental attitudes, those attitudes become much better predictors of pro-environmental behaviour (Mannetti, Piero, & Livi, 2004; Terry, Hogg, & White, 1999) and pro-environmental

behaviours become more common in general (Hogg & Smith, 2007; Smith, Terry, Crosier, & Duck, 2005). From this perspective, social identity is the mechanism through which other people, specifically ingroup members, can become a powerful influence on individual behaviours, via the internalisation of group norms. However, this form of social influence only occurs when group membership is psychologically real and the social identity is strong. In this sense, *literal* group membership is irrelevant in determining behaviour, ceding the power of social influence to *perceptions* of identity. This potential discrepancy between literal group membership and the strength of social identity can determine whether norms will encourage behaviour, be ineffectual, or backfire altogether.

Social Identification Strength and Pro-Environmental Behaviour

In some cases, such as opinion-based groups, membership is highly permeable and determined only by members' shared beliefs, such as groups based on shared values like the civil rights movement (Bliuc, McGarty, Reynolds, & Muntele, 2007). In other cases, when group boundaries are less permeable, members have barriers to leaving a group they do not identify with. For example, a worker may dislike their employer, but remain in the group because they need an income. In these cases, group members with low group identity may choose to leave the group symbolically, but not literally, by engaging in counter-normative behaviours to distance themselves from the undesirable group.

High-identifiers typically seek to assimilate toward group norms through a process of self-stereotyping as a prototypical group member (Turner, 1991). Low-identifiers, on the other hand, are less likely to self-stereotype themselves as group members. As a result, low-identifiers may show non-involvement toward group norms, or may even make a point of contrasting away from those norms (Ellemers, Spears, & Doosje, 1997; Ellemers, Spears, & Doosje, 2002; Lapinski, Rimal, DeVries, & Lee,

2007). Although the divergence in how high- and low- identifiers respond to group norms has long been established by self-categorization theory, recent research into identity processes and environmental behaviours has confirmed empirically that ingroup stereotyping is a mediator through which group norms predict behaviour (Rabinovich, Morton, Postmes, & Verplanken, 2008).

As social identity salience increases, the strength of these effects may also increase. One way in which social identity salience is increased is through intergroup comparisons. In a series of studies where participants described their own national stereotypes either before or after describing another nation's stereotypes, the simple act of intergroup comparison sharpened stereotyping consensus considerably, therefore converging on the content of ingroup norms (Haslam et al., 1998; Haslam, Oakes, Reynolds, & Turner, 1999; see also Sani & Thomson, 2001). Thus, intergroup comparisons can act to increase social identity salience, accentuating ingroup norms, and the extent to which high-identifiers will self-stereotype these norms.

Threats to the group, such as criticism or negative feedback, may have a similar effect in moderating how low- and high-identifiers act regarding group norms. Threats to the group often involve an intergroup comparison with an outgroup who appears to be superior on some measure of performance or morality, or whose identity is too similar to the ingroup's, which threatens the status or distinctiveness of the ingroup identity. When a group is under threat, high-identifiers tend to "dig in," express group solidarity, and enforce group norms. Low-identifiers tend to pursue a strategy of disengagement and dissociation from the group, emphasizing the group's heterogeneity and therefore decreasing the applicability of the criticism to themselves (Doosje & Ellemers, 1997; Jetten, Postmes, & McAuliffe, 2002; Spears, Doosje, & Ellemers, 1997; but see also Packer, 2008; Morton, Postmes, & Jetten, 2006).

The Present Research

The present studies investigate both the role of identity and intergroup comparisons on pro-environmental behaviours. This is assessed by measuring student participants' social identity with their university, providing participants with environmental feedback about how students at their university are doing as a whole, and measuring pro-environmental behaviours.

I predict that those with a strong social identity with their university would assimilate toward the group norm implied by the feedback. If the university is portrayed as having a poor environmental track record, high-identifiers' environmental behaviours will be low. Conversely if the university is portrayed as doing well, high-identifiers are predicted to engage in more pro-environmental behaviours, while the opposite will occur for low-identifiers, who are predicted to contrast away from the norm suggested by the feedback. If the university is portrayed as doing well environmentally, they will engage in less pro-environmental behaviour, but if the university is portrayed as doing poorly, they will engage in more pro-environmental behaviour. A secondary prediction is that presenting the feedback in the form of an explicit intergroup comparison will strengthen all of these effects by making the ingroup categorization more salient through the reference to a specific outgroup.

The duration of these effects is unknown, so this research incorporates a longitudinal measurement of pro-environmental behaviour both at the time of manipulation, and one week later. I predict that the effects will weaken over time, but any changes will be more strongly maintained for high-identifiers one week later, as high-identifiers' attachment to their group is deeper and longer-lasting than for low-identifiers. One week after their initial reaction, low-identifiers' change in behaviour is predicted to weaken because, by definition of being a low-identifier, the group's normative behaviours are not as important and less likely to be internalised, even

though they are reacting away from these implied group norms instead of converging toward them.

STUDY 1

Method

Participants

Participants (N = 107) were university students of ages 18 to 25 years, with a median age of 19 years. Participants were recruited by email from a list of university students who had previously volunteered to take part in psychological studies. Participation was rewarded with a chance to win one of four £20 online shopping vouchers.

Design

This study used a 2 × 2 between-subjects design, with independent variables of comparison type (specific intergroup or general intergroup) and valence (positive or negative), presented in an online questionnaire. Social identification as a university student was measured before the manipulation, and dependent variables of pro-environmental behaviour were measured at the time of manipulation (Time 1) and one week later (Time 2).

Manipulations

Participants were provided with information about the University of Exeter's environmental performance relative to other universities, either in general, or specifically compared to the University of Plymouth. Participants were told Exeter was either doing well, or poorly. The manipulation was worded as follows, with words in bold indicating text that varied depending on condition, with the words in square brackets appearing in the specific intergroup comparison condition:

"To figure out what kinds of people are helping the environment, DEFRA (The Department for Environment, Food, and Rural Affairs) has

been studying groups of people throughout the UK.

In a recent study released in early 2007, they found that although most people care about the environment, students at the University of Exeter have been doing a particularly **good/poor** job. Over the past two years, students at Exeter have been **saving/wasting** 15% more electricity than the national average for university students. Additionally, students at Exeter have been recycling 22% **more/less** than the national average. [In addition to doing **better/worse** than average, Exeter students significantly **outperformed/underperformed in comparison to** their local rival, the University of Plymouth.] Students at Exeter say they value the environment, **and/but** their actions **/do not** live up to their words."

Measures

Just before the manipulation, participants completed a measure of social identity with the University of Exeter. Following the manipulation, participants completed a measure of how willing they were to volunteer with an environmental organisation of their choice and then generated a list of five pro-environmental behaviours they could do within the next week (Time 1). Participants were thanked, and led to believe that the survey had ended, but participants were contacted one week later (Time 2) to ask how much they had conserved energy, and how much they had engaged in the five pro-environmental behaviours they had listed one week prior.

Social identification. Identification with the University of Exeter was measured with 9 items like, "I identify with other students at the University of Exeter," with four items reverse-scored, such as, "I have little respect for the University of Exeter," using a 7-point Likert-style scale anchored with "strongly disagree" and "strongly agree." The

measure was adapted from a scale developed by Ellemers, Kortekaas, and Ouwerkerk (1999), and was reliable ($\alpha = .86$) and averaged into a single measure.

Ingroup environmental norms. Following the manipulation, participants were asked to respond to the following items on a Likert-type scale, "Exeter students value the environment"; "Exeter students are taking action to protect the environment"; "Exeter students are doing enough to protect the environment"; and "Exeter students are behaving in accordance with their values". These items were highly reliable ($\alpha = .78$) and were averaged into a single measure.

Pro-environmental volunteering. Participants were told that they would receive contact information for a wide range of pro-environmental charities and organisations that they could choose to volunteer with, such as regional wildlife trusts, local university student groups, and national groups like Friends of the Earth. The organisations were balanced to provide a range of organisation types and political orientations, so as to minimise the influence of any one particular organisation on participants' volunteering intentions. Participants were asked "Would you be willing to spend time helping these organizations?," measured on a 7-point scale, anchored with "not at all" and "very much so". Participants were then asked "During a typical week, how much time (in hours) would you be willing to volunteer to these kinds of organisations?," and responded freely. Because the measurement range of these two items were different, they were standardised into z-scores. These standardised scores were highly correlated ($r = .71$, $p < .001$), and averaged into a single measure.

Pro-environmental behaviours. At Time 1, participants were asked to look over a list of ten actions they could do which would benefit the environment, such as "Wash clothes at a lower temperature," and "Take recyclables to a recycling bin". These ten ideas were generated by non-participating students through pilot testing. Participants were asked to select five of these ten ideas that they believed they could realistically do

within the next week, but were not explicitly directed to engage in them. Participants also gave intention ratings for these behaviours at Time 1. At Time 2, participants were reminded of the five actions they selected and asked how much they had engaged in them over the past week, responding on a 7-point scale anchored with "not at all" and "very much so". These items were moderately reliable, and were averaged into a single measure ($\alpha = .57$). Participants were also asked at Time 2, "Over the past one week, how much have you conserved electricity? (turned off lights when leaving a room, put on a jumper before turning on the heating, bought energy efficient products instead of inefficient ones, etc).", and responded on a 7-point scale anchored with "not at all" and "very much so". The responses for the five pro-environmental behaviours and energy conservation were fairly reliable ($\alpha = .60$). Because the energy conservation item measures a broad range of behaviours, and the five specific items only measure one type of behaviour each, the two overall scores were averaged together into a single measure of general self-reported conservation at Time 2. This combined measure was the primary dependent variable for Time 2 conservation.

Environmental values. Using two items, "I value the environment" and "The environment is an important issue to me personally," environmental values were measured before the manipulation (pre-test values), after the manipulation (Time 1 values), and one week later (Time 2 values).[1]

Procedure

Participants were invited to participate in the study through email and given a link to one of four surveys. Participants were not aware of the experimental design or that there were multiple versions of the survey. Once participants completed the survey (Time 1), they were thanked, and led to believe the study had ended. One week later

[1] Environmental values were not a core part of this study's predictions, but they are discussed in Chapter 5 in a meta-comparison of Study 1 and Study 3. The correlations between environmental values and behaviours are presented in Table 5.9 and are discussed further in Chapter 5.

(Time 2), participants were contacted again to report how much energy they had conserved, and if they had engaged in the environmental behaviours they had selected at Time 1. Of the 107 participants who completed Time 1, 79 completed Time 2. Following this, all participants were thanked again and debriefed.

Results

The means and standard deviations of all measures within each cell are presented in Table 4.1.

Table 4.1.
Means and Standard Deviations of All Variables in Studies 1 and 2 by Condition

Study 1	Positive		Negative		Total
	General	Specific	General	Specific	
Ingroup Env. Norms	4.71(0.78)	4.67(1.01)	3.64(1.12)	3.79(0.92)	4.26(1.06)
Identification	5.81 (0.69)	5.57(1.18)	5.45(1.12)	5.77(0.65)	5.65(0.95)
Pre-Test Env. Values	5.69(0.94)	5.90(0.88)	6.08(0.83)	5.85(0.91)	5.87(0.89)
Env. Values (Time 1)	5.91(0.85)	5.97(0.93)	6.00(0.83)	5.82(0.84)	5.93(0.86)
Env. Values (Time 2)	5.63(0.96)	6.02(0.72)	5.97(0.92)	5.94(0.70)	5.89(0.83)
Pro-Env. Volunteering (z)	-0.07(0.83)	0.02(0.80)	0.19(1.18)	-0.08(0.95)	0.01(0.93)
Gen. Conservation (Time 2)	5.16(1.05)	5.47(0.96)	5.80(0.84)	5.70(0.76)	5.52(0.93)
Study 2	**Positive**		**Negative**		**Total**
	Ingroup	Outgroup	Ingroup	Outgroup	
Ingroup Env. Norms	4.72(0.99)	4.97(0.84)	3.68(0.96)	2.72(0.87)	4.11(1.24)
Identification	5.45 (0.83)	5.45(1.14)	5.58(0.95)	5.65(1.05)	5.55(0.99)
Negative Emotions	2.65(1.06)	3.50(1.09)	4.27(0.94)	4.48(1.25)	3.68(1.28)
Calm Emotions	4.35(1.19)	3.60(1.07)	2.78(0.90)	2.56(0.74)	3.37(1.22)
Productivity Emotions	4.97(1.32)	4.81(1.23)	4.21(1.23)	4.19(1.56)	4.56(1.36)
Pro-Env. Volunteering (z)	-0.13(0.84)	0.01(0.92)	-0.15(0.99)	0.17(0.96)	-0.04(0.93)
Gen. Conservation (Time 2)	4.86(1.28)	4.67(1.29)	4.69(1.24)	4.61(1.14)	4.71(1.24)

Note. All scores measured on a scale of 1 to 7, except for volunteering, which is a composite of two volunteering-related z-scores.

Ingroup Environmental Norms

To test that participants' perceptions of ingroup norms were manipulated, I analysed the items with a 2 (valence: positive, negative) × 2 (comparison type: specific, general) analysis of variance. The results revealed a main effect of valence, $F(1,103) = 27.02$, $p < .001$, $\eta_p^2 = .21$, with participants receiving positive feedback scoring higher on the ingroup norm measures ($M = 4.69$, $SD = 0.90$) than those with negative feedback ($M = 3.71$, $SD = 1.02$), indicating that participants understood the feedback directed at their group in the manipulation. As expected, comparison type had no main effect, $F(1,103) = 0.10$, $p = .75$, $\eta_p^2 < .01$, as the items were focused on valence. The interaction was also not significant, $F(1,103) = 0.28$, $p = .60$, $\eta_p^2 < .01$.

Moderation of Identification and Feedback Valence on Pro-Environmental Behaviour

To investigate how student social identity is related to feedback valence, intergroup comparisons, and pro-environmental behaviours, I followed methods outlined by Aiken and West (1991) for conducting moderated regression analyses of continuous and categorical data. Feedback valence (coded as good, 1; bad, -1), intergroup comparisons (coded as intergroup, 1; non-intergroup, -1) and student social identity (centred with $M = 0$) were entered at Step 1 of the regression, followed by the three two-way interaction terms at Step 2, and the three-way interaction term at Step 3.

The analysis of pro-environmental volunteering intentions revealed that feedback valence, $\beta = -.04$, $t(103) = 0.40$, $p = .70$, comparison type, $\beta = -.04$, $t(103) = 0.36$, $p = .72$, and identification, $\beta = -.11$, $t(104) = 1.12$, $p = .27$ were not significant predictors at Step 1, $R^2 = .015$, $F(3,103) = 0.51$, $p = .67$. Step 2 revealed a significant two-way interaction of feedback valence by identification, $\beta = .32$, $t(102) = 2.79$, $p = .006$. The interaction for comparison type by identification and valence by comparison type were not significant, $\beta = -.16$, $t(102) = 1.46$, $p = .15$ and $\beta = .08$, $t(102) = 0.78$, $p = .44$, respectively. Overall for Step 2, $\Delta R^2 = .077$, $\Delta F(1,100) = 2.84$, $\Delta p = .042$. The

three-way interaction was not significant, β = -.12, $t(99) = 1.09$, $p = .28$, and for Step 3, $\Delta R^2 = .011$, $\Delta F(1,99) = 1.19$, $\Delta p = .28$. The full output is presented in Table 4.2.

Table 4.2.
Moderated Regression Table of Feedback Valence, Comparison Type, and Identification Predicting Volunteering Intentions (Time 1), Study 1.

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	.017	.091		.185	.854
Valence	-.035	.091	-.038	-.387	.700
Comparison	-.033	.090	-.035	-.360	.719
Identification	-.105	.095	-.108	-1.100	.274
Step 2					
(Constant)	.006	.089		.070	.945
Valence	-.056	.090	-.060	-.624	.534
Comparison	.002	.090	.002	.020	.984
Identification	-.134	.096	-.137	-1.403	.164
ID×Valence	.310	.111	.318	2.793	.006
ID×Comparison	-.160	.110	-.164	-1.462	.147
Comp.×Valence	.070	.090	.076	.782	.436
Step 3					
(Constant)	-.011	.090		-.118	.907
Valence	-.053	.090	-.057	-.590	.557
Comparison	.004	.090	.004	.041	.967
Identification	-.072	.111	-.074	-.644	.521
ID×Valence	.299	.111	.307	2.689	.008
ID×Comparison	-.139	.111	-.142	-1.247	.215
Comp.×Valence	.078	.090	.085	.868	.387
ID×Val.×Comp.	-.121	.111	-.123	-1.089	.279

Note. $N = 107$. Valence is coded as negative = -1, positive = 1. Reference is coded as ingroup = -1, outgroup = 1. To prevent multicollinearity, identification is centred with $M = 0$. Step 1 $R^2 = .015$ ($p = .67$); Step 2 $\Delta R^2 = .077$ ($\Delta p = .04$); Step 3 $\Delta R^2 = .011$ ($\Delta p = .28$).

When the interaction of identification and feedback valence was decomposed through simple slopes analysis, no difference was found between low- and high-identifiers for positive feedback, $t(102) = 0.70$, $p = .49$. However, when feedback was

negative, the difference between identification levels was significant, $t(102) = 2.58$, $p = .01$, with high-identifiers intending to volunteer less and low-identifiers intending to volunteer more as predicted. The overall slope for high-identifiers was not significant, $t(102) = 1.46$, $p = .15$, but was trending in the predicted direction of assimilating toward the norm implied by feedback valence. The slope for low-identifiers was significant, $t(102) = 2.00$, $p = .05$, with low-identifiers contrasting away from the group norm implied by the valence feedback as predicted. These results are plotted in Figure 4.1.

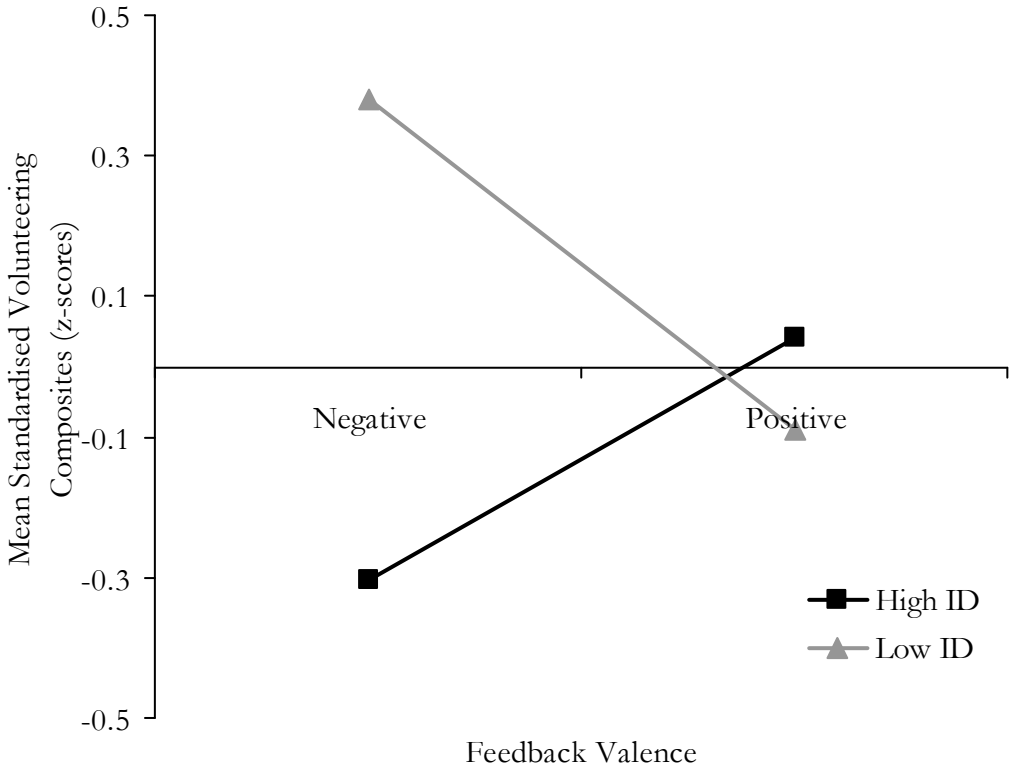

Figure 4.1. The interaction of feedback valence and identification strength on pro-environmental volunteering intentions at Time 1, Study 1.

To investigate self-reported conservation behaviours one week later, I conducted a similar moderated regression as above. This analysis revealed a significant effect of feedback valence, $\beta = -.23$, $t(76) = 2.06$, $p = .043$, which was the only significant effect in the entire three-step model with all other ps > .1. Negative feedback was associated with slightly higher self-reports of pro-environmental behaviour, though

the Step overall was not significant. For Step 1, R^2 = .057, $F(3,75)$ = 1.51, p = .22. For Step 2, Δ R^2 = .015, Δ$F(3,72)$ = 0.39, Δp = .76. For Step 3, ΔR^2 = .026, Δ$F(1,71)$ = 2.08, Δp = .15. The full results are presented in Table 4.3.

Table 4.3.
Moderated Regression Table of Feedback Valence, Comparison Type, and Identification Predicting General Conservation (Time 2), Study 1.

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	5.537	.104		53.048	<.001
Valence	-.215	.104	-.231	-2.059	.043
Comparison	.064	.106	.069	.604	.548
Identification	.020	.114	.020	.176	.861
Step 2					
(Constant)	5.527	.108		51.255	<.001
Valence	-.220	.107	-.237	-2.051	.044
Comparison	.066	.108	.071	.607	.546
Identification	.034	.125	.034	.274	.785
ID×Valence	.055	.147	.056	.376	.708
ID×Comparison	-.045	.146	-.045	-.308	.759
Comp.×Valence	.115	.109	.124	1.061	.292
Step 3					
(Constant)	5.505	.108		50.934	<.001
Valence	-.247	.108	-.266	-2.287	.025
Comparison	.084	.108	.091	.780	.438
Identification	.146	.146	.147	1.001	.320
ID×Valence	.067	.146	.067	.459	.648
ID×Comparison	-.017	.146	-.017	-.120	.905
Comp.×Valence	.125	.108	.135	1.159	.250
ID×Val.×Comp.	-.211	.146	-.209	-1.441	.154

Note. N = 79. Valence is coded as negative = -1, positive = 1. Comparison is coded as general = -1, intergroup = 1. To prevent multicollinearity, identification is centred with M = 0. Step 1 R^2 = .057 (p = .22); Step 2 ΔR^2 = .015 (Δp = .76); Step 3 ΔR^2 = .026 (Δp = .15).

Mediation of Group Norms

To test if the moderation effects above were mediated by group norms, I tested for statistical mediation using the logic of Baron and Kenney (1986). First, group norms were entered as a predictor of volunteering at Step 1. This was not significant, $\beta = -.140$, $p = .10$. When all of the variables from the moderation were added in three additional steps, all variables were qualitatively unchanged from the original moderation. For the identification × valence interaction, $\beta = .300$, $p = .008$ (originally $\beta = .310$, $p = .006$), and group norms in the final step, $\beta = -.114$, $p = .27$. Thus, group norms did not mediate the moderation effect on volunteering intentions.

Because there was no moderated effect for Time 2 behaviours, no mediation was possible. However, as an individual predictor of Time 2 behaviours, group norms were not significant, $\beta = -.053$, $p = .60$.

Discussion

As predicted, negative group feedback led high group identifiers to engage in less pro-environmental behaviour than with positive feedback, in the form of volunteering intentions. Also as predicted, low-identifiers engaged in more pro-environmental behaviour intentions when the group feedback was negative rather than positive. The corresponding predictions for positive feedback were not supported, with no significant difference between low- and high-identifiers. At Time 2, one week later, all of these effects had dissipated, and there was no difference in self-reported conservation behaviours between high- and low-identifiers.

The original prediction was that the effects of group-based feedback among low and high-identifiers would be amplified when presented in a specific comparative context. However, the intergroup comparison component of the manipulation did not appear to evoke any response in participants and did not result in any statistically significant effects. The intergroup comparison manipulation may have been too subtle

to influence participants' behaviours, as even the non-intergroup comparison condition contained a general, implicit comparison. To adjust for this possibility, I conducted another study in which the intergroup manipulation was changed to be specifically about a rival group. Additionally, I included an emotional response scale immediately after the manipulation to further explore how participants interpreted the feedback about their group. Finally, I relaxed the nature of the pro-environmental behaviour ideas, so instead of selecting items from a list, participants were asked to create their own ideas in an open-ended format. Participants might be more likely to engage in behaviours they had personally thought of rather than selected from a list given to them.

STUDY 2

Method

Participants

Participants (N = 185) were university students of ages 18 to 36 years, with a median age of 19 years. Participants were recruited by the same method as the prior study, but people who participated in Study 1 were screened from participating in Study 2. Participation was rewarded with a chance to win one of four £25 cash payments.

Design

This study used a similar 2 × 2 design to Study 1, except the target was either the University of Exeter (ingroup focus with no specific intergroup comparison) or the University of Plymouth (outgroup focus, implying an intergroup comparison). The universities were portrayed as doing either well or poorly environmentally. Like Study 1, this study was presented in an online questionnaire, with dependent variables of pro-environmental behaviour measured at the time of manipulation (Time 1) and one week later (Time 2).

Manipulations

The manipulation used was as follows, with words in bold indicating text that varied depending on condition:

> "To figure out what kinds of people are helping the environment, DEFRA (The Department for Environment, Food, and Rural Affairs) has been studying groups of people throughout the UK.
>
> In a recent study released in early 2007, they found that although everyone cares about the environment, students at the **University of Plymouth/Exeter** have been doing a particularly **good/poor** job. Over the past two years, students at **Plymouth/Exeter** have been **saving/wasting** 15% more electricity than the national average for university students. Additionally, students at **Plymouth/Exeter** have been recycling 22% **more/less** than the national average. Students at **Plymouth/Exeter** seem to value the environment, **and/but** their actions **/have failed to** match this."

Measures

The measures were similar to the prior study, except that emotional responses were measured after the manipulation, and the pro-environmental behaviours were open-ended rather than selected from a list.

Identification. Identification with the University of Exeter was measured as in Study 1 ($\alpha = .88$).

Ingroup environmental norms. These items were the same as in the prior study, but referred to either the University of Exeter or Plymouth as appropriate. These items were reliable ($\alpha = .84$) and were averaged into a single measure.

Negative emotions. After reading the study manipulation, participants were asked to report how much they were feeling anxious, uncomfortable, disappointed, guilty, sad, and angry using a 7-point Likert type scale for each emotion. These items were highly reliable ($\alpha = .88$), and were averaged together into a single measure.

Calm emotions. Similar to the negative emotions, participants reported how much they felt relaxed, calm, and assured. These items were reliable ($\alpha = .87$), and averaged together into a single measure.

Productivity emotions. Similarly, participants reported the levels they felt motivated and inspired. These items were also reliable ($\alpha = .87$), and were averaged into a single measure.

Negative emotions were negatively correlated with calm emotions, $r = -.54$, $p < .001$, but were not correlated with productive emotions, $r = .01$, $p = .87$. Calm emotions were positively correlated to productive emotions, $r = .29$, $p < .001$. All of the individual emotions from all three components were analysed with factor analysis using a direct oblimin rotation, as is recommended for intercorrelated factors. The analysis produced a three-factor solution confirming the factor structure used here, with each emotion loading on to the appropriate category.

Pro-environmental volunteering. Volunteering was measured in the same way as in Study 1, and averaged into a single standardised measure ($r = .69$, $p < .001$).

Pro-environmental behaviours. Pro-environmental behaviours were generated at Time 1 using an open-ended format for participants to complete, rather than selected from a list of 10 ideas as in Study 1. The text of the item was, "Think about the kinds of actions people can do to help the environment. These can range from simple and low-effort to complex and high-effort. Please write down 5 things you think you could *realistically* do to help the environment *in the next one week*." Responses were recorded at

Time 2 in the same manner as in Study 1 (α = .61) and were averaged into a single measure combined with general conservation (α = .72).

Participants responses covered a range of behaviours with most applying to conserving energy ("use energy saving light bulbs," "unplug laptop at night," "dry my hair naturally instead of using the hair dryer"), conserving water ("don't take overly long showers," "wash my clothes only when I need to," "Don't leave the faucet dripping"), and waste ("recycle," "reuse plastic bags," "pick up litter"). Participant responses also referred to transportation ("walk instead of driving," "use public transportation," "share lifts when using the car"), purchases ("use eco friendly cleaning and washing products," "do not buy products with excess packaging," "buy recycled products"), food consumption ("Buy local produce instead of going to a supermarket," "buy food with less packaging," "eat less meat"), and awareness-raising ("Encourage others to be more green," "put up posters to create an awareness of the problem," "play some films or documentaries to make my friends aware of the situation").

Procedure

The procedure was the same as in Study 1, with participants unaware of the experimental conditions or that they would be contacted again at Time 2. Of the 185 participants who completed Time 1, 151 completed Time 2.

Results

Ingroup Environmental Norms

To confirm that the manipulation affected perceptions of group norms, the norm items were analysed with a 2 (valence: positive, negative) × 2 (target: Exeter or Plymouth), analysis of variance. The results revealed a main effect of valence, $F(1,181) = 143.50$, $p < .001$, $\eta_p^2 = .44$, with positive feedback scoring higher ($M = 4.84$, $SD = 0.92$) than those with negative feedback ($M = 3.30$, $SD = 1.03$), showing that participants understood the manipulation feedback. There was a main effect for

reference target, $F(1,181) = 6.77$, $p = .01$, $\eta_p^2 = .04$, that was qualified by a significant interaction, $F(1,181) = 19.56$, $p < .001$, $\eta_p^2 = .10$. Simple effects analysis showed that when feedback was positive, participants rated environmental performance the same, $F(1,181) = 1.78$, $p = .18$, $\eta_p^2 = .01$, whether the target was Exeter ($M = 4.72$, $SD = 0.99$) or Plymouth ($M = 4.97$, $SD = 0.84$), but when the feedback was negative, pro-environmental ratings differed depending on target, $F(1,181) = 23.06$, $p < .001$, $\eta_p^2 = .11$, with participants rating Exeter as doing better than Plymouth ($M = 3.68$, $SD = 0.96$ and $M = 2.72$, $SD = 0.87$, respectively). This interaction reflects ingroup bias in responses to negative feedback: "our" poor performance is not perceived to be as bad as "theirs".

Emotions

To explore the kinds of emotions participants felt as they read the feedback, I conducted a series of 2 × 2 ANOVAs (Valence × Reference Target) on negative, calm, and productivity-related emotions.

For negative emotions (anxious, uncomfortable, disappointed, guilty, sad, and angry), there was a main effect of valence, $F(1,181) = 66.26$, $p < .001$, $\eta_p^2 = .27$, with negative feedback provoking more negative emotions ($M = 4.35$, $SD = 1.07$) than positive feedback ($M = 3.07$, $SD = 1.15$). Reference target also produced a main effect, $F(1,181) = 11.04$, $p = .001$, $\eta_p^2 = .06$, with feedback about Exeter eliciting fewer negative emotions ($M = 3.49$, $SD = 1.28$) than feedback about Plymouth ($M = 3.91$, $SD = 1.25$). However, this was qualified by a marginal interaction, $F(1,181) = 3.82$, $p = .052$, $\eta_p^2 = .02$. Simple main effects show that when feedback was negative, participants reported the same negative emotions regardless of the target group, $F(1,181) = 0.87$, $p = .35$, $\eta_p^2 < .01$, whether the target was Exeter ($M = 4.72$, $SD = 0.94$) or Plymouth ($M = 4.48$, $SD = 1.25$), but when the feedback was positive, participants felt the least

negative emotion when their group was the target, $F(1,181) = 14.98$, $p < .001$, $\eta_p^2 = .08$, ($M_{Exeter} = 2.65$, $SD = 1.06$ and $M_{Plymouth} = 3.50$, $SD = 1.09$).

Calm emotions (relaxed, calm, and assured) produced a very similar pattern of results as negative emotions, with a strong main effect of valence, $F(1,181) = 76.31$, $p < .001$, $\eta_p^2 = .30$, and a main effect of comparison target, $F(1,181) = 10.53$, $p = .001$, $\eta_p^2 = .06$, which again was qualified by an interaction of marginal significance, $F(1,181) = 3.12$, $p = .079$, $\eta_p^2 = .02$. The simple effects are similar to those of negative emotions; when feedback was negative, there was no difference between the groups, $F(1,181) = 1.02$, $p = .31$, $\eta_p^2 < .01$, but when feedback was positive, participants felt calmer and more assured when the target was Exeter, $F(1,181) = 13.50$, $p < .001$, $\eta_p^2 = .07$. All means are provided in Table 4.1. For productivity-related emotions (motivated and inspired), there was a main effect of valence, $F(1,181) = 12.44$, $p = .001$, $\eta_p^2 = .06$, with positive feedback being more motivating and inspirational ($M = 4.89$, $SD = 1.27$) than negative feedback ($M = 4.20$, $SD = 1.36$). No effect was found for target reference, $F(1,181) = 0.21$, $p = .65$, $\eta_p^2 < .01$, or the interaction, $F(1,181) = 0.12$, $p = .73$, $\eta_p^2 < .01$. Based on these results, participants seemed to interpret the feedback about another university (Plymouth) not necessarily as just an outgroup (a rival university), but also as a representative of a larger, shared ingroup (university students). Thus, all comparisons could have been perceived as referring to different levels of the ingroup (students at Exeter or students in general). The pattern of means suggest stronger reactions for Exeter than Plymouth, as though Exeter is the more meaningful ingroup of the two.

Moderation of Identification and Feedback Valence on Pro-Environmental Behaviour

As in Study 1, I investigated how student social identity is related to feedback valence and pro-environmental behaviours, following the methods outlined by Aiken and West (1991) for conducting moderated regression analyses of continuous and categorical data. Feedback valence (coded as bad -1, good 1), reference target (Exeter -

1, Plymouth 1), and student identification (centred with $M = 0$) were entered at Step 1 of the regression, followed by the three two-way interaction terms at Step 2, and the three-way interaction term at Step 3.

The analysis of pro-environmental volunteering intentions at Time 1 revealed that neither feedback valence, $\beta = -.03$, $t(182) = 0.41$, $p = .68$, reference target, $\beta = .12$, $t(182) = 1.58$, $p = .12$, nor identification, $\beta = .004$, $t(182) = 0.05$, $p = .96$, were significant predictors at Step 1, $R^2 = .014$, $F(2,182) = 0.85$, $p = .47$. Step 2 revealed a significant two-way interaction of feedback valence and social identification, $\beta = .22$, $t(178) = 3.02$, $p = .003$, but not for reference target by identification, $\beta = -.09$, $t(178) = 1.17$, $p = .25$, or reference target by valence, $\beta = -.054$, $t(178) = 0.73$, $p = .47$. Overall for Step 2, $\Delta R^2 = .052$, $\Delta F(3,178) = 3.29$, $\Delta p = .02$. The three-way interaction at Step 3 was not significant, $t(177) = 0.02$, $p = .83$. For Step 3, $\Delta R^2 < .001$, $\Delta F(1,177) = 0.04$, $\Delta p = .83$. The full output of this moderation is presented in Table 4.4.

To investigate the valence by identification interaction, I conducted simple slopes analyses. As predicted for low-identifiers, volunteering was higher when valence was negative rather than positive, $\beta = .24$, $t(180) = 2.31$, $p = .02$. Also as predicted for high-identifiers, volunteering was higher when valence was positive rather than negative, $\beta = -.18$, $t(180) = 1.70$, $p = .09$, though this was only marginally significant. For positive valence, the difference between low- and high-identifiers was significant, $\beta = .20$, $t(180) = 1.99$, $p = .048$, and likewise for negative valence, $\beta = -.22$, $t(180) = 2.03$, $p = .044$. These results are plotted in Figure 4.2.

Table 4.4.
Moderated Regression Table of Feedback Valence, Comparison Reference, and Identification Predicting Volunteering Intentions (Time 1), Study 2.

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	-.029	.069		-.426	.670
Valence	-.028	.069	-.030	-.408	.684
Reference	.109	.069	.117	1.578	.116
Identification	.004	.069	.004	.051	.959
Step 2					
(Constant)	-.012	.068		-.180	.858
Valence	-.039	.068	-.042	-.567	.572
Reference	.122	.068	.131	1.791	.075
Identification	-.002	.069	-.003	-.036	.971
ID×Valence	.211	.070	.224	3.017	.003
ID×Reference	-.082	.070	-.087	-1.165	.246
Ref.×Valence	-.050	.068	-.054	-.732	.465
Step 3					
(Constant)	-.012	.068		-.170	.865
Valence	-.039	.068	-.042	-.567	.572
Reference	.123	.068	.132	1.796	.074
Identification	-.005	.070	-.006	-.078	.938
ID×Valence	.209	.070	.222	2.980	.003
ID×Reference	-.082	.070	-.087	-1.166	.245
Ref.×Valence	-.050	.068	-.054	-.734	.464
ID×Val.×Ref.	.015	.070	.016	.211	.833

Note. N = 185. Valence is coded as negative = -1, positive = 1. Reference is coded as ingroup = -1, outgroup = 1. To prevent multicollinearity, identification is centred with M = 0. Step 1 R^2 = .014 (p = .47); Step 2 ΔR^2 = .052 (Δp = .02); Step 3 ΔR^2 < .001 (Δp = .83).

I conducted a similar moderation for the pro-environmental behaviours measured at Time 2. This revealed that feedback valence had no effect at Step 1, β = .07, $t(147) = 0.84$, p = .40, and neither did reference target, β = -.05, $t(147) = 0.65$, p = .51, but identification had a positive effect on behaviour, β = .19, $t(147) = 2.34$, p = .02.

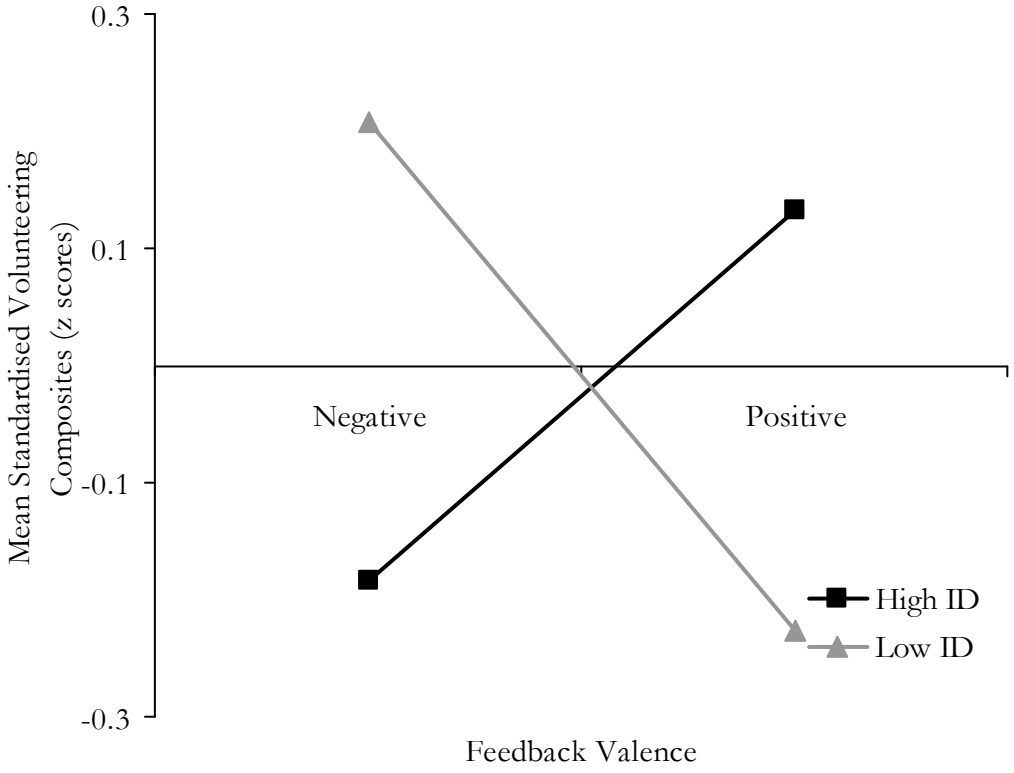

Figure 4.2. The interaction of feedback valence and identification strength on pro-environmental volunteering intentions at Time 1, Study 2.

Overall for Step 1, R^2 = .04, F(3,147) = 2.07, p = .11. Step 2 showed a marginal two-way interaction of feedback valence and social identification, β = .16, t(144) = 1.91, p = .059. The reference target by identification interaction was not significant, β = .03, t(144) = -0.40, p = .69, and neither was the valence by reference interaction, β = -.01, t(144) = 0.82, p = .94. Overall for Step 2, ΔR^2 = .026, ΔF(3,144) = 1.36, Δp = .26. The three-way interaction was not significant, β = -.02, t(143) = 0.29, p = .78, Step 3 ΔR^2 = .001, ΔF(1,143) = 0.82, Δp = .78. The full output of this moderation is presented in Table 4.5.

To investigate the valence by identification interaction, I conducted simple slopes analyses. For low-identifiers, pro-environmental behaviours were not influenced by valence, β = .12, t(146) = 0.81, p = .59. However, high-identifiers' behaviours were influenced by valence, engaging in more pro-environmental behaviour when the

Table 4.5.
Moderated Regression Table of Feedback Valence, Comparison Type, and Identification Predicting General Conservation (Time 2), Study 2.

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	4.702	.100		46.853	<.001
Valence	.085	.101	.069	.841	.402
Reference	-.066	.101	-.053	-.654	.514
Identification	.240	.102	.190	2.343	.020
Step 2					
(Constant)	4.726	.102		46.541	<.001
Valence	.084	.102	.068	.829	.408
Reference	-.054	.101	-.043	-.533	.595
Identification	.241	.102	.192	2.366	.019
ID×Valence	.196	.103	.155	1.906	.059
ID×Reference	.041	.103	.033	.399	.691
Ref.×Valence	-.008	.102	-.007	-.082	.935
Step 3					
(Constant)	4.724	.102		46.275	<.001
Valence	.085	.102	.069	.829	.409
Reference	-.057	.102	-.046	-.560	.576
Identification	.245	.103	.195	2.375	.019
ID×Valence	.195	.103	.154	1.892	.060
ID×Reference	.041	.103	.033	.397	.692
Ref.×Valence	-.008	.102	-.006	-.077	.938
ID×Val.×Ref.	-.030	.103	-.023	-.286	.775

Note. N = 151. Valence is coded as negative = -1, positive = 1. Comparison is coded as general = -1, specific = 1. To prevent multicollinearity, identification is centred with M = 0. Step 1 R^2 = .041 (p = .11); Step 2 ΔR^2 = .026 (Δp = .26); Step 3 ΔR^2 = .001 (Δp = .78).

feedback was positive than negative, β = -.23, $t(146) = 2.00$, p = .047. For positive valence, the difference between low- and high-identifiers was significant, β = .35, $t(146) = 3.08$, p = .003, but not for negative valence, β = .03, $t(146) = 0.28$, p = .78. These results are plotted in Figure 4.3.

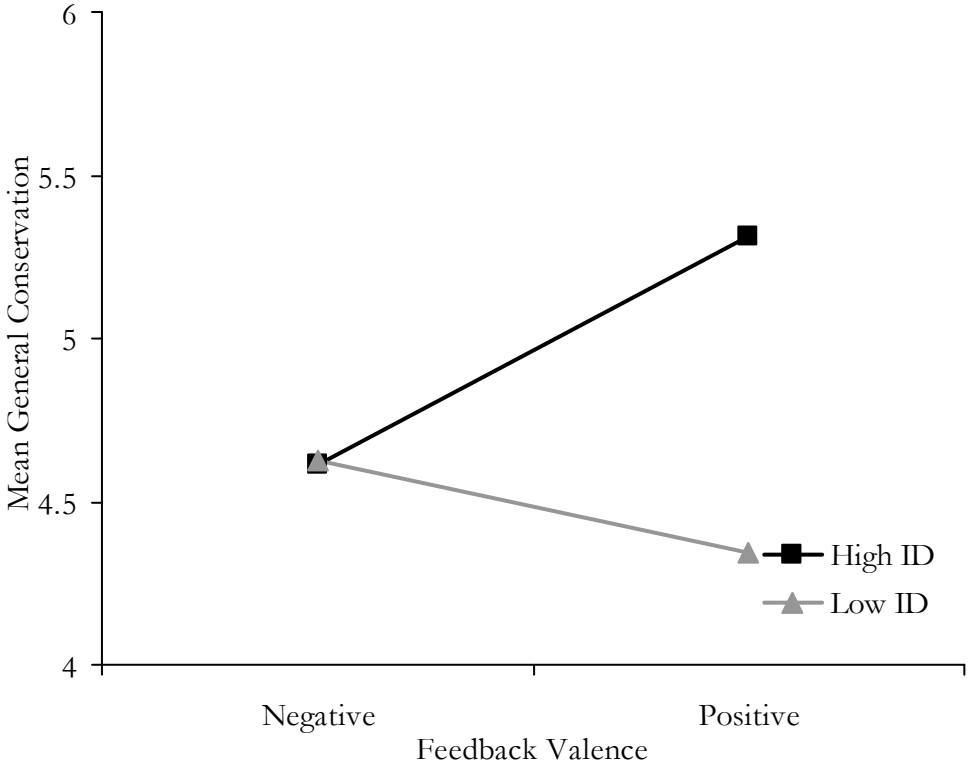

Figure 4.3. The interaction of feedback valence and identification strength on general conservation behaviour at Time 2, Study 2.

Mediation of Group Norms

To test if the moderated effects above were mediated by group norms, we tested for statistical mediation using the logic of Baron and Kenney (1986). First, group norms were entered as a predictor of volunteering at Step 1. This was not significant, $\beta = -.018$, $p = .74$. When all of the variables from the moderation were added in three additional steps, all variables were qualitatively unchanged from the original moderation. For the identification × valence interaction, $\beta = .211$, $p = .003$ (originally $\beta = .209$, $p = .003$), and group norms in the final step, $\beta = -.017$, $p = .83$.

A similar mediation test was performed for conservation behaviour at Time 2. Group norms were not significant predictors at Step 1, $\beta = -.015$, $p = .45$. With the other variables from the moderation added in three additional steps, all variables were qualitatively unchanged from the original moderation. For the identification × valence interaction, $\beta = .200$, $p = .057$ (originally $\beta = .196$, $p = .059$), and group norms in the

final step, $\beta = -.032$, $p = .79$. Thus, the measure of group norms did not mediate the moderation of either volunteering or Time 2 conservation behaviour.

Discussion

Our attempt to make the intergroup manipulation more explicit by targeting feedback to a nearby university appears to have had a different effect than intended. Exeter students felt more distressed when Plymouth was doing poorly than when it was doing well. Exeter students also felt calmer and more motivated when Plymouth was performing well rather than when they were doing poorly. However, the magnitude of these effects was stronger when the reference target was Exeter, suggesting that Exeter was a more pertinent and meaningful ingroup than Plymouth. This is consistent with prior social identity research finding that people have multiple levels of overlapping identities that become salient depending on context (Abrams et al., 1990; Roccas & Brewer, 2002). Based on these emotional responses to the manipulation, students appeared to interpret the feedback about a potential rival university not necessarily as targeting a rival outgroup, but instead referring to a larger more abstract ingroup of university students in general. Thus, these results will be interpreted in the context of positive and negative feedback and strength of social identity, dropping the intergroup comparison variable which did not produce any significant effects related to pro-environmental behaviour.

Apart from the effect of the intergroup comparison manipulation, the results supported the hypotheses as predicted. At Time 1, high-identifiers acted in line with the direction of the feedback, intending to engage in more pro-environmental volunteering when the feedback was positive, and less when the feedback was negative. Low-identifiers showed the reverse by contrasting away from the direction of group feedback; when feedback was positive, they had lower pro-environmental intentions, and when feedback was negative, low-identifiers' intentions were higher. Also as

predicted, these effects endured after one week, but for high-identifiers only, particularly with positive feedback. The enduring effect of the valence manipulation among high-identifiers suggests that they may have internalised the feedback, whereas low-identifiers' behaviours were unchanged. The longitudinal effect of high-identifiers assimilating toward the implied norm occurred when feedback was positive but not when feedback was negative.

GENERAL DISCUSSION

I predicted that when given an implied group norm, low-identifiers would contrast away from that norm, while high-identifiers would assimilate toward the norm. Over time, the high-identifiers' assimilation would be internalised and maintained, while the low-identifiers' contrastive effect would not. These results generally support the hypotheses. Broadly, I found that at Time 1 in both studies high-identifiers tended to assimilate and internalise group norms, acting as typical group members would. In Study 2, this effect persisted at Time 2. In comparison, low-identifiers appeared to act in a more counter-normative way. In both studies, low-identifiers contrasted away from the group norm, intending to engage in less pro-environmental behaviour when norms are positive and more when norms are negative, as if psychologically and behaviourally distancing themselves from the group. However, these effects were not carried over into Time 2, where low-identifiers' self-reported behaviours were consistent across conditions. The notion that high-identifiers act normatively and low-identifiers act counter-normatively is a consistent pattern of effect in research on self-categorization and social identity theory (Ellemers et al., 1997; Ellemers et al., 2002). These two studies offer additional insight by demonstrating these effects on environmental behaviours, investigating how these responses endure over time, and how the internalisation of group norms may depend on strength of identification. Although our measure of norms did not mediate the behavioural effects directly, this does not mean

norms are uninvolved. Research by Rabinovich and colleagues (2008) found that ingroup-stereotypes (a reflection of group norms) do mediate behaviour from comparison valence, but only with the addition of value centrality in a two-step mediation chain; ingroup-stereotyping alone was not a significant predictor of behaviour.

In the second study, but not the first, there was a longitudinal effect; the manipulation participants had read a week prior affected how much pro-environmental behaviour they had engaged in over the last week. Why no longitudinal effect was detected in the first study is not known but could be related to the smaller sample size and more restricted way of measuring environmental behaviours (e.g., selecting from a list of pro-environmental behaviours in Study 1 rather than generating the behavioural ideas themselves in Study 2). This suggests that under the right conditions, brief, simple feedback about group performance can have effects long after the point of comparison. Given that people hear similar feedback about their environmental behaviours on a regular basis through news reports and other media, this constant barrage of information has the potential to lead to very real effects in how people actually act toward the environment.

Looking at the effects of both study results as a whole, negative feedback appeared to provoke a reaction initially but not in the long term; only positive feedback produced a longitudinal effect. This may be because the manipulated positive norm was more consistent with participants' perceptions of the existing group norm and their own personal attitudes. Pro-environmental attitudes are relatively high in the United Kingdom, and prior research has found that norms and attitudes best predict behaviour when they are consistent rather than inconsistent (Terry, Hogg, & McKimmie, 2000; Terry, Hogg, & White, 1999). Additionally, because a function of social identity is to

provide group members with positive self-esteem (Hogg & Turner, 1985; Turner & Tajfel, 1979), positive group norms may be easier to internalise than negative norms.

Our results also suggest that longitudinal effects are stronger for high-identifiers than low-identifiers. While the effects for high and low-identifiers were approximately equivalent immediately after the experimental manipulation, the effect was weaker for low-identifiers than high-identifiers one week later. The longitudinal patterns suggest that high-identifiers internalised the group feedback as normative information about their group, and act in line with those norms one week later. This may be because, by definition, social identity is more central to high-identifiers, and social influence of the group occurs more easily when the identity is salient. Furthermore, because high-identifiers' social identity is more likely to be chronically salient, there will be more opportunities for them to be influenced by the norms of that group. Low-identifiers may be more variable in their response because they are less committed to the group. They may also resent what they perceive as a social miscategorization and rebel against the group norm only as long as the categorization is active, and once that threat is removed, they may prefer disinterest over counter-normative behaviour (Ellemers et al., 2002).

Interestingly, when low-identifiers were given positive feedback about their group, they could have capitalised on this beneficial feedback, taking a "free ride" on the efforts of a group that they are not heavily invested by sharing in its positive environmental norm. However, in both studies low-identifiers' pro-environmental behaviours increased when the implied group norm was negative and decreased as the implied norm became positive. Although the exact process behind the contrastive behaviour is not known, it is congruent with past research that has found that when people's preferred self-categorizations are ignored, such as when low-identifiers are subjected to group comparisons, they may resist these comparisons (Barreto &

Ellemers, 2002; Hornsey & Hogg, 2000), and experience increased physiological reaction, even when the categorization is meant to be positive (Branscombe, Ellemers, & Spears, 1999). Unwanted categorization can be unpleasant, and praise for a group in which one does not wish to belong can likewise be undesirable.

An asset of these studies is the variety of the dependent variables used to measure environmentally sustainable behaviours. In addition to general pro-environmental volunteering intentions, I also measured self-reported behaviours one week later, including energy conservation and five specific, concrete behaviours created by participants themselves. Behavioural intentions and self-reported behaviours are different types of measures, and although they are not perfect, they are both fair proxies of actual behaviour (Armitage & Conner, 2001). The pro-environmental behaviours participants considered were concrete, specific, and self-generated, which are generally more accurate than abstract generalised intentions (Fishbein & Ajzen, 1975; Kraus, 1995).

Practical Implications

Because of the individual longitudinal effects found here after providing group feedback, this research suggests group feedback may be a viable way of influencing individual behaviours over an extended time. If campaigners are able to isolate high-identifiers with their message, then providing feedback that implies a pro-environmental group norm could have a positive, lasting effect in promoting environmentally sustainable behaviour.

However, if campaigners are not able to isolate high-identifiers with their message, but are addressing both low and high-identifiers together, the intervention must be carefully crafted to avoid potential backlash from low-identifiers (a similar "boomerang effect" has been found with other interventions; c.f., Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). In these cases, because group feedback has a

more lasting effect on high-identifiers than low-identifiers, group feedback to a mixed audience should target constant behaviours that occur over time, like turning off electrical devices and recycling; high-identifiers are likely to stick with it, while low-identifiers' counter-normative reactions may be short-lived. One-off behaviours, like who to vote for, whether to buy an efficient appliance, and whether to install subsidised cavity-wall insulation are not as suitable for targeting by group feedback because low-identifiers may react against the suggestion of the positive norm, and a short-term reaction can have a long-term effect.

This research also suggests some good news; while people are barraged every day with negative environmental group feedback about the environment, these findings suggest individual responses to negative group feedback tend to be short-lived; only positive feedback showed a longitudinal effect in this research. While more studies are needed to investigate this aspect, and these studies had no control condition to compare behavioural results against, this result is welcome amongst the worrying findings of how suggestions of negative environmental group norms can lead to negative environmental behaviours (Cialdini et al, 2006; Smith et al., 2010; see Smith & Louis, 2008; Smith & Louis, 2009 for a similar effect in non-environmental domains).

Limitations and Future Research

One limitation to the design of the second study is that the intergroup comparison may not have functioned as intended. In the first study, the intergroup comparison was relatively weak, and did not elicit any effects in the dependent variables. I aimed to correct this by making the manipulation in the second study feature a rival university, which I assumed would imply a comparison to their own university. Instead, it appears students perceived this feedback as applying to the larger shared ingroup of university students. Although unintentional, this reinforces the notion that we all belong to numerous overlapping social groups simultaneously

(Roccas & Brewer, 2002), and which particular group is salient at any one time is highly dependent on situational factors (Abrams et al., 1990; Doosje, Haslam, Spears, Oakes, & Koomen, 1998). Despite the weak intergroup comparison manipulation, these studies still provide useful insight into the main thrust of the hypotheses, how strength of social identity moderates the effects of group feedback on environmentally sustainable behaviour. Although this means that in Study 2, identification was measured at the level of specific university, and the manipulation was sometimes targeted at university students in general, the effect of this appear minimal, and the moderating effect of identity still occurred reliably.

Although the perspective presented in this thesis is that intergroup comparisons can play an important and dynamic role in determining how social influence can affect environmentally sustainable behaviour, the present two studies are only a first attempt to address this issue. To build on the patterns observed here, I conducted three additional studies to investigate the role of different types of comparative feedback on individual behaviour (see Chapters 5 and 6).

In the following chapter, I focus on investigating the role of group discussion in generating environmental group norms in response to group feedback social comparisons. The two studies presented in this chapter offer compelling evidence that group feedback has the power to influence group norms and individual behaviour, but it also lacked actual interaction with group members, which is an important component of reaching consensus and forming norms within groups.

Conclusion

While it has long been known that providing feedback about social group norms can influence behaviour at the time of feedback, this research demonstrates that group feedback about environmental performance can have a longitudinal effect on individual environmental behaviours. While high-identifiers converge toward the group norm

implied by the feedback, low-identifiers seem to contrast away from it. Moreover, the effects of group-directed feedback on individual behaviour appeared to be more enduring among high-identifiers, whereas the contrastive behaviour of low-identifiers appeared to be more reactive and temporally constrained.

– CHAPTER 5 –

Small-Group Interaction and Inductive Norm Formation

The other work in this thesis has researched how social comparisons can imply group norms and influence intentions and behaviours. This was done by giving group members feedback that implied a group norm relative to other groups. However, this approach offers an incomplete portrayal of how group norms grow and develop. Comparison processes can play a powerful role, as evidenced by the findings in the other empirical chapters of this thesis, but additional factors work to inform group norms from within the group. In day to day life, group members do not simply make social observations in isolation from each other. Rather, they discuss with each other the meaning and importance of how their group performs relative to other groups, which behaviours are important, and which outcomes are valued. Through interaction, group members work toward a consensus that serves to inform the group's norms, priorities, and social reality. This chapter examines how small-group interaction can be a mechanism for environmental norm formation, leading to powerful and enduring behavioural effects.

The Social Identity Approach and Small-Group Interaction

Most social identity research has focused on how identity is informed through top-down deductive contexts, such as through receiving comparative feedback. While this approach has been productive in investigating how group members respond to comparisons and implied norms, it has been criticized for being too mechanistic in its theorising of identity formation, portraying group members as passive recipients of social identities and neglecting the role of the individual (Greenwood, 2004). This critique feeds into a larger debate within social psychology of viewing social processes as either being primarily individually-driven or group-driven. Responding to this

criticism, some social identity theorists have claimed that using paradigms of either individual or group influence alone creates an artificial and inaccurate dichotomy around how social influence occurs. Instead, it is said that "influence is constituted by both individual and social levels *simultaneously and inseparably*" (p. 33, italics in original; Postmes, Haslam, & Swaab, 2005). However, it is also acknowledged that the social identity approach has not given bottom-up interpersonal processes of influence the same attention as top-down processes. To address this, Postmes, Haslam, and Swaab developed an interactive model of identity formation that formally elaborates how bottom-up processes contribute to social identity formation.

The key mechanism through which these bottom-up, inductive processes of social influence occurs is through discussion with other group members. As group members interact with each other, they are likely to reach consensus on some points, especially when group identification is high (Turner, 1991). This social consensus serves to validate individuals' beliefs in line with the consensus view (Correll & Park, 2005; McGarty, Turner, Oakes, & Haslam, 1993; Sechrist & Stangor, 2001) and leads members to believe their views are more accurate (Baron et al., 1996). When a view is shared and discussed by the group, it is likely to become a local group norm and is especially likely to guide individual behaviour (Postmes, Haslam, & Swaab, 2005; Postmes, Spears, Lee, & Novak, 2005). In one study of computer-mediated communication, conducted at a time when home computers were still uncommon, participants were found to develop communication norms idiosyncratic to their groups, responding in kind to local norms of tone, grammar, and use of humour (Postmes, Spears, & Lea, 2000). Research into stereotypes has found that group discussion can reinforce stereotypical beliefs (Myers & Bishop, 1970). Discussing negative stereotypes led group members to be more likely to discriminate against the discussed groups later (L. Smith & Postmes, 2009; L. Smith & Postmes, 2010a). Notably, individual

rumination of negative stereotypes did not have this same effect, suggesting that discussion in particular is key to creating discriminatory norms. However, discussion can also be used to challenge and overcome stereotypical beliefs, overriding the negative effects of stereotype threat (L. Smith & Postmes, 2010b). Thus, people appear to use the content of discussion to interpret and guide group responses to complex social problems in a way that impacts real behaviours.

Using principles of inductive identity formation, recent research has shown small-group interaction can powerfully affect public behaviour. For example, using opinion-based groups, which are groups based around a common belief, such as an endorsement of human rights (Bliuc, McGarty, Reynolds, & Muntele, 2007), researchers have found that small-group interaction is a highly effective way of evoking action. This has been demonstrated for promoting clean water availability in the developing world (Thomas & McGarty, 2009) and reducing prejudice against those with mental disorders and indigenous minorities (McGarty, Khalaf, Blink, Gee, & Stone, 2007). In a similar vein, additional research has found that small-group discussion can successfully be used to counter and delegitimise existing negative ingroup stereotypes (L. Smith & Postmes, 2010b). In these studies, the content of group discussion guided individual behaviours after the discussion was complete, supporting Postmes, Haslam, and Swaab's (2005) notion of inductive norm formation through interaction among group members.

Classic Investigations of Small-Group Interaction

Although the social identity approach has formulated new ideas about how discussion influences behaviour, social interaction has long been recognised as an important process for making sense of new information. Sherif (1936) found that when participants interacted, they formed distinct group norms in interpreting visual stimuli. Participants were asked to estimate how far a light in a darkened room moved. The

light was actually stationary, but it appeared to move because of an optical illusion caused by autokinetic motion. Each group interacted and decided how far the light moved. Sherif noted that participants' sense of reality was often influenced by observing and accepting the information provided by others, which he termed informational influence. While different groups had very different estimations, *within* each group, the interpretation of reality was consistent. These norms were internalised and persisted for years after the group's short-lived discussion. Festinger (1954) expanded on these ideas, theorising that group members use discussion for more than just interpreting arbitrary information, but much more broadly to interpret the fabric of social reality itself.

While Sherif found that the group norms developed through social interaction to be very durable, their influence on actual behaviour was less clear. To investigate this, Kurt Lewin (1947) studied small-group interaction regarding the promotion of offal (organ) meat to American housewives during wartime. One group received a lecture from an expert about the benefits of consuming offal, while another group received some basic information about offal and then had a small-group discussion. Of the group receiving the lecture, 3% went on to prepare offal at home in the following months, while 32% of those in the small-group discussion prepared offal. This same effect was then replicated with feeding cod liver oil and orange juice to babies (Radke & Kilsurich, 1947) and implementing work policies against discrimination (Lewin & Butler, 1956, as cited in Turner, 1991). Further research found that the critical element in determining action was the culmination of consensus that is often the product of group discussion (Bennet, 1955; Pelz, 1958, both as cited in Turner, 1991).

Although discussion has a long history in psychological research, the social identity perspective allows a new understanding of how these past findings work to influence actual behaviour. As group members reached consensus interpreting the

information they were given, they established local norms of how to act in response. Whether the scenario involved how far a light moved, whether to eat offal, or whether to give babies dietary supplements, these local norms all had powerful effects in influencing behaviour months and years beyond the original interaction. This durability was not found with individually-focused manipulations and attests to the strength of small-group interaction in influencing behaviour.

Inductive and Deductive Influence

Although inductive and deductive influence have been studied in depth separately, less research has examined how they might operate together. Postmes, Haslam, and Swaab (2005) theorise that they often work in tandem, with deductive comparisons providing a context for inductive discussion. This type of integrative influence can be seen in the research of L. Smith and Postmes (2010a), where inductive norms of discrimination developed out of discussion focused around portraying other groups negatively.

While deductive and inductive influence can work together, this is not always the case. Inductive norm formation involves interaction between people and is therefore more "organic" compared to the effects of deductive comparison contexts. As such, the outcomes are more difficult for experimenters to predict. Discussion content may not be consistent with the norms implied by deductive comparisons. Indeed, researchers have found that many manipulations that influence norms and behaviours in individual settings do not have the same effect after small-group interaction (Postmes, Spears, Sakhel, & de Groot, 2001). This may be because inductive norms are more powerful and override the deductive norm, as evidenced by the strong effect sizes found in group discussion research. Thus, deductive influence can help direct inductive influence, as in the case of discrimination in L. Smith and Postmes

(2010a), but if discussion does not dwell on deductive comparisons, then those deductive influences are likely to have little effect.

The Present Research

In the present research, I repeat the basic procedure of Study 1, with the addition of a small-group interaction after the experimental manipulation. I predict that small-group interaction will allow for the creation of local, inductive norms, allowing the content of discussion to guide group members' behaviours long after the discussion has ended. As supported by past research, the experimental manipulation that influenced behaviour in Study 1 through deductive processes may not be influential, as inductive discussion processes tend to be stronger determinants in norm formation than deductive processes.

Based on the strength of small-group interaction in producing enduring behavioural change, I predict that the content of discussion will influence environmental behaviour, both for better and for worse. Based on self-categorization principles, I believe the extent to which participants discuss environmental behaviour will predict how much pro-environmental behaviour they engage in one week later. I believe the process behind this is the creation of inductive, local norms, rather than just participants who value the environment also discuss it and act on it. To account for this, I predict that discussion content will moderate behaviours even when controlling for pre-test pro-environmental values.

Given past research findings, I cannot make specific predictions about how the discussion groups will interpret and act upon the experimental manipulation. In Study 1, this same manipulation led high-identifiers to assimilate toward the implied norm; however, previous research has found that group norm manipulations that work in individual settings often do not work after small-group interaction (Postmes et al., 2001). Thus, while results may be similar to Study 1, the deductive norm of the

manipulation may be overpowered by the strength of the inductive norms created through interaction.

STUDY 3

Method

Participants

Participants (N = 69) were university students of ages 18 to 37 years, with a median age of 18 years. Participants were recruited after lectures and through email from a pool of first-year students, and divided into groups of 3 to 5 (N = 17). Participation was rewarded through academic research participation credits and a chance to win a £20 online shopping voucher.

Design

This design was very similar to Study 1, using a 2 × 2 between-subjects design, with independent variables of valence (positive or negative) and comparison type (specific intergroup or general). Unlike in Study 1, participants engaged in a small-group discussion of up to 20 minutes after reading the manipulation. These discussions were recorded and assessed for content of environmental behaviour and length of discussion. Social identification as a university student and environmental values were measured before the manipulation, and dependent variables of pro-environmental behaviour were measured at the time of manipulation (Time 1) and one week later (Time 2).

Manipulations

As in Study 1, participants were provided with information about the University of Exeter's environmental performance relative to other universities, either in general, or specifically compared to the University of Plymouth. Participants were told Exeter was either doing well, or poorly. The manipulation was worded as follows, with words

in bold indicating text that varied depending on condition, with the words in square brackets appearing in the specific intergroup comparison condition:

> "To figure out what kinds of people are helping the environment, DEFRA (The Department for Environment, Food, and Rural Affairs) has been studying groups of people throughout the UK.
>
> In a recent study released in early 2007, they found that although most people care about the environment, students at the University of Exeter have been doing a particularly **good/poor** job. Over the past two years, students at Exeter have been **saving/wasting** 15% more electricity than the national average for university students. Additionally, students at Exeter have been recycling 22% **more/less** than the national average. [In addition to doing **better/worse** than average, Exeter students significantly **outperformed/underperformed in comparison to** their local rival, the University of Plymouth.] Students at Exeter say they value the environment, **and/but** their actions **/do not** live up to their words."

Following the manipulation but before the discussion, participants were asked to respond to the following items, "Exeter students value the environment"; "Exeter students are taking action to protect the environment"; "Exeter students are doing enough to protect the environment"; and "Exeter students are behaving in accordance with their values". These items were highly reliable ($\alpha = .85$) and were averaged into a single measure.

Measures

Social identification. As in Study 1, identification with the University of Exeter was measured at the start of the study with 9 items like, "I identify with other students at the University of Exeter," with four items reverse-scored, such as, "I have little respect for the University of Exeter," using a 7-point Likert-style scale anchored with "strongly disagree" and "strongly agree." The measure was adapted from a scale developed by

Ellemers, Kortekaas, and Ouwerkerk (1999), and was reliable ($\alpha = .80$) and averaged into a single measure.

Environmental values. Environmental values were measured with two items, "I value the environment" and "The environment is an important issue to me personally." These were measured at the very start of the study (Pretest), after the discussion (Time 1), and one week later (Time 2). These items were reliable ($r = .74$, $p < .001$; $r = .82$, $p < .001$; $r = .77$, $p < .001$, respectively), and were averaged together for each time.

Discussion analysis. In the small-group discussions after the manipulation, participants were given a sheet of paper with directions to discuss three questions, "How does the group feel about Exeter students' environmental performance?", "Do group members feel satisfied with their own environmental behaviour?"; and "Do group members have plans to change their own environmental behaviour?" These discussions were recorded with the participants' permission, but no experimenters were in the room during the discussions. Two independent raters, who were blind to participants' conditions and quantitative responses, assessed the extent to which participants discussed environmental behaviour while discussing the questions and gave each group a score on a scale of 1 to 10. The two raters' scores were correlated ($r = .56$, $p = .02$), giving inter-rater reliability to the assessments. The two sets of scores were averaged into a single measure ($M = 5.81$; $SD = 1.21$). The length in seconds for which participants discussed the questions was also noted ($M = 596$; $SD = 197$).

Pro-environmental volunteering. Volunteering intentions were measured after the discussion. As in Study 1, participants were told that they would receive contact information for a wide range of pro-environmental charities and organisations that they could choose to volunteer with, such as regional wildlife trusts, local university student groups, and national groups like Friends of the Earth. The organisations were balanced to provide a range of organisation types and political orientations, so as to minimise the

influence of any one particular organisation on participants' volunteering intentions. Participants were asked "Would you be willing to spend time helping these organizations?," measured on a 7-point scale, anchored with "not at all" and "very much so". Participants were then asked "During a typical week, how much time (in hours) would you be willing to volunteer to these kinds of organisations?," and responded freely. Because the measurement range of these two items was different, they were standardised into z-scores. These standardised scores were highly correlated ($r = .67$, $p < .001$) and were averaged into a single measure.

Pro-environmental behaviours. As in Study 1, after completing the volunteering information, participants were asked to look over a list of ten actions they could do which would benefit the environment, such as "Wash clothes at a lower temperature," and "Take recyclables to a recycling bin". These ten ideas were generated by non-participating students through pilot testing. Participants were asked to select five of these ten ideas that they believed they could realistically do within the next week, but were not explicitly directed to engage in them. At Time 2, participants were contacted through email and reminded of the five actions they selected and asked how much they had engaged in them over the past week, responding on a 7-point scale anchored with "not at all" and "very much so". These items were reliable ($\alpha = .69$) and were averaged into a single measure. As in Study 1, participants were asked at Time 2, "Over the past one week, how much have you conserved electricity? (turned off lights when leaving a room, put on a jumper before turning on the heating, bought energy efficient products instead of inefficient ones, etc).", and responded on a 7-point scale anchored with "not at all" and "very much so". The responses for the five pro-environmental behaviours and energy conservation were highly correlated ($r = .62$, $p < .001$). Because the energy conservation item measures a broad range of behaviours, and the five specific items only measure one type of behaviour each, the two overall scores were averaged together

into a single measure of general self-reported conservation at Time 2. This combined measure was the primary dependent variable for Time 2 conservation.

Procedure

Participants were invited to participate in the study through email and through announcements after lectures. Participants arrived at classrooms and were directed to form groups of 3 to 5 with people they did not already know, with each group sharing the same experimental manipulation. Participants were not aware of the experimental design or that there were multiple manipulations. After the manipulation, participants were asked to discuss their thoughts regarding the three discussion points listed above. These discussions were recorded with participants' permission, but the experimenters left the room for these discussions. All aspects of the questionnaire were completed individually rather than in groups. Once participants completed the survey (Time 1), they were thanked, and led to believe the study had ended. One week later (Time 2), participants were contacted again through email to report how much energy they had conserved, and if they had engaged in the environmental behaviours they had selected at Time 1. Of the 69 participants who completed Time 1, 47 completed Time 2. Following this, all participants were thanked again and debriefed.

Results

Full descriptive statistics are provided in Table 5.1

Overview of Typical Discussion Content

In a typical exchange, participants would discuss their own environmental behaviours, both positive and negative, as a group. Often, one or more group members would state that groups members should improve, and other members would concur and make specific commitments. Exchanges were often group-focussed, identified by use of the collective pronoun "we," with discussion focussed on what "we" the group feel and what "we" should be doing. This kind of exchange is shown below. Many

groups also showed a high level of within-group agreement, with participants verbally affirming the views of other participants while they were speaking, also as shown below. Participants A, B, C, and D were from Group 14, while participants E, F, and G were from Group 9. In the first extract, Participant A starts by explaining why she does not recycle, citing difficulty and because other university members do not do it either.

A: If recycling was easier here, then I would do it, but I just can't be bothered, because I can't… because no one else does it, you're like, well I'm not going to bother [D: That's the thing.] I'm not going to separate my rubbish.

The group then discussed their non-environmentally-friendly behaviours, and concluded they were not satisfied with their current behaviours.

A: Do we feel satisfied with our own environmental behaviour? Now, we're kind of on the agreement that none of us [D: Yeah], well, you might be, but certainly people who are in catered halls [B: Yeah] [C: Yeah], I'm not, thinking about it, I'm not satisfied with it. [C: No]
[…]
D: Well, we should improve, it would be nice.

Participant A, who had just recently explained why she did not recycle, then decides that she will start recycling. Participants B and C also say they will improve their behaviours. However, all participants say they focus on behaviours they view as easy to achieve.

A: Now that I know [B: Yeah, 15%, yeah] that my actions are actually making an impact [B: Yeah], from what we've read here that students at Exeter have been wasting 15% more electricity and recycling 22% less than the national average, I'm like well actually maybe I should [B: Should do it, yeah] put my wine bottles in a separate bin, so yeah, I think I might, [B: Yeah, I think I need to start changing] on these easy things I will start changing, I will make an effort now to do my bottles…

[…]

B: So, yeah…

A: Has this…?

C: Yeah, I'll probably turn off my lights and stuff [B: Yeah, lights], and walk, because it's quite easy. I just flick a switch.

Note that participants used Exeter's negative feedback as a reason to collectively engage in *more* pro-environmental behaviour rather than *less*, which is the opposite of the effect for high identifiers in Chapter 4 and the intergroup condition in Chapter 6. This use of discussion to reverse an expected effect is consistent with the research of L. Smith and Postmes (2010b), who found that participants used counter-stereotypical discursive strategies to reverse the behavioural effects of stereotype threat.

Participants also shared practical information about how to engage in pro-environmental behaviours, as in this extract from Group 9 regarding recycling points.

E: They do give you the leaflet in the welcome pack about saving energy and saving water, but there didn't seem to be anything else about recycling.

F: Well this is the thing. Recycling, we can, our recycle point outside Berks, we can only recycle glass.

E: We've got glass, tins, and plastic. I was impressed with plastic.

F: I didn't know that, because at home we have the green bags and we literally recycle everything [E: Yeah] apart from kitchen waste, [E: Yeah] and I'm just not used to not recycling. I feel really bad that…

The group then had a lengthy conversation about the location of recycling points, and participant F says she will start recycling more because of this information.

F: I didn't know there was one [a recycling point] by Clydesdale.

G: Yeah.

E: Yeah, if you go right down, they're all there.

[…]

F: Now that I'm aware of the recycling points, I'll do more, because I wasn't aware there were ones by Clydesdale.

All 17 of the groups viewed the state of the natural environment as a problem and considered pro-environmental behaviour to be generally desirable. However, while some groups discussed the topic enthusiastically for most of the allotted time, other groups only discussed environmental issues briefly for a few minutes before continuing to other unrelated topics. Thus, in the quantitative analysis that follows this section, length of the discussion is included as a moderating variable.

Manipulation Check

To confirm that participants understood the manipulation, we analysed our manipulation check items with a 2 (valence: positive, negative) × 2 (comparison:

general or intergroup) analysis of variance. The results revealed a main effect of valence, $F(1,65) = 37.25$, $p < .001$, $\eta_p^2 = .37$, with positive feedback scoring higher ($M = 4.59$, $SD = 0.89$) than negative feedback ($M = 3.32$, $SD = 0.82$), indicating that participants understood the manipulation feedback. As expected, comparison type was not significant, $F(1,65) = 0.03$, $p = .86$, $\eta_p^2 < .01$, and neither was the interaction, $F(1,65) = 1.01$, $p = .32$, $\eta_p^2 = .02$.

Table 5.1.
Means and Standard Deviations of Variables by Valence and Comparison Type, Study 3.

	Positive		Negative		Total
	No Comp.	Comp.	No Comp.	Comp.	
Manipulation Check	4.47(0.92)	4.72(0.88)	3.41(0.91)	3.24(0.74)	3.91(1.06)
Identification	5.65(0.84)	5.70(1.00)	5.82(0.51)	5.57(0.65)	5.69(0.74)
Pre-Test Env. Values	5.53(0.67)	5.33(1.20)	5.24(1.39)	5.17(0.92)	5.31(1.07)
Env. Values (Time 1)	5.24(0.77)	5.47(1.20)	5.24(1.47)	5.42(0.83)	5.33(1.09)
Env. Values (Time 2)	5.71(0.73)	5.82(0.84)	5.09(1.70)	5.09(1.48)	5.45(1.23)
Pro-Env. Volunteering (z)	0.01(0.89)	0.16(0.95)	-0.11(0.97)	-0.04(0.89)	0.00(0.91)
Gen. Conservation (Time 2)	4.83(0.92)	5.15(1.24)	4.81(1.60)	5.16(1.29)	4.98(1.23)

Note. All scores measured on a scale of 1 to 7, except for volunteering, which is a composite of two volunteering-related z-scores. "No Comp." refers to the general intergroup comparison, while "Comp." refers to the specific intergroup comparison condition.

Moderation of Identification and Feedback Valence on Pro-Environmental Behaviour

To investigate how student social identification is related to feedback valence, intergroup comparisons, and pro-environmental behaviours, we followed methods outlined by Aiken and West (1991) for conducting moderated regression analyses of continuous and categorical data. Feedback valence (coded as good, 1; bad, -1), intergroup comparisons (coded as intergroup, 1; general, -1) and student social identification (centred with $M = 0$) were entered at Step 1 of the regression, followed by the three two-way interaction terms at Step 2, and the three-way interaction term at Step 3.

The analysis for pro-environmental volunteering intentions showed that none of the predictors at any level were significant, final R^2 = .04, $F(7,61) = 0.32$, p = .94. The full results are presented in Table 5.2.

For general conservation one week later, the only significant predictor was the interaction between comparison and identification, β = 0.52, $t(40) = 2.40$, p = .02 at Step 2. However, the Step overall was not significant, ΔR^2 = .12, $\Delta F(6,40) = 1.93$, Δp = .14, final R^2 = .18, $F(7,39) = 1.23$, p = .31. The full results are presented in Table 5.3.

Table 5.2.
Moderated Regression Table for Volunteering by Valence and Comparison Type (Time 1), Study 3.

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	.004	.111		.036	.972
Valence	.082	.111	.090	.736	.464
Comparison	.061	.111	.067	.545	.587
Identification	.136	.150	.112	.907	.368
Step 2					
(Constant)	.009	.114		.079	.937
Valence	.075	.114	.082	.654	.515
Comparison	.068	.115	.075	.589	.558
Identification	.148	.167	.121	.887	.378
ID×Valence	-.074	.165	-.061	-.449	.655
ID×Comparison	.105	.155	.086	.675	.502
Comp.×Valence	.004	.115	.005	.039	.969
Step 3					
(Constant)	.004	.116		.037	.971
Valence	.079	.116	.087	.679	.499
Comparison	.069	.116	.076	.596	.554
Identification	.153	.169	.125	.906	.368
ID×Valence	-.083	.169	-.068	-.489	.627
ID×Comparison	.086	.169	.070	.510	.612
Comp.×Valence	.004	.116	.004	.031	.976
ID×Val.×Comp.	.050	.169	.041	.295	.769

Note. N = 69. Valence is coded as negative = -1, positive = 1. Comparison is coded as general = -1, specific = 1. To prevent multicollinearity, identification is centred with M = 0. Step 1 R^2 = .023 (p = .67); Step 2 ΔR^2 = .011 (Δp = .88);
Step 3 ΔR^2 = .001 (Δp = .77).

Table 5.3.
Moderated Regression Table for General Conservation by Valence and Comparison Type (Time 2), Study 3.

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	5.016	.182		27.592	<.001
Valence	-.002	.181	-.002	-.012	.990
Comparison	.175	.181	.143	.966	.339
Identification	.299	.219	.202	1.367	.179
Step 2					
(Constant)	5.026	.177		28.436	<.001
Valence	-.069	.179	-.056	-.384	.703
Comparison	.218	.179	.178	1.214	.232
Identification	.237	.240	.160	.986	.330
ID×Valence	-.033	.239	-.022	-.137	.892
ID×Comparison	.521	.217	.354	2.398	.021
Comp.×Valence	-.043	.179	-.035	-.240	.812
Step 3					
(Constant)	5.014	.182		27.622	<.001
Valence	-.062	.182	-.051	-.343	.733
Comparison	.215	.182	.176	1.183	.244
Identification	.237	.243	.160	.975	.335
ID×Valence	-.042	.243	-.029	-.174	.863
ID×Comparison	.486	.243	.330	2.000	.052
Comp.×Valence	-.036	.182	-.030	-.200	.843
ID×Val.×Comp.	.085	.243	.057	.349	.729

Note. $N = 47$. Valence is coded as negative = -1, positive = 1. Comparison is coded as general = -1, specific = 1. To prevent multicollinearity, identification is centred with $M = 0$. Step 1 $R^2 = .060$ ($p = .44$); Step 2 $\Delta R^2 = .119$ ($\Delta p = .14$);
Step 3 $\Delta R^2 = .003$ ($\Delta p = .73$).

When the interaction of comparison type and identification was decomposed through simple slopes analysis, no difference was found for low-identifiers between comparison types, $B = 0.22$ $t(43) = 1.04$, $p = .30$. However, for high-identifiers, intergroup comparisons led to more behaviour than when there was no comparison, $B = 0.59$, $t(43) = 2.47$, $p = .02$. These results are plotted in Figure 5.1.

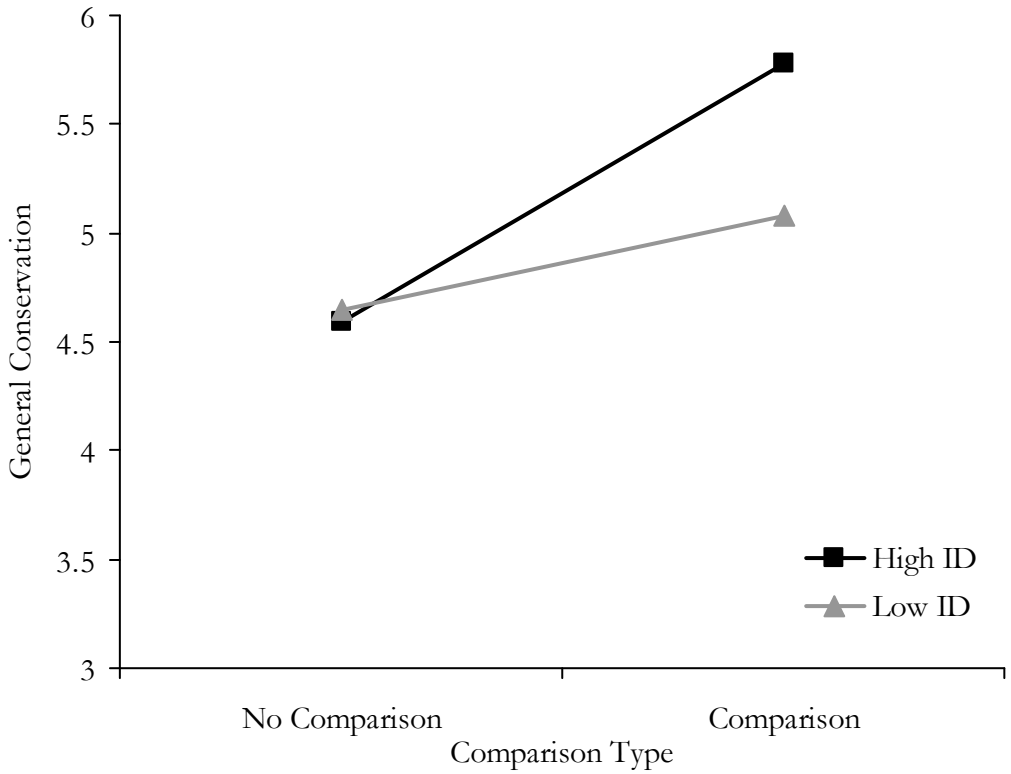

Figure 5.1. The interaction of comparison type and identification on self-reported environmental behaviours one week after discussion, Study 3. "No Comparison" refers to the general intergroup comparison, while "Comparison" refers to the specific intergroup comparison condition.

Moderation of Discussion Length and Content on Pro-Environmental Values

Because all groups viewed pro-environmental behaviour positively, time spent discussing pro-environmental behaviour was chosen as a moderator. If some groups had viewed pro-environmental behaviour negatively, than that factor would need to be added to the analysis. The valence of the discussion content would very likely moderate the outcome on the dependent variables, with more time talking about pro-

environmental behaviour negatively leading to less behaviour, similar to how L. Smith and Postmes (2009, 2010a) found that negative discussion about minorities led to an increase in prejudiced behaviour.

I investigated how discussion length and discussion environmental behaviour content may moderate pro-environmental values, following the methods outlined by Aiken and West (1991) applied in hierarchical linear modelling (HLM) using HLM v6.08 (Raudenbush & Bryk, 2002). This is appropriate because individual-level data is nested within groups. Values at Time 1 or Time 2 were set as the level-1 outcome variable, prior values were set as the level-1 independent variable, while discussion length and environmental behaviour discussion content were set as level-2 predictor variables, along with the interaction term of discussion length and content. Discussion length, discussion content, and pre-existing values were centred with $M = 0$. The full results of these moderations are presented in Tables 5.4-5.6. Significant predictors are reported below.

For environmental values at Time 1, including pre-test values, only pre-test values were a significant predictor, $\gamma = 0.705$, $t(13) = 6.23$, $p < .001$, with no significant effects from discussion length, behavioural content of discussion, or the interaction of these two. See Table 5.4.

For environmental values at Time 2, including pre-test values, pre-test values were a significant predictor, $\gamma = 0.455$, $t(13) = 3.42$, $p = .002$, while behavioural discussion content was marginal, $\gamma = 0.210$, $t(13) = 1.80$, $p = .094$, with more discussion content leading to higher values one week later. Discussion length and the interaction were not significant. See Table 5.5.

Table 5.4.
Moderated HLM Table for Values (Time 1) by Discussion Time and Content with Pre-Test Values, Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	5.400	0.136	39.596	<.001
Time Talking	<0.001	0.001	-0.541	.596
Beh. Content	0.155	0.141	1.097	.291
Pre-test Values	0.705	0.113	6.221	<.001
Step 2				
(Constant)	5.282	0.157	33.545	<.001
Time Talking	-0.001	0.001	-0.692	.501
Beh. Content	0.231	0.148	1.557	.143
Pre-test Values	0.705	0.113	6.228	<.001
Time×Content	<0.001	0.001	1.246	.235

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Values are centred with $M = 0$.

Table 5.5.
Moderated HLM Table for Values (Time 2) by Discussion Time and Content with Pre-Test Values, Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	5.496	0.204	26.894	<.001
Time Talking	-0.002	0.001	-1.603	.131
Beh. Content	0.210	0.209	1.795	.094
Pre-test Values	0.455	0.133	3.421	.002
Step 2				
(Constant)	5.309	0.235	22.546	<.001
Time Talking	-0.002	0.001	-1.823	.091
Beh. Content	0.511	0.222	2.306	.038
Pre-test Values	0.458	0.113	3.448	.002
Time×Content	0.001	0.001	1.420	.179

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Values are centred with $M = 0$.

For environmental values at Time 2, including values at Time 1, Time 1 values were a significant predictor, $\gamma = 0.523$, $t(13) = 4.02$, $p < .001$, as was behavioural discussion content, $\gamma = 0.197$, $t(13) = 2.187$, $p = .047$, with more environmental behaviour discussion content leading to higher values one week later. Discussion length and the interaction were not significant. See Table 5.6. Thus, the more participants discussed environmental behaviours, the more they reported valuing the environment one week later, but not immediately following the discussion. This effect was present when accounting for pre-existing values.

Table 5.6.
Moderated HLM Table for Values (Time 2) by Discussion Time and Content with Values (Time 1), Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	5.441	0.171	31.877	<.001
Time Talking	-0.002	0.001	-1.634	.124
Beh. Content	0.324	0.179	1.813	.091
Values (Time 1)	0.541	0.130	4.168	<.001
Step 2				
(Constant)	5.300	0.204	25.941	<.001
Time Talking	-0.002	0.001	-1.812	0.093
Beh. Content	0.197	0.200	2.187	0.047
Values (Time 1)	0.523	0.130	4.015	<.001
Time×Content	0.001	0.001	1.215	.246

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Values (Time 1) are centred with $M = 0$.

Moderation of Discussion Length and Content on Pro-Environmental Behaviour

To investigate how discussion length and environmental behaviour content may moderate pro-environmental behaviours, I used HLM to follow a similar procedure as above. Discussion length and environmental behaviour content were centred with $M =$

0. The full output of the following moderations is presented in Tables 5.7-5.9. Volunteering intentions were set as the level-1 outcome variable, while discussion length and environmental behaviour discussion content were set as level-2 predictor variables, along with the interaction term of discussion length and content. At Step 1, discussion length was not significant, $\gamma < 0.001$, $t(13) = -1.01$, $p = .33$, and neither was behavioural content, $\gamma = -0.075$, $t(13) = 0.63$, $p = .54$. The interaction was added at Step 2, but this was not significant either, $\gamma < 0.001$, $t(13) = -0.15$, $p = .82$. See Table 5.7.

Table 5.7.
Moderated HLM Table for Volunteering (Time 1) by Discussion Time and Content, Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	-0.011	0.118	-0.097	.924
Time Talking	<0.001	0.001	-1.013	.329
Beh. Content	-0.075	0.119	-0.632	.537
Step 2				
(Constant)	0.001	0.146	0.005	.834
Time Talking	<0.001	0.001	-0.968	.351
Beh. Content	-0.083	0.132	-0.630	.640
Time×Content	<0.001	0.001	-0.146	.887

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Values are centred with $M = 0$.

We repeated the same analyses above using general conservation at Time 2 as the outcome variable. At Step 1, discussion length was not significant, $\gamma < 0.001$, $t(13) = -0.26$, $p = .80$, and neither was behavioural content, $\gamma = 0.34$, $t(13) = 1.46$, $p = .17$. The interaction was added at Step 2, which was significant, $\gamma = 0.003$, $t(13) = 2.32$, $p = .037$. See Table 5.8. To investigate this interaction, I decomposed it with simple slope analyses. When discussion time was low, discussion content had no impact on behaviour, $\gamma = 0.071$, $t(13) = 0.31$, $p = .76$. When discussion time was high, discussion

content had a significant impact on conservation behaviour one week later, γ = 1.067, $t(13) = 2.89$, $p = .013$, with more discussion content leading to more self-reported behaviours. This interaction is plotted in Figure 5.2.

To investigate the role of environmental values, I repeated the analyses above with pre-test values added as an individual-level variable. These results were very similar to the results without controlling for values, with no qualitative differences. In the interest of space, the moderated HLM tables controlling for values can be found in Appendix A. Thus, the connection between environmental behaviour discussion content and behaviour cannot be explained just by pre-existing values.

Table 5.8.
Moderated HLM Table for General Conservation (Time 2) by Discussion Time and Content, Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	4.917	0.232	21.181	<.001
Time Talking	<0.001	0.001	-0.259	.800
Beh. Content	0.339	0.233	1.456	.167
Step 2				
(Constant)	4.600	0.243	18.944	<.001
Time Talking	<0.001	0.001	-0.607	.554
Beh. Content	0.569	0.222	2.561	.024
Time×Content	0.003	0.001	2.322	.037

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking and Behavioural Content of Discussion are centred with $M = 0$.

While hierarchical linear modelling has advantages over traditional multiple linear regression in that it can account for different levels of variance within each nested group, HLM does not have an equivalent to R^2 to report the variance explained by the model. To estimate R^2, I repeated all of the analyses above using traditional

moderated regression techniques. The results were very similar to the results using HLM, with regression tables reported in Appendix B. Notably, the R^2 was very high, R^2 = .37 using pre-test values and discussion to predict future behaviours and R^2 = .50 using Time 2 values and discussion to predict past behaviour.

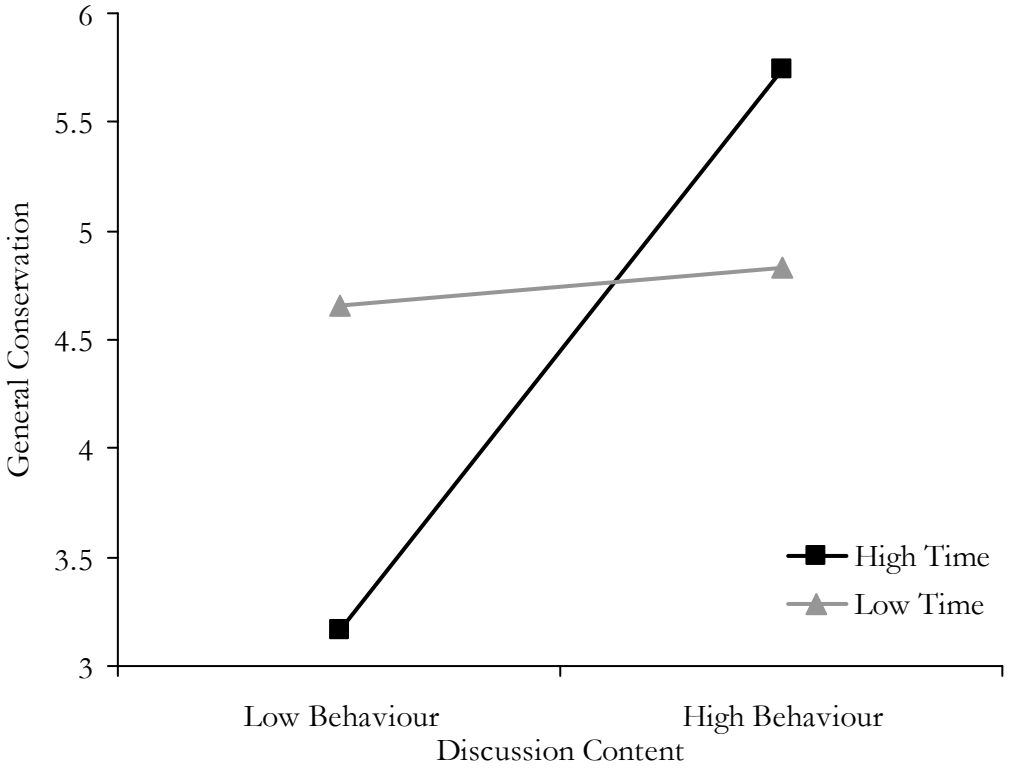

Figure 5.2. The interaction of environmental discussion content and discussion length on self-reported environmental behaviours one week after discussion, controlling for pre-test environmental values, Study 3.

Predictive Power of Environmental Values and Behaviour

To better understand how discussion may influence the connection between values and behaviours, I tested the correlations between values and behaviours, and compared these results to Study 1. Pre-test environmental values were good predictors of volunteering intentions, r = .48, p < .001 and general conservation one week later r = .45, p < .001. At Time 1, after the manipulation and discussion, values remained good predictors of volunteering, r = .33, p = .005 and conservation one week later, r = .48, p < .001. At Time 2, values were an excellent predictor of general conservation, r = .66, p < .001.

I then compared these correlations with those in Study 1 to see if they differed (see Table 5.9 for comparison). A Fisher's z-test found the correlation between pre-test values and volunteering between this study and Study 1 were not significantly different, $z = 1.22$, $p = .22$. Similarly, the difference in correlations between pre-test values and

Table 5.9
Correlation r and R^2 Values of Value Centrality and Env. Behaviours by Presence of Discussion, Studies 1 and 3.

r(R^2)	Pre-Test Values		Values Time 1		Values Time 2	
	No Dis.	Discuss	No Dis.	Discuss	No Dis.	Discuss
Time 1: Volunteering	.32(.10)**	.48(.23)**	.31(.10)**	.33(.11)**	.30(.09)**	.26(.07)†
Time 2: Gen. Conservation	.21(.04)†	.45(.20)**	.16(.03)	.48(.23)**	.31(.10)**	.66(.44)**

Note. The data for "No Discussion" come from Study 1; the data for "Discussion" come from the present study. Volunteering intentions were measured at Time 1. General conservation self-report measures were self-report measures at Time 2, one week after Time 1.
** = $p < .01$; * = $p < .05$; † = $p < .1$

conservation one week later was not significant, $z = 1.43$, $p = .15$. Correlations between studies of values at Time 1 and volunteering were not different, $z = .14$, $p = .89$, but the difference in correlations between Time 1 values and general conservation was significant, $z = 1.9$, $p = .05$, with the relationship being stronger in this study (see Figure 5.3). At Time 2, the correlation between values and general conservation was again significantly different, $z = 2.5$, $p = .01$, with the correlation in this study being stronger than in Study 1, which had no group discussion. Thus, close to the time of manipulation, values and behavioural intentions were similar between studies, but as time progressed, values remained good predictors only in the present study. Engaging in small-group interaction narrowed participants' value-action gap significantly.

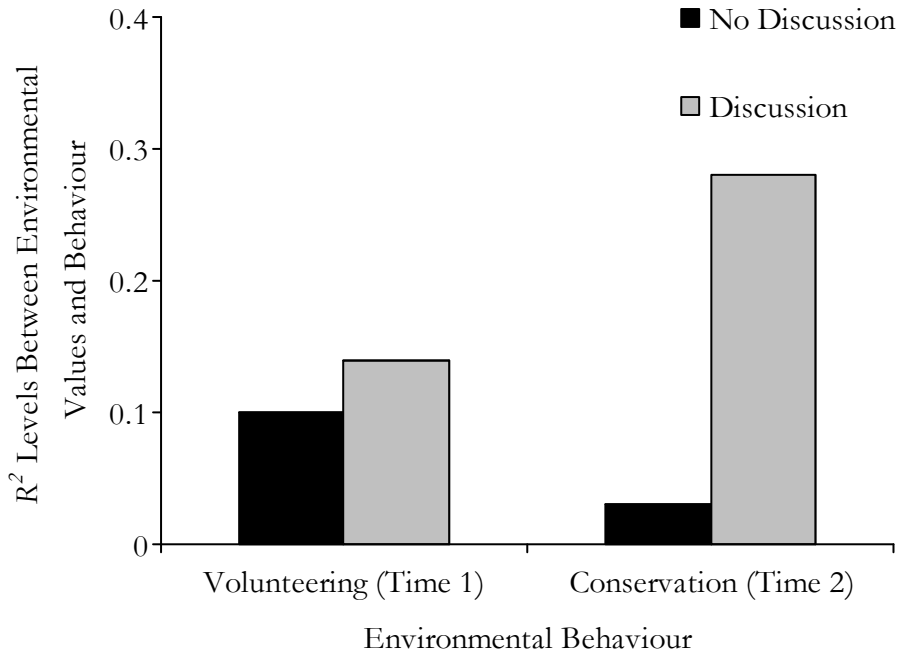

Figure 5.3. R^2 levels of environmental values (Time 1) predicting volunteering intentions (Time 1) and self-reported conservation behaviours one week later (Time 2), Studies 1 and 3.

Discussion

The purpose of this study was to test the effect of small-group interaction on environmental values, intentions, and behaviours. Because the design of this study was very similar to Study 1, the results of these two studies can be compared to examine the effect of discussion. Past research indicates that manipulations that work on individuals in surveys often do not have the same effect after group discussions (Postmes et al., 2001), which may be because inductive social influence over-rides the relatively weaker effect of deductive social influence. In support of this, the present study did not replicate the effects of valence and identity as found in Study 1. Results suggest participants understood the manipulation, as indicated by the manipulation check. Although these results are a departure from Study 1, they are not unexpected.

I also predicted that the environmental behaviour content of the discussion would guide individual values and behaviours through the induction of group norms. I

found the more the group talked about environmental behaviours, the more the individuals valued the environment one week later, though not immediately following the discussion. This was not simply a case of people with high values both talking about and continuing to value the environment, as this effect was strong while controlling for pre-test values and values just after the discussion.

I found a similar effect for self-reported conservation behaviour at Time 2, but not volunteering intentions at Time 1. The non-effect on volunteering at Time 1 may be because none of the groups actually discussed volunteering, while all of the groups discussed the private-sphere everyday conservation behaviours measured at Time 2. When discussion time was short, environmental behaviour content made no impact on behaviours. However, when discussion time was longer, the proportion of that time spent talking about environmental behaviour had a strong impact on the behaviours people reported one week later, with more talk translating into more behaviour. Again, this was not simply a matter of people who value the environment talking about it and then acting on it, as this effect remained strong even when controlling for initial environmental values. Thus, this study offers strong support for the notion that small-group discussion provides a powerful and enduring influence in guiding environmental values and behaviour.

I theorise that the process behind this effect is the induction of local group norms. Based on social identity principles, the subject matter of group discussion implies which ideals are valued by the group and what kind of behaviours are desirable. As group members reach consensus, local group norms are formed. These group norms go on to influence behaviour after the discussion has ended, as people internalise these norms as a part of their self-concept. The outcomes of this study provide support for this notion in the case of self-reported conservation behaviour one week later. However, there was no effect immediately after the discussion on

volunteering behaviour. This may be because environmental volunteering behaviour is notoriously difficult to predict (Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Stern, 2000), or because the inductive norms formed through interaction take some time to become internalised, as was seen with the influence on values in this study. Regardless, the strong effect on self-reported behaviours one week after the discussion suggests discussion can lead to robust and durable effects on behaviour.

In conservation psychology, and social psychology as a whole, many models of normative influence portray norms as being external and coercive (see Chapter 1 for a review). In this theoretical paradigm, people conform to norms not because they want to, but because of the external repercussions if they do not. However, in this study, the effects of normative influence were found in anonymous responses, long after the discussion group had disbanded. This supports a conceptualisation of norms as internally motivating rather than just external and coercive.

An alternative explanation to the effects found here is that individuals simply spent more time and cognitive effort engaging with environmental issues, and any kind of engagement, not just discussion, may be responsible for these effects. Because I did not also test for individual engagement, I cannot definitively rule out this possibility. However, research carried out by L. Smith and Postmes (2010a) compared the effects of group discussion versus individual rumination in exploring discrimination. They found that individual rumination did *not* produce the effects found with group discussion, suggesting individual cognitive engagement is unlikely to have the same effect as group discussion determining environmental behaviours. Thus, I feel confident that while individual engagement of environmental issues are likely to have some effects on behaviours, the processes found in the present study are not simply an aggregate of several individual-level processes that could be recreated with participants in isolation.

The deductive social comparisons in this study did not have the same influence on behaviours as in Study 1. An intergroup comparison led to slightly more conservation behaviour for high identifiers, although this effect was fairly weak. The valence of the feedback, which implied normative behaviour in Studies 1 and 2, did not have any effect in the present study. This is consistent with past research that manipulation effects can recede when combined with small-group interaction (Postmes

et al., 2001). In other research, manipulations sometimes do have an effect, influencing group discussion like a deductively-informed "seed" that grows into an inductively-guided social process (L. Smith & Postmes, 2010a). Like real growing things, the outcome is not always controllable. Discrepancies in normative fit, which may still be influential in individual settings, may recede when the group considers them collectively. In this case, participants may question whether the environmental performance of their university relative to others is actually representative of them personally. Discussion can be a tool for challenging and overcoming existing stereotypes (L. Smith & Postmes, 2010b), and group members may use discussion to dismantle unwanted comparisons and their implied connotations for the ingroup.

The predictive power of the measures used here is noteworthy. Conservation psychology has a history of chronically poor predictions of pro-environmental behaviours. A meta-analysis of attitudinal models of environmental behaviour found a typical prediction of 12% of variance in environmental behaviour explained (Hines, Hungerford, & Tomera, 1986/87), while Stern's VBN model, one of the most elaborate and exhaustive measures, comprising more than 50 items, predicts 19.4% of the variance in past private-sphere environmental behaviours (Stern et al., 1999). In contrast, I used two items (the items comprising values at Time 1) to predict 23% of the variance in *future* private-sphere environmental behaviours and using values at Time 2, 44% of the variance in past private-sphere behaviours was predicted. Using the simple content analysis of the group discussions, 25% of the variance in future pro-environmental behaviours was predicted and 37% was predicted when pre-test values were added to the model. With values at Time 2, the model explains 50% of the variance in concrete, specific self-reported environmental behaviours. This level of explanatory power is unusually strong for the domain of conservation psychology and

highlights the importance of incorporating group-level social influence into theories of environmental behaviour.

Narrowing the Value-Action Gap

A frequent finding among conservation psychologists is that while pro-environmental values are very high among the public, those values are often not actualised into pro-environmental behaviour. This has been termed the value-action gap, and is one of the leading quandaries within conservation psychology as a sub-discipline. In Kollmuss and Agyeman's (2002) review of the environmental value-action gap literature, they find that while explanations are as plentiful as they are diverse, none of these explanations have been particularly informative or predictive of actual outcomes (see Chapter 1 for a review of some common theoretical approaches). While many studies have contributed to narrowing the value-action gap, no theoretical approach has been able to close it or explain it conclusively.

The discussion in this study worked to close the value-action gap significantly. Whereas in Study 1 there was little relationship between values and behaviours, the discussion in the present study strengthened the correlation dramatically (see Figure 5.3). Research into values suggests values influence behaviour when the values are activated (i.e., conscious) and central to the self (Verplanken & Holland, 2002). Small-group interaction can help facilitate both of these aspects, by increasing the conscious links between behaviours and environmental impacts, and making values more or less a part of identity though inductive social identity principles. Although intriguing, the exact process was not documented here, and more research is needed to investigate this further.

Practical Implications

The results of this study offer a number of practical implications. This study demonstrates that discussion content can influence individual environmental values and

behaviours in very powerful ways. The explanatory power found here outstretches most other studies in the research literature, far beyond measuring environmental attitudes (Hines, Hungerford, & Tomera, 1986/87), comprehensive multivariate models (Stern, Dietz, Abel, Guagnano, & Kalof, 1999), or flat-out paying people to conserve (Stern, 1999). One reliable effect found here is that those with high environmental values have even higher values after discussion, and the reverse is true for those with low values. This effect can be exploited by having those with high values discuss the environment more often. However, the effect that discussion content influences behaviour independent of values is more difficult to control. Small-group interaction is an "organic" process, and attempts at outside control may be unsuccessful, especially in public campaigns. If implemented in an intervention setting, a facilitator or preset guided questions may be helpful in keeping discussion topical.

Discussion should not be seen as a panacea for promoting environmental behaviour, as this research shows the strong effects of discussion can just as easily lead to less pro-environmental behaviour instead of more. Even pro-environmental people who are exposed to discussion that devalues the environment may end up engaging in less pro-environmental behaviour. This highlights the importance of not only targeting individuals for change but social groups as well. If discussion is used as an intervention technique, pre-testing may be necessary to identify those with higher values and limit discussion to those individuals, using subtle techniques to keep discussion on topic. This facilitator-led discussion format has already had success in promoting activism behaviours in opinion-based groups (McGarty et al., 2007; Thomas & McGarty, 2009).

Overall, the inductive processes created by small-group interaction appear to be more powerful than the deductive processes explored in the other studies in this thesis. The comparison manipulations that were reliable in the other studies had an effect of comparison type in this study, but not feedback valence. The variance explained by

group discussion in this study is much higher than from comparative feedback received individually in the other studies, making group discussion a good candidate for use in controlled interventions. However, organised discussion would be difficult to implement on a large scale, while comparative feedback is very simple to use publicly, so the size of the target audience and the resources available would be guiding factors in determining which method to use.

Limitations and Future Research

The results found here appear to be robust and informative, but additional research would be helpful in uncovering more information about the underlying theoretical process. Based on the social identity approach, I predicted that group members reach consensus through discussion, which implies local group norms. These internalised norms go on to inform individual behaviours. While past research has found strong support for each of these steps, as reviewed above, I did not measure specific process variables in this study, and I cannot rule out other processes. For example, many participants made verbal commitments to change their behaviour in the discussion. Past research has found eliciting commitments to be an effective way of changing environmental behaviour such as water conservation (Dickerson, Thibodeau, Aronson, & Miller, 1992) and recycling (Fried & Aronson, 1995), and these effects could have been driving part of the behavioural change. However, commitment effects need not be incompatible with or exclusive of social identity processes, particularly when commitments take place within a group setting when group identity is salient. Simply thinking about environmental issues for several minutes may have also served to promote behaviour. To tease apart these alternate processes, future research should include conditions where participants either have a discussion, make an environmental commitment without discussion, or ruminate about environmental issues privately. Research by L. Smith and Postmes (2010b) on discrimination which compared private

rumination to discussion found rumination did not impact discriminatory behaviour while discussion did have an effect, suggesting a special role for the social aspect of discussion. Further research may also uncover additional insights about small-group processes, such as the effect of group conflict on influencing behaviour, and better understanding of the determinants that lead to group discussion content.

While strong effects for discussion were found in this study, other forms of small-group interaction may provide similar effects. In previous studies, computer-mediated communication has also been shown to offer a route to inductive group norm formation (Postmes et al., 2000; Postmes et al., 2001). Further research could be directed at how alternative forms of small-group interaction, such as through the internet, can lead to similar effects. Online discussions may be particularly powerful in guiding behaviour because people often gather online around their particular opinions, allowing the content of their discussion to be more homogenous and consensual than a similar discussion offline. This may be observed on forums and websites dedicated to environmentalism or, likewise, denial of climate change. These groups often become highly-consensual echo-chambers of opinion. Being able to communicate with like-minded others online may provide a competing set of inductive group norms to compete with the prevailing geographical norms.

Although this study did not measure behaviour directly, it did measure specific self-reports of concrete behaviours that participants personally selected. However, specifically-defined self-reports are considered to be fairly robust. Furthermore, studies of small-group interaction in other domains have found behavioural effects (L. Smith & Postmes, 2010b). Thus, I have some confidence that these differences in self-reported behaviour were reflections of changes in real behaviours, and not just perceptions of behaviour.

More generally, conservation psychologists would benefit from integrating social influence factors into their future research. Because human behaviours are socially informed, studying only individual-level variables limits explanatory power to the constraints of the theoretical paradigm, as reviewed in Chapter 1. Relying on self-reported normative influence is not enough, as participants routinely dismiss that their actions are influenced by others (Cialdini, 2005; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008), illustrating the need to measure actual normative influence rather than self-reported influence. Despite this, the results are clear; inductive social influence is a powerful determinant of behaviour, and both future researchers and campaigners would benefit from exploiting this rather than ignoring it.

Conclusion

In summary, this study examined the effect of small-group interaction on environmental values and behaviour. First, the comparative feedback that led to effects in Studies 1 and 2 no longer had an effect with the addition of discussion. Second, environmental behaviour discussion content was found to guide both values and behaviour, with more pro-environmental behaviour content leading to greater values and behaviour one week after discussion. This was independent of initial values, providing support for the notion that group norms developed inductively through discussion play an important role in guiding behaviours. Finally, discussion led to a much stronger connection between environmental values and behaviours. These results may explain why prior research in conservation psychology, which usually does not account for interaction among people, has typically found a poor relationship between values and behaviours.

– CHAPTER 6 –

Differential Effects of Comparisons Between Groups and Comparisons Within Groups

Despite recent growth in research into the psychology of environmental behaviour, relatively little of it has examined the social setting in which environmental behaviour occurs. In Chapters 4 and 5, I examined varying types of intergroup comparisons, and how other factors, such as social identification strength or small-group interaction, can moderate comparison effects. In the present chapter, I will explore how comparisons between groups can be different from comparisons within a group.

The research that exists on social influences and environmental behaviour has tended to look at social influence in the form of intergroup competition. For example, Siero and colleagues (1996) studied energy use at two Dutch factories. At one factory, workers received comparative feedback about how both they and the competing factory were performing at saving energy. The other factory workers received information about their own environmental behaviour but were unaware of the other factory's involvement. The results showed that both groups saved energy in response to feedback, but the group receiving comparative feedback conserved more, and continued to do so six months after the intervention. Although Siero and colleagues did not investigate the psychological mechanisms behind the apparent effects of these group-level comparisons, they attributed these to a "competitive orientation" (p. 245) that became internalised among the factory employees. However, Siero and colleagues do not investigate how comparisons within groups may be different from comparisons between groups.

The aim of the current research is to further explore how the individual's social milieu influences decision-making processes regarding the natural environment.

Specifically, drawing on the social identity approach (Tajfel & Turner, 1979; Turner, 1991), I argue that individual behaviour is often understood and enacted with reference to self-defining social groups. For example, the extent to which issues are perceived to be important often depends on whether they connect to important group memberships, and behaviours are more likely to be enacted to the extent that they are consistent with salient group norms (e.g., Smith, Terry, Crosier, & Duck, 2005; see also Hogg & Smith, 2007). Thus, the performance of one's group with respect to environmental issues (e.g., Siero et al., 1996) can seem to frame the ways in which individuals think about and engage in environmental behaviour. The present research addresses this issue by demonstrating that not only is group context important to understand how people respond to social feedback, but small differences in the framing of social comparisons have substantial power to influence how we perceive and act upon that feedback.

Social Identity and Influence

Individual behaviour can be particularly intractable even in the face of concerted efforts to promote change, a point that has been demonstrated in a variety of domains including drug abuse prevention (Derzon & Lipsey, 2002; West & O'Neal, 2004), sexual health (Albarracín et al., 2005; Brückner & Bearman, 2005; Hauser, 2004; Trenholm et al., 2007), and conservation behaviour (Stern, 1999; Stern et al., 1986). Many unsuccessful behaviour change campaigns share the assumption that each person will make their own choices based on the facts they have, the attitudes they hold, and their rational self-interest. In contrast to this assumption, there is ample evidence that individual knowledge (e.g., Hornik, 1989; Kollmuss & Agyeman, 2002) and general attitudes are poor predictors of specific behaviours (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Newhouse, 1990; Wicker, 1969). Even individual economic incentives tend to fare poorly (Stern, 1999; Stern et al., 1986). Thus, although important,

individual factors (i.e, knowledge, attitudes, and incentives) seem to provide an incomplete account of the process of behaviour change. One reason for this is that individual decisions about how to act in a given domain are also framed by a multitude of social influences (Hornik, 1997), the power of which is often underestimated (Cialdini, 2005; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). Instead of ignoring sources of social influence, those who seek to change behaviour may do better by capitalising on them, and harnessing their persuasive power.

The social identity approach offers a comprehensive account of when and why different sources of social influence can become effective guides to individual behaviour. According to this perspective, comprising both social identity theory (Tajfel & Turner, 1979) and self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), people are members of a number of different social groups (e.g., nationality, occupation, gender, etc). These group memberships can be an important basis for identity alongside more personal preferences and experiences. The approach predicts that when a group membership is the salient basis for self-definition in a given context, individuals will tend to appraise the situation through the lens of that identity, and their thoughts, feelings, and actions will reflect the shared norms, values and standards associated with that identity. In this way, social influence occurs through the mechanism of shared group membership (Turner, 1991). Importantly, rather than being a force imposed externally upon an individual, social influence stems from an internalised sense of identity.

In addition to highlighting the importance of social identities to individual behaviour, another key aspect of this approach is the idea that identities are flexible and dynamic. The specific identities that are salient, and the meaning that is attached to these, vary in response to context (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990). Here, intergroup comparisons are thought to be particularly important: what it

means to be a member of one group is often defined in contrast to relevant outgroups. For example, Doosje, Haslam, Spears, Oakes, and Koomen (1998) demonstrated that whether or not psychologists described themselves as dramatic or scientific dependent on whether they compared their group to physicists or dramatists, respectively. Applying these principles to the environmental domain, research by Rabinovich, Morton, Postmes, and Verplanken, (2008) explored how intergroup comparisons influence ingroup stereotypes and individual environmental action. Consistent with the social identity approach, their results showed that when British participants compared their group to the USA (a stereotypically poor-performing group in environmental terms) they perceived their nation as more stereotypically environmental than when they compared this group to Sweden (a stereotypically well-performing group in environmental terms). In addition to shifting ingroup stereotypes, these comparisons shifted individual environmental intentions: British participants reported more positive environmental intentions after comparing their group to the USA, and less positive intentions after comparing their group to Sweden. Importantly, these effects on individual intentions were mediated through the centrality of environmental values to the self. Thus, intergroup comparisons define not just who we are collectively, but also who the individual is as a group member and how they act in turn.

The effects of Rabinovich and colleagues (2008) provide an important qualification to the work of Siero et al. (1996). Rather than all forms of intergroup comparison increasing pro-environmental action via activation of a "competitive orientation", positive intergroup comparisons are likely to be more effective at encouraging behaviour via the internalisation of positive stereotypes about one's group. Thus, the extent to which comparisons facilitate behaviour is likely to be contingent on the extent to which these contribute to a positive sense of identity, at least in intergroup contexts. In the absence of a comparison outgroup (i.e., in intragroup contexts) these

processes of self-stereotyping are likely to play less of a role, and accordingly the superiority of positive comparisons may also recede. Under these conditions, negative comparisons may in fact be more effective at stimulating behaviour than positive comparisons.

In the absence of a comparison outgroup, group members may reflect on how their current behaviour meets their group's own standards, implicitly suggesting a group goal of resolving any discrepancies between the group's standards and actual group performance. Past research has found that goals generated from within the group are more motivating, lead group members to be more willing to compensate for weaker group members, and to place a higher importance on group success than when goals are instigated from outside the group (Wegge & Haslam, 2005). The effectiveness of group goal-setting is explained through self-categorization theory (Turner et al., 1987), where the act of group categorization leads to increased social identity accessibility and fit, and people see themselves more as prototypical group members and less as individuals. This in turn reinforces a sense of common fate and purpose (Oakes, Haslam, & Turner, 1991; Wegge & Haslam, 2003).

If the group has improved upon their past behaviour, group members are likely to conclude that they are living up to their own standards. This may contribute to positive feelings, but there may be little motivation to continue to improve, as people feel they, or their group, have "done enough". This is consistent with the "boomerang effect," whereby unqualified positive feedback results in reduced environmental behaviour (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). Similarly, positive intragroup comparisons over time have also been found to reduce motivation to combat sexism (Schmitt, Spoor, Danaher, & Branscombe, 2009); positive intragroup comparisons of discrimination against women (i.e., how gender equality has improved over time) led female participants to be relatively content with current levels of

discrimination against women, to expect sexual discrimination to be less frequent, and to be more weakly identified with other women. When the comparisons were intergroup (i.e., how women are still treated less than equally with men today) women were more dissatisfied with current levels of gender discrimination. In other words, drawing attention to improvement on past problems can lead to complacency and reduced motivation, even if the original problem still exists.

In contrast, negative intragroup feedback should highlight the extent to which the group's current performance is not living up to its own standards. The discrepancy between present performance and the standards set by their group in the past suggests an unspoken goal that the group should restore their collective performance to match their shared standards. Unlike with intergroup comparisons, no outgroup is readily available for group members to contrast and self-stereotype against. Consistent with self-categorization theory, this intragroup comparison will lead group members to a sense that the group problem is shared and should be addressed collectively with a common purpose (Wegge & Haslam, 2003). While negative feedback can elicit defensiveness and rejection when it is linked to an outsider (the intergroup sensitivity effect: Hornsey, 2005; Hornsey & Esposo, 2009), decoupling criticism from an outside group and keeping the context of the criticism 'in house' can lead people to take that feedback constructively and to act on it. Thus, intragroup comparisons can provide a more productive context to provide negative feedback than with intergroup comparisons, where the association of an outside group may lead to outright rejection of any criticism.

The Present Research

In this chapter, I examine the effects of different types of comparison on individual intentions in the environmental domain. Chapter 4 has already examined some of these ideas, but only in the context of intergroup comparisons. Previous

research has demonstrated that intergroup comparative feedback can motivate positive environmental behaviour (Siero et al., 1996), but that the effect of such intergroup comparisons may be contingent on the extent to which they portray the ingroup in a positive light (Rabinovich et al., 2008). To address this question, I considered how the effects of feedback valence might be contingent on the group-based context of the feedback. Specifically, although positive feedback may be superior to negative feedback in the context of intergroup comparisons, negative feedback may be more motivating in the context of intragroup comparisons. In addition, different processes may be responsible for the effects of comparative feedback in inter- versus intragroup contexts.

In line with self-categorization theory, I expect that intergroup comparisons result in perceptions that contrast the ingroup away from outgroup standards. Thus positive comparisons (i.e., with a poorer performing outgroup) elicit greater conservation behaviour because group members come to see their group, and therefore themselves, as people who value and act to protect the environment. Negative comparisons (i.e., with a better performing outgroup) should instead lead to disengagement from conservation behaviour as group members perceive concern for the environment is not a central value for their group or their self. Along these lines, the process behind intergroup comparison effects should stem from shifting perceptions of the ingroup stereotype, which is then internalised into the self (i.e., self-stereotyping).

Drawing on more general principles from the social identity approach, my expectation is that intragroup comparisons should lead to different effects. In the absence of an outgroup, the ingroup should be the focus of attention and group members should be more attuned to whether their ingroup is living up to its own standards. If group standards are not being met, this implies a shared goal of matching their behaviour to their standards. Accordingly, in intragroup contexts, positive

comparisons should lead to less conservation behaviour as people feel the group's goals have been accomplished (see Schultz et al., 2007; Spoor & Schmitt, 2009). Conversely, negative comparisons should lead to greater conservation behaviour as this situation highlights how the ingroup has fallen short of its own standards, increasing motivation to perform better.

In sum, my predictions involve different effects of group-level comparative feedback (positive, negative) on individual behaviour depending on whether that feedback involves intergroup or intragroup comparisons. To test these predictions I conducted two experiments in which participants received feedback about Britain's national CO_2 emissions either in comparison to an outgroup or to Britain's own previous performance (i.e., an intergroup versus an intragroup comparison). The specific information presented in these comparisons was varied such that it was either relatively positive for the ingroup (i.e., Britain was doing better than an outgroup or its own past) or relatively negative for the ingroup (i.e., Britain was doing worse than an outgroup or its own past). Importantly, the actual level of Britain's CO_2 emissions remained constant across conditions; only the comparative information varied.

STUDY 4

Method

Participants

Participants (N = 104) were university students of ages 18 to 50, with a median age of 20 years. All participants were British citizens. Participants were recruited by email from a list of university students who had volunteered at the start of the academic year to take part in psychological studies. Participation was rewarded with a chance to win one of four online vouchers worth £20 each.

Design

This study used a 2 × 2 between-subjects design, with independent variables of comparison type (intergroup or intragroup) and comparison valence (positive, negative). All information collected from participants was gathered in the form of an online questionnaire. The manipulations were contained in an explanatory text read by participants before they completed the dependent variables (conservation behavioural intentions, environmental value centrality, and shared responsibility). Items were measured on a 7-point Likert-style scale anchored with "Strongly Disagree" and "Strongly Agree" or similar labels, depending on the context of the item.

Manipulations

In the intergroup comparison condition, participants were provided with information about Britain's environmental performance relative to other nations. Specifically, they were told British people were either polluting half as much as Americans (a relatively positive, downward comparison) or twice as much as Swedes (a relatively negative, upward comparison). The exact wording of the manipulation was as follows:

> The UN Statistics Division tracks greenhouse gas emissions from each nation. They found that in 2004, the average British person emitted 9.8 tonnes of CO2 equivalent greenhouse gasses. In comparison, the average **American [Swedish]** person polluted far **more**, **20.4 [less, 4.7]** tonnes of greenhouse gasses. Per person, British people are polluting **less than half [more than twice]** as much as **American [Swedish]** people.

Words in bold indicate text that varied depending on condition, with the words out of square brackets appearing in the positive intergroup comparison manipulation, and words in square brackets in the negative intergroup comparison. The bolding and

brackets were not present in the original text. In the intragroup comparison condition, the wording of the manipulation was identical, except that the comparisons were made with British people of the past, rather than people from other nations. Specifically, participants were told that British people were now polluting half as much as British people 10 years ago (a positive comparison) or twice as much as British people 10 years ago (a negative comparison). The actual amount that British people were said to be polluting today remained the same across conditions. To check the effectiveness of this manipulation, immediately after reading the text participants were asked the extent to which they agreed that "Britain is taking better care of the environment than Sweden/America/in the past".

Measures

After participants were exposed to the manipulations, participants completed measures of national stereotypes and intentions to engage in conservation behaviour.

National stereotypes. After reading the manipulations and completing the manipulation check, participants first completed eight items concerning national stereotypes about Britain, America and Sweden in terms of the dimensions of competence ("competent," "intelligent," and "skilled", $\alpha = .89$ for the ingroup; $\alpha = .91$ for the outgroup), warmth ("warm," "friendly," and "trustworthy", $\alpha = .85$ for the ingroup; $\alpha = .77$ for the outgroup), and environmentalism ("environmentally aware" and "environmentally active", $\alpha = .65$ for the ingroup; $\alpha = .98$ for the outgroup). In the two intra-group comparison conditions, only stereotypes about British people were measured.

Conservation intentions. Conservation intentions were then measured through the item, "Over the next week, do you intend to do environmental behaviours like save energy and recycle?" This was anchored with "not at all" and "very much so" on a 7-point scale.

Procedure

Participants were invited to participate in the study through email and given a link to one of the four surveys. Participants were not aware of the experimental design or that there were multiple versions of the survey. Once participants completed the survey, they were debriefed and compensated via email.

Results

Full descriptive statistics are presented in Table 6.1.

Table 6.1.
Means and Standard Deviations of All Variables in Studies 4 and 5 by Feedback Valence and Comparison Type.

Study 4	Intergroup		Intragroup		Total
	Positive	Negative	Positive	Negative	
Manipulation Check	6.03(0.80)	2.59(1.35)	5.33(1.32)	3.43(1.65)	4.36(1.93)
Ingroup Competence	4.77(0.84)	4.72(1.00)	4.40(1.17)	4.46(1.11)	4.62(1.02)
Ingroup Warmth	4.02(1.03)	4.07(1.22)	3.81(1.13)	3.96(1.18)	3.98(1.12)
Ingroup Environmental	4.48(0.79)	4.24(1.19)	3.81(0.97)	3.85(1.00)	4.14(1.02)
Outgroup Competence	4.24(1.18)	5.21(0.71)	—	—	4.71(1.09)
Outgroup Warmth	4.63(1.04)	4.60(0.92)	—	—	4.62(0.98)
Outgroup Environmental	2.04(1.04)	5.76(0.80)	—	—	3.84(2.08)
Conservation Intentions	4.81(1.30)	4.90(1.61)	5.48(1.50)	5.30(1.19)	5.08(1.42)
Study 5	**Intergroup**		**Intragroup**		**Total**
	Positive	Negative	Positive	Negative	
Manipulation Check	6.00(1.30)	2.19(1.07)	5.66(1.10)	3.28(1.65)	4.33(2.06)
Env Value Centrality	4.37(1.36)	3.60(1.27)	4.11(1.42)	4.73(1.20)	4.17(1.37)
Shared Env Responsibility	5.95(1.12)	5.38(1.40)	5.41(1.48)	6.03(0.74)	5.66(1.27)
Conservation Intentions	5.44(1.27)	4.79(1.62)	5.11(1.59)	5.62(1.19)	5.21(1.47)

Note. All scores measured on a scale of 1 to 7.

Manipulation Check

The manipulation check indicated that participants understood the manipulation. In a 2 × 2 ANOVA, there was a main effect of valence, $F(1,100) = 110.14$, $p < .001$, $\eta_p^2 = .52$, with participants in the positive conditions having rated Britain as performing better at environmental behaviour ($M = 5.75$, $SD = 1.08$) than those in the negative conditions ($M = 2.96$, $SD = 1.53$). There was no main effect of comparison type, $F(1,100) = .086$, $p = .77$, $\eta_p^2 = .001$. However, the effect of valence was qualified by a significant interaction, $F(1,100) = 9.23$, $p = .003$, $\eta_p^2 = .085$, with the magnitude of the difference being greater for intergroup comparisons ($M_{positive} = 6.03$, $SD = 0.80$; $M_{negative} = 2.59$, $SD = 1.35$) rather than intragroup comparisons ($M_{positive} = 5.33$, $SD = 1.32$; $M_{negative} = 3.43$, $SD = 1.65$). Thus, the manipulation was successful, but especially so for intergroup comparisons.

National Stereotypes

To analyse national stereotypes, I conducted a series of ANOVAs. Outgroup stereotypes only applied to intergroup comparison conditions and were analysed with one-way ANOVAs of positive and negative valence. For outgroup competence, there was a main effect of valence, $F(1,58) = 14.69$, $p < .001$, $\eta_p^2 = .20$, with the Swedish ($M = 5.21$, $SD = 0.71$) viewed as more competent than Americans ($M = 4.24$, $SD = 1.18$). For outgroup warmth, there was no significant difference between groups, $F(1,58) = 0.02$, $p = .89$, $\eta_p^2 < .001$. For outgroup environmentalism, there was a large main effect, $F(1,58) = 239.32$, $p < .001$, $\eta_p^2 = .81$, with the Swedish ($M = 5.21$, $SD = 0.71$) seen as more pro-environmental than the Americans ($M = 2.05$, $SD = 1.04$).

Ingroup stereotypes were analysed with 2 × 2 ANOVAs of comparison type and valence. For ingroup national stereotypes of competence, there was no main effect of valence, $F(1,100) = 0.002$, $p = .97$, $\eta_p^2 < .001$, comparison, $F(1,100) = 2.49$, $p = .118$, $\eta_p^2 = .02$, or significant interaction, $F(1,100) = 0.08$, $p = .77$, $\eta_p^2 = .001$. For ingroup

stereotypes of warmth, there were no significant effects, valence, $F(1,100) = 0.19$, $p = .69$, $\eta_p^2 = .002$, comparison, $F(1,100) = 0.52$, $p = .47$, $\eta_p^2 = .005$, or significant interaction, $F(1,100) = 0.05$, $p = .83$, $\eta_p^2 < .001$. For environmentalism, there was no significant effect of valence, $F(1,100) = 0.27$, $p = .61$, $\eta_p^2 = .003$, but there was a significant effect of comparison type, $F(1,100) = 7.26$, $p = .008$, $\eta_p^2 = .07$, with intergroup comparisons ($M = 4.37$, $SD = 1.00$) leading to more environmental stereotypes than intragroup comparisons ($M = 3.83$, $SD = 0.98$). The interaction was not significant, $F(1,100) = 0.50$, $p = .48$, $\eta_p^2 = .005$.

Conservation Intentions

To analyse conservation intentions, I ran a 2 × 2 ANOVA of comparison type and valence on environmental behaviour intentions. The results revealed a marginally significant effect of comparison type, $F(1,100) = 3.69$, $p = .058$, $\eta_p^2 = .036$, with intergroup comparisons associated with lower environmental behaviour ($M = 4.85$, $SD = 1.45$) than intragroup comparisons ($M = 5.39$, $SD = 1.33$). The main effect of valence was not significant, $F(1,100) = .02$, $p = .89$, $\eta_p^2 < .001$, and neither was the interaction, $F(1,100) = .22$, $p = .64$, $\eta_p^2 = .002$.

Discussion

For national stereotypes, participants did find the Swedish to be more pro-environmental than the Americans. However, British stereotypes did not change, except for an increase in pro-environmental stereotypes with intergroup comparisons over intragroup comparisons. This may be a social-competition effect.

For the conservation intentions, the only effect found was that intergroup comparisons led to slightly less behaviour than intragroup comparisons. This is unexpected for social identity theory, and at odds with the national stereotype results, as social competition through comparisons typically causes an increase in behaviour rather than a decrease.

These results did not support my predictions, and are not in line with prior research on intergroup comparisons. However, several participants left feedback that they found the national stereotyping questions to be offensive and inappropriate. In prior studies that have measured national stereotypes (e.g., Rabinovich et al, 2008), the questions have been more subtle than ours. I believe that this measure may have confounded the study's results by causing participant hostility toward the experiment and clouding potential results. To investigate this further, I repeated the study, but without the national stereotype questions. The additional process variables of environmental value centrality and shared environmental responsibility were also included.

STUDY 5

In this study, I seek to improve upon the previous study by removing the potentially confounding effect of the national stereotype questions. Additionally, process variables have been included to further investigate how the predicted changes occur.

For intergroup comparisons, the between-group, deductive comparison should lead to a change in self-stereotyping, defined by a shift in the values which are considered central to the group. To document this empirically, the effects of intergroup comparisons are predicted to be mediated through changes in the centrality of environmental values to the self in response to intergroup comparisons. This chain of effects has been demonstrated in previous research (i.e., Rabinovich et al., 2008).

For intragroup comparisons, the opposite behavioural effects from intergroup comparisons are expected, and for this process to be focused on meeting internal group goals. This should be mediated by a re-emphasis on collective standards and particularly shared responsibility, because when group goals are internally devised, rather than

imposed from outside, groups efforts are characterized by shared responsibility for accomplishing those goals (Wegge & Haslam, 2003).

Method

Participants

Participants (N = 157) were university students of ages 18 to 47 years, with a median age of 19. Similar to Study 4, all participants were British citizens. Participants were recruited by email from a list of university students who had volunteered at the start of the academic year to take part in psychological studies. Participation was rewarded with a chance to win one of eight online vouchers worth £20 each.

Design

This study used the same 2 × 2 between-subjects design, with independent variables of comparison type (intergroup or intragroup) and comparison valence (positive, negative) as in Study 4.

Manipulations

The manipulation and manipulation check were identical to Study 4.

Measures

After participants were exposed to the manipulations, participants completed the same measures as in Study 4, with the exception of national stereotypes, and the addition of environmental value centrality and perceptions of shared national responsibility for environmental care.

Environmental value centrality. Participants indicated their agreement with the following statements: "Protecting the environment is not really central to my values," and, "In the scheme of things, there are a lot of other issues that are more important than the environment," anchored with the labels "strongly disagree" and "strongly agree" on a 7-point scale. These items were phrased as reverse items to reduce social desirability and restricted variance that can occur with positively-framed value items.

These items were significantly correlated ($r = .52$, $p < .001$) and scored such that higher scores indicated that the environment was a more central value.

Shared environmental responsibility. This was measured through the single item, "Citizens share responsibility for their nation's environmental record" in which participants indicated their agreement on a 7-point scale anchored with "strongly disagree" and "strongly agree".

Procedure

As in Study 4, participants were invited to participate in the study through email and given a link to one of the four surveys. Participants were not aware of the experimental design or that there were multiple versions of the survey. Once participants completed the survey, they were debriefed and compensated via email.

Results

Manipulation Check

The manipulation check indicated that participants understood the manipulation. In a 2 × 2 ANOVA, there was a main effect of comparison valence, $F(1,153) = 229.44$, $p < .001$, $\eta_p^2 = .60$, with participants in the positive comparison conditions rating Britain as performing better at environmental behaviour ($M = 5.82$, $SD = 1.20$) than those in the negative conditions ($M = 2.66$, $SD = 1.45$). No significant main effect of comparison type was found, $F(1,153) = 3.37$, $p = .07$, $\eta_p^2 = .02$. However, the effect of comparison valence was qualified by a significant interaction, $F(1,153) = 12.28$, $p = .001$, $\eta_p^2 = .07$, with the magnitude of the difference being greater for intergroup comparisons ($M_{positive} = 6.00$, $SD = 1.30$; $M_{negative} = 2.19$, $SD = 1.07$) than for intragroup comparisons ($M_{positive} = 5.66$, $SD = 1.10$; $M_{negative} = 3.28$, $SD = 1.65$). Thus, as in Study 4, the manipulation was successful, but especially so for intergroup comparisons.

Conservation Intentions

To test the effect of the experimental manipulation on conservation behaviour intentions, I conducted a 2 × 2 ANOVA. This analysis revealed no main effects of feedback valence, $F(1,153) = .09$, $p = .77$, $\eta_p^2 = .001$ or comparison type, $F(1,153) = 1.23$, $p = .27$, $\eta_p^2 = .008$. There was, however, a significant interaction, $F(1,153) = 6.23$, $p = .014$, $\eta_p^2 = .04$. This interaction is depicted in Figure 6.1.

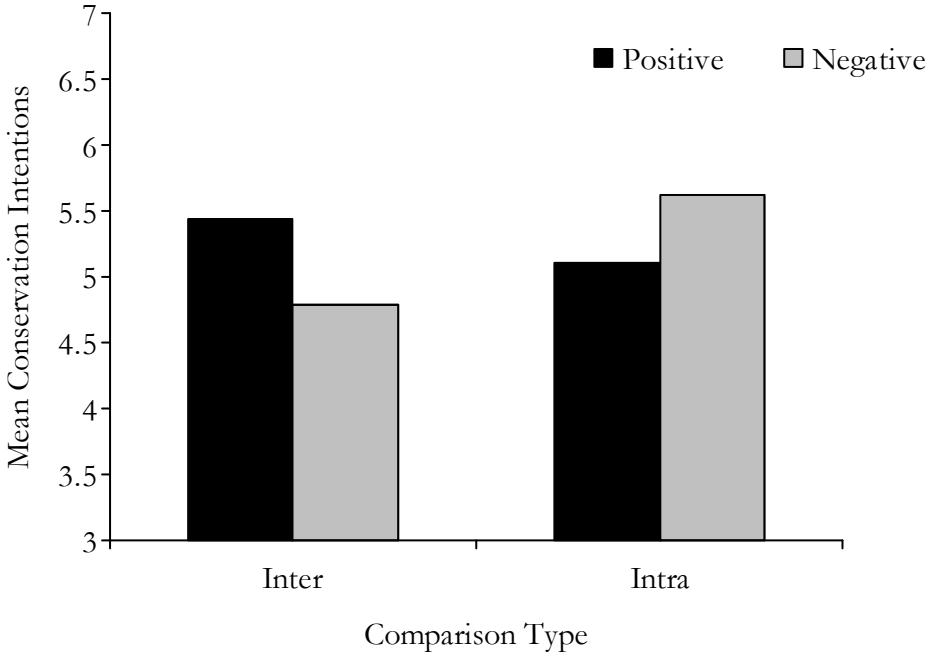

Figure 6.1. Mean shared conservation intentions by feedback valence and comparison type, Study 5.

Follow-up analyses revealed a significant effect of comparison valence in the intergroup comparison condition, $F(1,153) = 4.08$, $p = .045$, $\eta_p^2 = .026$: positive comparisons ($M = 5.44$, $SD = 1.27$) were associated with stronger intentions to engage in conservation behaviour than negative comparisons ($M = 4.79$, $SD = 1.62$). The same effect did not reach significance in the intragroup condition, $F(1,153) = 2.31$, $p = .13$, $\eta_p^2 = .015$. However, the pattern of means was in the opposite direction with negative comparisons ($M = 5.63$, $SD = 1.19$) associated with stronger intentions than positive comparisons ($M = 5.11$ $SD = 1.59$). Looked at differently, there was a significant effect

of context for negative comparisons, $F(1,153) = 6.11$, $p = .02$, $\eta_p^2 = .04$, such that intergroup comparisons resulted in weaker behavioural intentions ($M = 4.79$, $SD = 1.66$) than intragroup comparisons ($M = 5.62$, $SD = 1.19$). There was no effect of context for positive comparisons, $F(1,153) = 1.03$, $p = .31$, $\eta_p^2 = .007$. In combination, these patterns suggest that the effects of comparative feedback on intentions depends on the context of that feedback: Negative feedback elicits stronger intentions when delivered in an intragroup context than an intergroup context, whereas positive feedback is more effective in intergroup contexts than negative feedback.

The same analysis performed on value centrality revealed a significant main effect of comparison type, $F(1,153) = 4.28$, $p = .04$, $\eta_p^2 = .03$, with intragroup comparisons ($M = 4.38$, $SD = 1.36$) associated with higher levels of environmental value centrality than intergroup comparisons ($M = 3.97$, $SD = 1.36$). There was no effect of comparison valence, $F(1,153) = 0.13$, $p = .72$, $\eta_p^2 = .001$. However, the interaction between these factors was significant, $F(1,153) = 10.76$, $p = .001$, $\eta_p^2 = .07$. As can be seen in Figure 6.2, this mirrored the pattern found for conservation behaviour intentions.

Follow-up comparisons revealed that the interaction was driven by significant, but opposing, effects in the intergroup and intragroup conditions. In the intergroup condition, positive comparisons ($M = 4.37$, $SD = 1.36$) were associated with greater centrality of environmental values than negative comparisons ($M = 1.27$, $SD = 1.27$), $F(1,153) = 6.95$, $p = .009$, $\eta_p^2 = .04$. In the intragroup condition this was reversed, with negative comparisons ($M = 4.73$, $SD = 1.20$) associated with greater centrality of environmental values than positive comparisons ($M = 4.11$, $SD = 1.43$), $F(1,153) = 4.07$, $p = .026$, $\eta_p^2 = .03$.

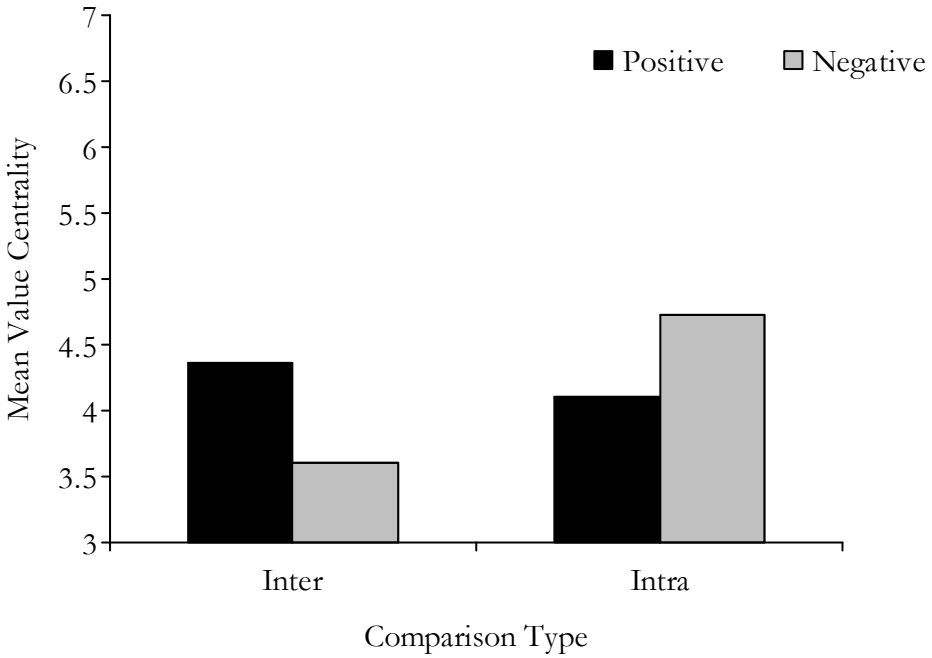

Figure 6.2. Mean environmental value centrality by feedback valence and comparison type, Study 5.

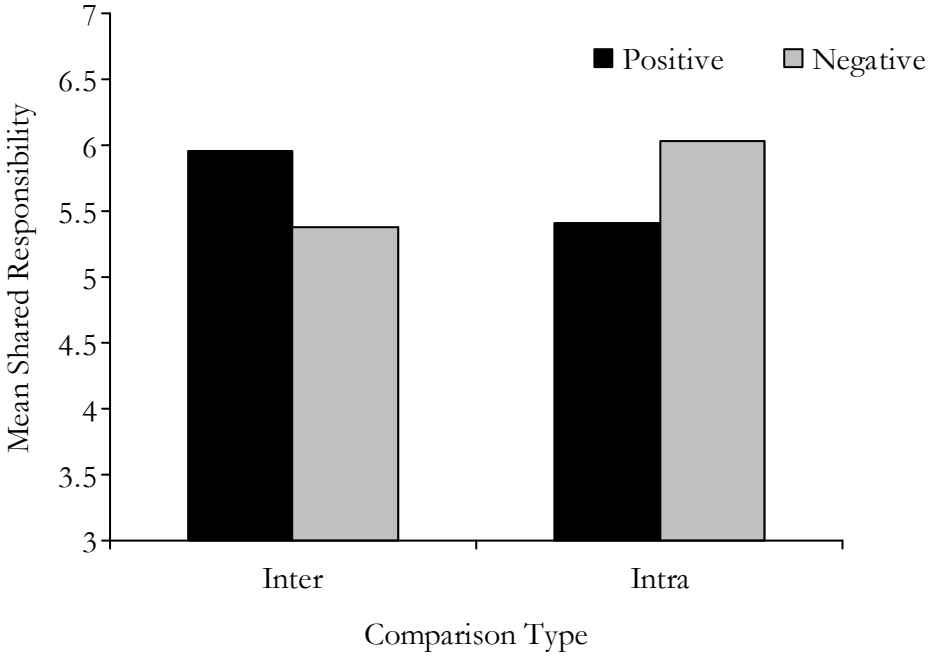

Figure 6.3. Mean shared environmental responsibility by feedback valence and comparison type, Study 5.

The ANOVA on shared responsibility revealed no significant main effects of comparison type, $F(1,153) = 0.76$, $p = .78$, $\eta_p^2 < .001$, or valence, $F(1,153) = 0.18$, $p = .89$, $\eta_p^2 < .001$, but the two-way interaction between these factors was significant, $F(1,153) = 8.75$, $p = .004$, $\eta_p^2 = .05$ (see Figure 6.3). Follow-up tests again revealed that this was due to significant, but opposing, effects of valence in each of the comparison conditions. In the intergroup comparison condition, positive comparisons ($M = 5.95$, $SD = 1.12$) were associated with a stronger sense of shared responsibility than negative comparisons ($M = 5.38$, $SD = 1.48$), $F(1,153) = 4.17$, $p = .043$, $\eta_p^2 = .03$. In the intragroup condition, this pattern was reversed with negative comparisons ($M = 6.03$, $SD = 0.74$) associated with a stronger sense of shared responsibility than positive comparisons ($M = 5.41$ $SD = 1.48$), $F(1,153) = 4.58$, $p = .034$, $\eta_p^2 = .03$.

Mediation

Our expectation was that the differential effects of comparison type in response to intergroup and intragroup comparisons would be differentially mediated by value centrality (in the intergroup condition) and shared responsibility (in the intragroup condition). Given the parallel patterns of effect, each of these patterns of mediation was possible.

To test whether value centrality mediated the effect of comparison valence on intergroup comparisons I conducted a series of regressions following the logic of Baron and Kenny (1986). As demonstrated in the above analyses, in the intergroup comparison condition, there were significant effects of comparison valence (coded as positive = 1, negative = 2) on conservation intentions ($\beta = -0.22$, $p = .049$) and value centrality ($\beta = -0.29$, $p = .009$). When both comparison valence and value centrality (the proposed mediator) were included as simultaneous predictors of intentions, value centrality was a significant predictor of conservation intentions ($\beta = 0.36$, $p = .001$), but valence was not ($\beta = -0.12$, $p = .29$). A significant Sobel test ($z = -2.09$, $p = .037$)

confirmed that value centrality was a statistically significant mediator of the effect on conservation intentions. I then tested whether similar mediation effects occurred in the intragroup comparison conditions. Comparison valence was not found to be a successful predictor of conservation intentions (β = .18, p = .13), while value centrality was modestly significant (β = .23, p = .049). When both valence and value centrality were included together, valence was not significant (β = .08, p = .48) while value centrality was significant (β = .45, p < .001). A Sobel test showed this was not significant (z = 1.81, p = .07). Thus, the mediating effect of value centrality was significant for intergroup comparisons but not intragroup comparisons. This mediation is depicted in Figure 6.4.

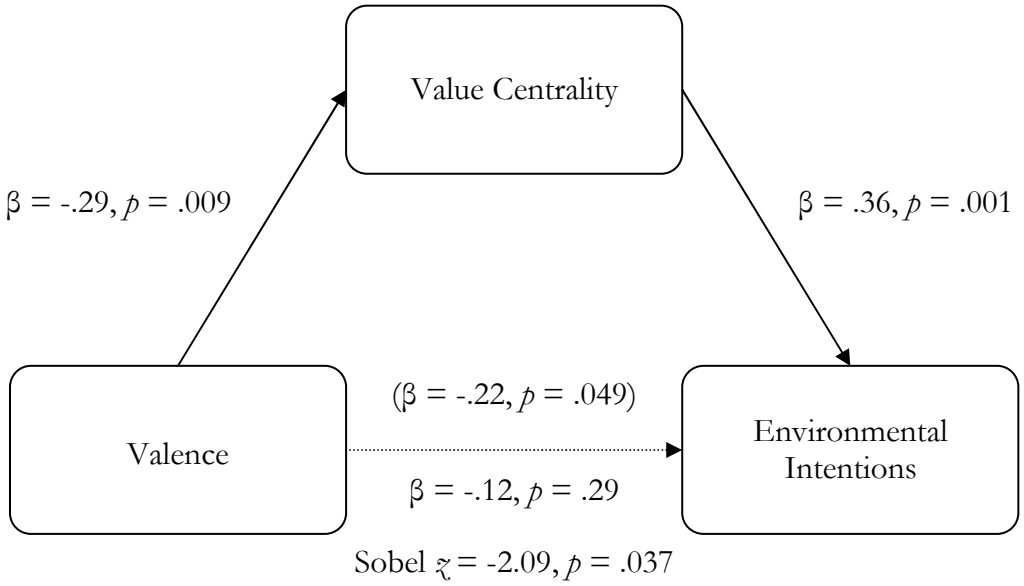

Figure 6.4. Mediation of value centrality on valence and environmental intentions for intergroup comparisons, Study 5.

We conducted a similar analysis as above with shared responsibility as a mediator in the intragroup comparisons. As per the previous analyses, though trending in the predicted direction, valence was not a significant predictor of conservation intentions, (β = 0.36, p = .13). However, comparison valence did predict shared

responsibility (β = 0.25, p = .032). With both predictors entered, shared responsibility significantly predicted conservation intentions (β = 0.49, p < .001), and the effect of comparison valence reduced further (β = 0.06, p = .59). A significant Sobel test (z = 1.98, p = .048) confirmed that shared responsibility mediated the effect of comparison valence on conservation intentions. I then tested whether this mediation effect would occur with intergroup comparisons. Valence was a modest predictor of conservation intentions (β = -0.22, p = .049) and shared responsibility (β = -0.22, p = .048). When both valence and shared responsibility were included in the model together, the modest effect of valence remained unchanged (β = -0.23, p = .049), while shared responsibility did not predict intentions at all (β = -0.03, p = .78). A Sobel test confirmed there was no mediation effect (z = 0.28, p = .78). Thus, shared responsibility only mediated the valence effect within the intragroup comparison conditions. This mediation is depicted in Figure 6.5.

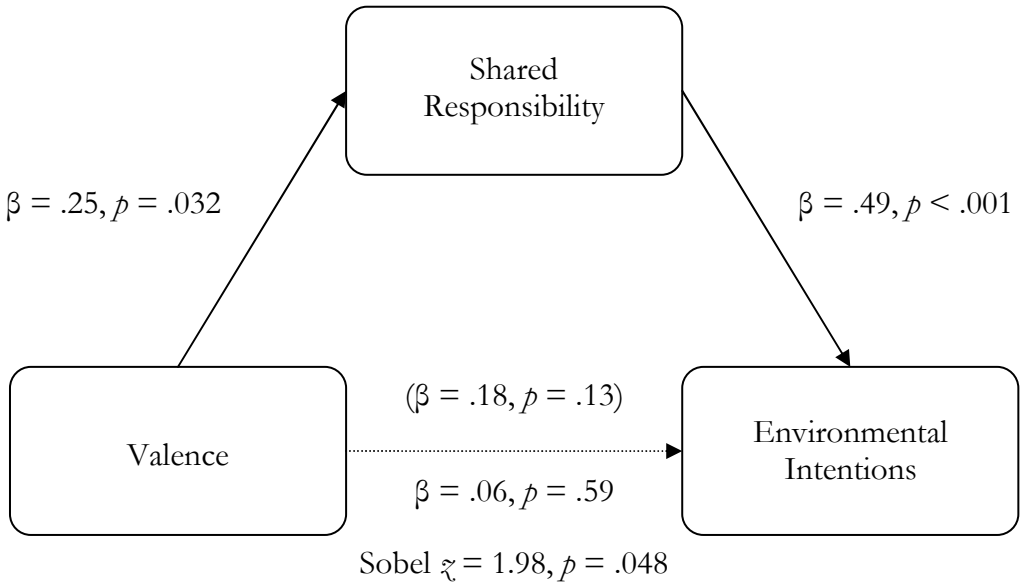

Figure 6.5. Mediation of shared responsibility on valence and environmental intentions for intragroup comparisons, Study 5.

Discussion

The results of this experiment broadly supported the hypotheses. Specifically, the results revealed consistent interactions between comparative context (intergroup versus intragroup) and comparison valence (positive versus negative) on environmental intentions, the centrality of environmental values, and perceptions of shared responsibility for environmental problems. Thus, rather than group based comparisons increasing performance uniformly via engendering a "competitive orientation" (Siero et al., 1996), the effects of these comparisons depend on their context and value.

When comparisons were intergroup (i.e., relative to the performance of another nation), positive comparisons increased behavioural intentions relative to negative comparisons. Thus, in an intergroup context, participants seemed to contrast away from the outgroup standard and internalise this as a guide to their own behaviour. This interpretation is further supported by the mediating role of environmental value centrality in the intergroup condition: in comparison to a poorly performing outgroup, participants emphasised the centrality of environmental values to their self and expressed intentions that accorded with these. In contrast, when comparisons were intragroup (i.e., relative to the nation's own past performance), the opposite pattern emerged, and negative comparisons were associated with stronger intentions to behave environmentally, particularly when compared to the effects of negative feedback in intergroup contexts, which seemed de-motivating rather than motivating. I predicted that awareness that one's group is falling short of its own standards should motivate behaviour in response to negative intragroup feedback as people re-affirm their group's collective standards. Consistent with this, perceptions of shared responsibility did play some role in mediating the effects of intragroup comparisons on behaviour: in response to negative comparisons with a better performing past, group members emphasised their shared responsibility for environmental stewardship and expressed stronger

intentions to behave environmentally. However, the pattern of mediation via shared responsibility in intragroup contexts was not as strong as that of value centrality in intergroup contexts, perhaps because intergroup comparisons tend to be more striking and less subtle than intragroup comparisons over time, which may seem more distant and less proximal than contemporaneous intergroup comparisons. Despite this, both environmental value centrality and shared responsibility played a role in mediating intergroup and intragroup comparisons respectively.

Study 5 produced very different behavioural effects from Study 4, and the primary difference between the two studies was the removal of the national stereotype items. This supports out interpretation that Study 4's results may have been skewed by the inclusion of these items.

GENERAL DISCUSSION

While the results of Study 4 did not produce the predicted effects, Study 5 did. Based on participant feedback, I believe Study 4's results were the effect of a confounding measure that offended participants. When the measure was removed, the results were as expected.

The patterns in Study 5 are consistent with the social identity approach. Depending on the context of group-based comparisons, individual group members are likely to be guided by different identity-relevant concerns when contemplating their own behaviour. Consistent with self-categorization principles, the guiding principle in intergroup contexts is likely to be differentiation from relevant outgroups (Doosje et al., 1998). Thus, self-perception and action becomes contrastive under these conditions as people embody the contextual stereotype of their group (Rabinovich et al., 2008). When we outperform another group, the dimension of that success becomes a more central aspect of collective identity, and more central to individual self-definition and action. However, when our group is outperformed, the dimension in question is likely

to become less important to collective definition and self-definition accordingly. These patterns of response to intergroup comparison provide a theoretical adjunct to the effects identified in prior research on environmental group comparisons (Siero et al., 1996); intergroup comparisons will only lead to more positive intentions when these reflect positively on collective identity.

Although the pattern of effects in the intragroup condition was reversed, this is also consistent with the social identity approach. In the absence of an outgroup against which the ingroup is defined, comparisons to our group and its past define us by who we have been. Especially when past performance sets a high standard, sub-optimal behaviour by group members in the present highlights a discrepancy between our own standards and current performance. This kind of negative comparison is not so easily disengaged from, as is the case for negative intergroup comparisons. Instead, deviation from our own high standards is likely to be concerning and prompt group members to redouble their efforts to live up to these standards, and set restoration of group standards as an implied group goal. According to self-categorization theory, goals originating from within the group are characterized by a sense of shared responsibility (Wegge & Haslam, 2003), and tend to be more motivating for group members than goals originating from outside the group, such as from outgroup members (Wegge & Haslam, 2005). This theoretical interpretation of these results highlights that both types of social comparisons, between groups and within groups, have the power to motivate people to action, but the paths of thought and behavioural outcomes are heavily dependent on the context of that comparison.

Although the results here can be predicted with the social identity perspective, this does not mean these particular combinations of comparative feedback will always produce this exact set of responses. The effects of social comparisons may manifest themselves differently depending on additional factors like specifics of the group

identity, intergroup relations, and situational factors. For example, a group that shares a belief in the rejection of environmental concerns as a part of its identity, such as the climate change denial movement, would not be expected to respond in the same fashion as seen in the present study. Similarly, comparison groups with particularly hostile or amicable relations may react differently than to these studies' participants. In these cases, social comparisons are still influential, but the nature of their outcome may vary.

Beyond these specifically theoretical concerns, the results of this study demonstrate how an individual's social milieu has considerable power to influence environmentally relevant action. The relevance of social factors such as these has often been neglected by both behaviour change researchers and campaigners. Harnessing the power of social contexts to structure individual thought and action provides an exciting opportunity for behaviour change, over and above approaches that seek to change attitudes and intentions one individual at a time. That said, I am not advocating for a social group-focused understanding of environmental behaviour instead of an individual-focused understanding, but rather that these two approaches constitute an inseparable whole. In human society, there can be no groups without individuals, and no individuals without groups. Viewing group and individual processes as exclusive rivals of each other is an artificial and unnecessary distinction (Postmes, Haslam, & Swaab, 2005), and the group-individual intersection is a particularly rich and informative domain for research. This was true of the results: participants' individual feelings about shared responsibility or value centrality *and* their group feedback together best predicted behaviour, not *either* of these individual- or group-level attributes. Likewise, past research has found the combination of both individual and group attributes, such as personal attitudes and group norms, to be more predictive of behaviour than either alone (Terry, Hogg, & White, 1999; Terry, Hogg, & McKimmie,

2000). Along these lines, I recommend that both future researchers and campaigners adapt approaches that take into account the combination of both individual- and group-level processes.

Practical Implications

These results suggest a number of practical implications for behavioural intervention campaigns. Although competition has long been promoted as a way to increase behaviour, my research suggests that this may succeed or backfire, depending on the success of the group in question. While winning competitors may be spurred to further action, losing competitors may disengage from the behaviour altogether, using social creativity to value other aspects, such as common variations of the claim, "we may pollute a lot, but we are productive, and that is what counts." Because prior research has shown that people are more likely to accept criticism from a fellow ingroup member than an outgroup source (Hornsey, Oppes, & Svensson, 2002), negative competitive messages may best be communicated from within the group rather than an external source (but see Rabinovich & Morton, 2009).

If a group has been improving their environmental behaviour, unqualified praise may also be harmful in maintaining the behavioural improvement. Research by Schultz and colleagues (2007) has documented a boomerang effect where individuals that receive positive personal feedback relax their efforts. In this study, I have documented a similar effect, but applied to the group level rather than just the individual level. Positive feedback about the group as a whole may lead to a sense of complacency that the group has "done enough" and individual members may relax their efforts. Research by Schultz and colleagues suggests this boomerang effect can be avoided by reinforcing the injunctive norm that the group still values the targeted behaviour. My data suggest that positive feedback can maintain positive behaviour when it is delivered in an intergroup context and thereby the praised behaviour becomes defining of the group in

a positive sense (Rabinovich et al., 2008). In addition to intentional behavioural intervention campaigns, these comparative framing effects are worth bearing in mind by the news media, non-governmental organisations, and politicians, all of whom regularly make very public social comparisons on the topic of the environment.

Conclusion

These results have demonstrated that social comparisons have the power to frame interpretations of and responses to environmental feedback, and that intragroup comparisons can be fundamentally different to intergroup comparisons. In this chapter, each group's present behaviour was the same, but the nature of the comparisons to the ingroup was altered, which led to distinct influences in patterns of thought and behavioural intentions regarding the environment. The present research offers practical applications to pro-environmental campaigns: Specifically, if group environmental performance is of good quality and collective maintenance of this is desired, then praise should be delivered in ways that highlight the achievements of the group relative to others but should not rely on reflecting solely about the ingroup alone. However, if group environmental performance is poor and the goal is to encourage collective betterment, then criticism should be delivered in ways that highlight the group's failings relative to the group's own standards, but not relative to other groups. This study highlights the interconnectedness of group-level and individual-level psychological variables, and how both should be addressed when understanding behavioural change.

– CHAPTER 7 –

General Discussion

The state of global environment is one of the most pressing concerns today. In addition to the compelling scientific evidence of the impact of climate change, environmental degradation is leading to an accelerating pace of species extinction and loss of biodiversity. More mundanely, many aspects of modern life currently require the extraction of unsustainable levels of finite resources that are dwindling in supply. While the challenges of environmental degradation may seem over-whelming, much progress can be made now by engaging in more environmentally sustainable everyday behaviours. As highlighted by the writing of Victor Lebow (1955), as cited at the start of this thesis, people's actions toward the environment often have psychological motivations, and these can be developed to promote environmentally sustainable behaviour or to hinder it. Psychologists have recently realised their role in understanding and promoting sustainable behaviour, but most prior research has been scattered in its theoretical perspective and modest in its predictive power of behaviour.

The aim of the research presented in this thesis was to investigate how environmental behaviours are influenced by social forces, a perspective that has been under-appreciated in most traditional research on environmental behaviour. Where social influence is examined, such as in most social normative approaches, variability in how norms work and the role of group membership are not usually taken into account (see Chapter 2 for a few notable exceptions). My research has been guided by the social identity approach, which provides a theoretical framework for understanding how individuals place themselves within social groups, how these groups relate to each other, and the consequences of both these things for individual behaviour. The social identity approach theorises that individuals identify with a number of social groups.

Depending on the context, a particular social identity will be salient, such as university student or British citizen. As people come to identify with a group, they act more in line with how a prototypical group member would act (Turner, 1991). However, group norms are also influenced by situational factors, such as comparisons with other, relevant groups in the social sphere. Typically, groups seek to be positively distinct from other groups, and define themselves in contrast to their comparators (Tajfel & Turner, 1978). The nature of social comparisons implies a particular meaning for social identity (Doosje, Haslam, Spears, Oakes, & Koomen, 1998). Typically, the perceived norms of one's group contrast away from comparison outgroups, which in turn may be internalised by group members into individual values and behaviours (Rabinovich, Morton, Postmes, & Verplanken, 2008). Group members also develop group norms inductively through discussion with other members (Postmes, Haslam, & Swaab, 2005; L. Smith & Postmes, 2009, L. Smith & Postmes, 2010a; L. Smith & Postmes, 2010b). Both these types of social influence (i.e., norm deduction via intergroup comparison, norm induction via intragroup interaction) have been found to be powerful determinants of behaviour in other domains, but their application to environmental behaviour has previously been limited.

To investigate this, I developed three related strands of research into group-based social influence in the environmental domain. In Chapter 4, I examined how social comparisons can imply group norms, and how the strength of social identification moderates how individuals' behaviours will respond to those comparisons. In Chapter 5, I looked at how discussion within groups allows the formation of strong local norms, and how discussion content guides values and behaviours long after discussion has ended. In Chapter 6, I investigated how different types of social comparisons, either between groups or within one's own group, can lead to differing psychological and behavioural outcomes. In all three chapters, I found

effects of social influence on individual environmental behaviour. In the present chapter, I summarise the primary results, provide an overall theoretical interpretation of their meaning, and discuss the practical application of these findings to real-world scenarios of environmental behaviour.

Chapter 4: Summary of Results

The two experimental studies presented in Chapter 4 show how social comparisons can lead to differing behavioural outcomes among group members, depending on their strength of identification with the relevant ingroup. Drawing on social identity theory, I argued that comparative feedback can imply group norms by portraying the group as relatively positive or negative on a given dimension relative to others and that individuals who identify strongly with their group are more likely to internalise and self-stereotype implied group norms than low-identifiers (Ellemers, Spears, & Doosje, 1997; Ellemers, Spears, & Doosje, 2002). Thus, I predicted that the group norms implied through comparative feedback would have different meanings for group members, depending on how much they identify with the group.

To test these ideas, Study 1 presented student participants with environmental feedback about their university that was either positive or negative (valence). This feedback was framed either generally, or as a specific comparison with another university (comparison type). Participants' identification with their university was also measured, as were their intentions to engage in environmental volunteering. One week later, participants were contacted again to report their behaviour on a number of pro-environmental activities they had selected from a list one week earlier. As predicted, low-identifiers were more willing to volunteer when the feedback was negative rather than positive, contrasting away from the implied norm. High-identifiers showed a similar assimilation pattern, but this did not reach conventional levels of significance. Contrary to predictions, the effect of feedback was not intensified when it was

delivered as part of a specific intergroup comparison. Importantly, the effects on intentions were also relatively short-lived; there were no effects on conservation behaviours reported one week later.

While these initial results were promising, I felt the manipulation may have been too subtle and the environmental behaviours too restrictive. I refined the manipulation and measures and ran an additional study to continue to test these predictions. In Study 2 the comparison manipulation was changed to be more direct by giving feedback about the rival university, and participants could choose any conservation behaviour they wanted, rather than selecting from a list of pre-determined behaviours. Again, there was no effect of comparison type. However, emotion ratings from participants suggest the feedback about a rival university may have been interpreted as referencing the larger, more abstract ingroup of university students in general (i.e., a common ingroup at a higher level of abstraction). Apart from this, as predicted, there were effects of feedback valence on behaviours moderated by identification. High-identifiers intended to volunteer more when feedback was positive and less when feedback was negative, replicating the result of Study 1. Low-identifiers again showed a mirrored response of higher intentions when feedback was negative and lower intentions when feedback was positive. Importantly, one week later, high-identifiers still displayed this pattern of assimilation to the implied norm in their reported behaviours, while the pattern of contrast by low-identifiers had disappeared by Time 2. This endurance of the manipulation across time among high-identifiers suggests that they may have indeed internalised the group-based feedback.

Together, the results of these initial studies demonstrate that group-based feedback can imply a group norm that is then internalised, particularly by high-identifiers, guiding subsequent behaviour. However, there was less evidence for the hypothesised role of comparison type in this process. The original expectation, guided

by social identity theory, was that specific intergroup comparisons would intensify the effects of feedback by making this information more ingroup defining relative to relevant outgroups. Despite these null effects, I believe that intergroup comparisons should still play an important role in influencing how people react, and I investigated the role of different forms of group-based comparison more thoroughly in Chapter 6.

Chapter 5: Summary of Results

To build on the observation that group-processes can guide individual behaviour, in Chapter 5 I examined the potential role of intragroup processes in this. Specifically, I investigated how groups may form environmental norms not just from comparative feedback but through interaction with other group members. Past research, both classic (Festinger, 1954; Lewin, 1947; Sherif, 1935) and more contemporary (L. Smith & Postmes, 2009; L. Smith & Postmes, 2010a; L. Smith & Postmes, 2010b), has found that group-based discussion can be a very powerful and long-lasting influence on individual behaviour. According to the social identity approach, interaction with other group members is part of the process through which people establish local group norms (Postmes, Haslam, & Swaab, 2005). As people reach consensus, they work to interpret social reality from the perspective of a group member. This is known as the inductive, or "bottom-up," process of social influence, and past research suggests that it can be more powerful than the deductive, or "top-down" process of influence, which stems from intergroup comparisons (Postmes, Haslam, & Swaab, 2005; Postmes, Spears, Sakhel, & de Groot, 2001). Studies have demonstrated that the content of small group discussions can influence important behaviours, such as whether people will discriminate against minorities (L. Smith & Postmes, 2010a) and can also help stigmatised groups overcome the negative effects of the stereotypes that are imposed on them by others (i.e., alleviating stereotype threat effects: L. Smith & Postmes, 2010b). However, despite these strong effects in other

domains, researchers have not applied this approach to studying environmental behaviour.

To investigate the role of discussion in guiding environmental behaviour, Study 3 replicated Study 1, with the addition of an up to 20-minute discussion about the environment following the experimental manipulation. I predicted that the content of the discussion would establish local norms about environmental behaviour, which would determine participants' environmental behaviours over the following week. I also predicted that this effect of inductively established local norms would be stronger than, and over-riding of, the effects of any norms induced via social comparison. The manipulation check suggested that participants did register the social comparisons provided in the manipulation, but unlike Study 1, this comparative feedback had almost no impact on behavioural intentions. Instead, aspects of the group discussion itself proved to be powerful influences on the behaviour of individual group members.

Discussions were analysed for their content and length. As predicted, the more time participants devoted to discussions that focussed on environmental behaviour, the more likely they were to subsequently report more pro-environmental behaviour one week after the discussion session. Importantly, this effect remained even when controlling for initial environmental values. This suggests that the effects of discussion cannot be simply attributed to a reinforcement effect whereby people who value the environment both talk about it and maintain their already high level of environmental behaviour. Discussion also had similar effects on reported values over time: more focus on environmental issues within the small groups also shifted participants' values to be more in line with the content of the discussion.

While these effects of small group interaction on individual behaviour and values are themselves interesting, an additional finding from this study was that discussion increased the correspondence between values and behaviour, reducing the

value-action gap. Study 1, which involved the same design but without discussion, revealed no significant correlation between initial environmental values and environmental behaviour one week later. Study 3, which simply incorporated discussion into the design, showed a very strong correlation between initial values and subsequent action. Although the exact mechanism of this effect remains unclear, it seems that group-based discussions can activate individual values and support people to subsequently act more in line with these. Together, the results of this study support the notion that small group discussions can both override intergroup comparisons and lead to the formation of local norms that guide behaviour long after discussion has ended.

Chapter 6: Summary of Results

Chapter 6 returned to the issue of group-based comparisons and how these might influence people's individual behavioural responses. Past research in social identity theory has found that the choice of comparator influences ingroup stereotypes, with people typically contrasting perceptions of their ingroup away from comparison outgroups. For example, when psychologists are compared to dramatists, they will define themselves as more scientific, but when compared to physicists, they will say they are more artistic (Doosje, Haslam, Spears, Oakes, & Koomen, 1998). Thus, group identities are dynamic and shift to meet situational contexts (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990; Roccas & Brewer, 2002; Turner, 1991). Although intergroup comparisons have been the focus of much social identity research, these are not the only form of comparison people might engage in. To reach an understanding of what their group is and what it represents in the present, people can also engage in comparisons with the ingroup of the past (e.g., Mummendey, Klink, & Brown, 2001; Nigbur & Cinnirella, 2007). However, less is known about the processes behind and effects of comparisons within a group relative to comparisons between groups. The goal of the final set of studies within this thesis was to explore this issue.

To investigate this, I conducted two studies of similar design. In Study 5, participants received either relatively positive or negative feedback about Britain's environmental record. This was compared with either another nation (i.e., an intergroup comparison) or Britain in the recent past (i.e., an intragroup comparison). Importantly, Britain's actual environmental performance was the same in all conditions; only the comparison group and its relative performance varied. Following the manipulation, national stereotypes of the groups concerned and participants' pro-environmental intentions were measured. I predicted that when compared to an outgroup, participants would self-stereotype their own intentions to be in line with the norm implied by the comparison (in line with the findings reported in Chapter 4). However, when comparisons were within the group, I predicted the opposite pattern of effect. In this condition, positive comparisons were expected to result in less pro-environmental intentions, whereas negative comparisons were expected to result in more pro-environmental intentions. To explain this reversal in the effects of comparative feedback when delivered within groups, I theorised that under such conditions past performance implies an established norm, or standard, for collective performance. Positive comparisons (i.e., that the group is doing better than before) therefore imply that group members are exceeding their own standards and can relax their efforts, a phenomenon similar to the boomerang effect (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). A negative comparison, however, implies the group is falling short of its own prior standards. This should be concerning and lead to increased efforts to live up to these standards.

The results of the initial test (Study 5), however, did not support the hypotheses. Although this was unexpected, in response to the study, several participants reported that they found that national stereotype measure to be offensive. Given this, I suspected that reactance may have interfered with the expected effects of this study. To

resolve this issue, I conducted a second study (Study 6) using the same design but omitting the offending national stereotype measures and assessing the proposed process variables. The results of this improved study were consistent with the hypotheses: When comparisons were intergroup, positive feedback resulted in more positive intentions than negative feedback. The opposite was observed when comparisons were intragroup, with negative comparisons resulting in more positive intentions than positive comparisons.

To investigate the processes behind these effects, environmental value centrality and shared environmental responsibility were also measured. I theorised that for intergroup comparisons, the underlying process involves shifts in ingroup stereotyping and therefore self-stereotyping as a group member. To capture this process, the centrality of environmental values to the self were assessed (Rabinovich et al., 2008), and this did indeed mediate the effects of feedback valence in the intergroup comparison condition. In contrast, when comparisons are within group, I expected that effects should be driven by a perceived discrepancy between current behaviour and collective goals. To capture this process, feelings of collective responsibility to improve the ingroup's environmental record were assessed. Indeed, the results revealed that feedback valence affected feelings of shared responsibility in the intragroup comparison condition. There was also evidence of mediation via this variable, though this was not as strong as the mediation of value centrality for intergroup comparisons. Together, these studies show that both inter- and intra-group comparisons can drive environmental behaviour, at least when these comparisons do not trigger reactance, but that the nature of, and processes behind, these effects are likely to be quite different. Intergroup comparisons lead to behaviour in line with the implied ingroup stereotype, mediated through shifts in self perception, such as value centrality. Intragroup

comparisons lead to behaviour in line with previously established group standards, mediated through feelings of shared responsibility.

Integration of Results

Taken together, these studies provide a complex portrayal of how social group influence can affect behaviour. Perhaps the single most consistent message from this research is that interpretations of identity can be highly nuanced, and small differences in circumstances can lead to considerable differences in behavioural outcomes. While social influence can be powerful, it does not lend itself to one-size-fits-all interventions.

The results from Chapters 4 and 6 suggest that social comparisons can be used to deduce the content of group identity. Looking to others can inform people about themselves, whether this kind of comparison involves an outgroup, as in Chapters 4 and 6, or the ingroup of the past, as in Chapter 6. I theorised that in either case, the group's performance relative to the comparator implies a particular norm, and people self-stereotype to this implied norm, which goes on to guide behaviour. How people respond to this comparison depends upon their own individual-level traits, such as how closely they identify with the group. Intergroup comparisons tend to inform identities in a way that contrasts away from the comparator, while intragroup comparisons tend to assimilate identity content toward the comparator, because the comparator is the ingroup itself.

There is also some evidence that the specifics of the group identity can affect the outcome. For example, participants in the intergroup comparison condition in Chapter 6 responded as a whole in a similar way to the high-identifiers in Chapter 4. One of the differences between the chapters is that Chapter 4 focused on university identity among students, most of who were in their first year, while Chapter 6 focused on British identity among British citizens. While I can only speculate on the reasons for the different outcomes, the nature of the specific group identities could be a likely

reason. National identity may be more concrete, but also more stable in its relation to the self. A recently gained university identity may be more flexible in its content and more novel as a part of participants' psychological repertoire of identities, allowing for a broader range of interpretations of group comparisons.

Social influence can also occur through inductive influence, which is more of a bottom-up process than deductive influence. I theorised that as group members interact, the content of their discussion inducts norms which go on to guide group members' behaviours, and in Chapter 5, the extent to which groups talked about pro-environmental behaviours went on to predict members' behaviour independent of their initial values. This process is quite different from deductive comparisons, and empowers group members to take more control over the development of their identity, and potentially override the effects of deductive comparisons. While different, these two routes of social influence are similar in the respect that they may operate outside the bounds of conscious awareness to guide individuals' future behaviours.

Taken together, these results portray dual processes where the content and salience of identity is perpetually being informed both by comparison targets and interactions between group members themselves. While these processes were studied separately in this thesis, outside of the laboratory, they are likely to blend into and fuel each other. The full extent to which these processes interact is unknown, but comparisons may provide a context for discussion to occur, and discussion may be used to either reinforce or challenge existing group stereotypes.

Theoretical Implications

The findings from this research demonstrate that people are responsive to group-level feedback when forming intentions about how to act as individuals, but that this effect is most likely and enduring when people identify with the relevant group. This effect is also moderated by the type of feedback that is entailed. Apart from social

comparisons, small group interaction may be an effective way of creating a social context that reinforces positive behaviour over time; however, the effects of small group interaction are contingent on what happens in interaction itself and may need to be structured to be most effective. Many of these relatively simple social manipulations had a lasting effect on individuals' everyday pro-environmental behaviours.

Our findings are consistent with the social identity approach, which proposes that in many situations people's behaviour is framed by their group membership rather than driven by purely individual factors. When group membership is salient, or when people identify strongly with a group, they tend to think and act as an interchangeable member of a social group rather than as an autonomous and independent-minded individual (see Chapter 2 for a review of social identity theory and self-categorization theory). I documented that simple social comparisons and group-based interactions can influence environmental behaviours one week later, and that how people react to a social comparison is moderated by how much an individual identifies with their group. I believe that in all of these studies, the manipulation worked to craft a particular group norm for how group members should approach the environment, and that these norms can be developed through deductive processes (i.e., comparisons: Studies 1, 2, 4, and 5) and inductive processes (e.g., interaction: Study 3).

In all of these studies, the experimental manipulations were simple and straightforward. People regularly encounter similar social comparisons of nations, regions, and other groups in the news media. In the wake of chronic and conspicuous environmental degradation, people have frequent occasion to discuss the environment and what should be done about it. Thus, the experimental manipulations used in my studies are likely to be occurring to most people outside the laboratory on a regular basis. These ongoing processes are likely to have very real effects on people's thoughts and behaviours toward the environment.

While traditional self-categorization theory suggests these effects normally only occur when a social identity is salient (Turner, 1991), some of the effects remained after a week without any reminder of the social group in question. The longevity of these effects suggests the social comparison and discussion effects were, to some extent, internalised at the individual level. Thus, rather than speaking of social and individual factors as if they were mutually exclusive understandings of human behaviour (Greenwood, 2004), it is more accurate to understand them as complementary and intertwined (Postmes, Haslam, & Swaab, 2005; Postmes, Spears, Lee, & Novak, 2005). In my studies, social influence provided a route to reaching individual thoughts and behaviours, and in time, the aggregate of group members' actions are likely to feed into the perceptions of group identity.

Despite the success of the socially-grounded interventions in this thesis, social influence is surprisingly absent from most established pro-environmental models of behaviour, as reviewed in Chapter 1. Informational, economic, attitudinal, and habitual models are all defined by a focus on particular attributes of individual people. For the most part, social influence and norms have only had a peripheral role in conservation psychology. A partial explanation for this is that asking people directly about group norms and influence tends to provide the appearance of no effect, as people regularly underestimate the extent that they are influenced by social norms (Cialdini, 2005; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). Most normative models see social norms as social *forces*, in the literal sense of the word, rather than social *influences*. In this conception, social forces are located externally to the individual and coercively press upon people against their will, against the "true" individual self. Integrative models, such as Stern's Value-Belief-Norm model, maintain this perception that social factors reside at the sidelines of influence, and when they do act, they are seen to be mostly monolithic to a society, static, and external to the individual (Stern, Dietz, Abel,

Guagnano, & Kalof, 1999). However, my research supports a very different interpretation of social influence.

First, these results offer compelling evidence that the behavioural change documented was internally motivated within the self, and not a result of forced conformity. In all of my studies, participants responded privately, either on paper questionnaires or using computers in private at their own discretion. Because participants answered privately, were assured of confidentiality, and did not provide their names, social coercion or demand characteristics are unlikely explanations for the social influence that occurred. This empirical demonstration of the interconnectedness of social influence and individual pro-environmental behaviours underlines the need to widen conservation psychologists' theoretical lens to encompass both social- and individual-level attributes.

Second, I have shown that social identity content and implied norms are not static and monolithic, but contextual and dynamic. By shifting comparisons to be negative or positive, and between groups or within a group, the pattern of effects also shifted. In Chapter 4, the effect of comparisons also varied by strength of identification. Thus, social influence is not some unchanging constant, but its effects are highly contextual and dependent on individual-level variables. This conception is supported by past research in self-categorization theory (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990; Roccas & Brewer, 2002). Although this sensitivity to framing makes social influence more difficult to deploy in public campaigns, the rewards of doing it correctly may be worth the additional effort.

Based on the results of this thesis, and additional work within the social identity framework, I believe that one explanation for conservation psychology's historically low predictive power of environmental behaviour is that most research has focussed on individual-level traits while ignoring social considerations. Given the research here, and

that of other social identity theorists, it may be that individual-level traits have been poor predictors of environmental behaviour because they have been incongruent with social traits. This conflict between individual factors and social factors may lead to despair and inaction regarding the environment. Prior research has already found that individuals' environmental attitudes become much better predictors of behaviour when supported by a complementary pro-environmental group norm (Terry & Hogg, 1996; Terry, Hogg, & McKimmie, 2000; Terry, Hogg, & White, 1996). People are reminded daily about their collective poor stewardship of the earth, and based on the present research, this feedback is likely to be absorbed into people's sense of social self. If social influence and individual attributes can pull with each other rather than against, the behavioural effect is likely to be more productive than either type of influence alone. In this regard, the findings of this thesis can be applied in a complementary fashion to many of the theories and techniques of existing models of environmental behaviour. All of the models described here share some overlap, and need not be conceived as exclusive of each other. Taking an ecumenical approach by combining the models below with a greater understanding of social processes may provide the most beneficial outcome.

Informational models. The informational model assumes people do not conserve because they do not have the necessary information. Social influence can help remedy this barrier by acting as a knowledge vector for both environmental problems and practical solutions for how to implement new behaviours. As seen in the discussion extracts from Chapter 5, group members use discussion to convey this kind of information. Because the information comes from an ingroup source, it is more likely to be trusted than if it came from an outgroup, such as a governmental organisation.

Rational-economic models. In the review of economic incentives for environmental behaviour, a surprising conclusion was that the economic value of the incentive was

often unrelated to whether it influenced behaviour. Instead, how programmes were marketed had a larger influence on whether these programmes were taken up by the public. Because financial costs can represent a very real barrier to particular environmental behaviours, such as buying a more efficient boiler or installing home insulation, economic programmes still have a valuable role to play, and harnessing social influence to promote uptake may be well worth the additional planning. Future intervention programmes that promote economic incentives may be more successful if they harness social influence to do so. Likewise, because many economic decisions are socially meaningful in terms of status and identity (e.g., hybrid cars, organic food, drying clothes outside rather than in a dryer), successful incentive programmes will need to be mindful of the compatibility between existing identities in the target group and how economic incentives are chosen.

Attitudinal models. Attitudinal models are both plentiful and diverse, but in many cases, individuals' attitudes are surprisingly weak predictors of behaviour (Newhouse, 1990, Wicker, 1969). As mentioned, attitudes become better predictors of behaviour when they are supported by a congruent social ingroup norm (Terry & Hogg, 1996; Terry, Hogg, & McKimmie, 2000; Terry, Hogg, & White, 1996), which may help explain why attitudes alone are typically weak predictors. Because identity salience shifts regularly (Turner, 1991), attitude/group norm congruency may also shift, making the accuracy of attitudes as behavioural predictors context-dependent. Because incongruence between group attitudes and individuals' attitudes and lack of identity salience could pose barriers, interventions may have better success by targeting both individual and group attitudes simultaneously. Associating the target behaviour with the relevant group so that the identity is more likely to become salient when behavioural opportunities arise would also be beneficial.

Habitual models. This thesis' theoretical approach is quite distinct from the literature on automatic, habitual behaviours, but applying both approaches together may allow for especially durable interventions. Social influences often change over time, as different identities become meaningful (Turner, 1991), making durability a potential weakness to socially influenced behaviour. However, if the behaviour is repeated often enough before this, habituation may serve to crystallize or "lock in" the behavioural gains from social influence. Likewise, because habits are weakest when situational context is in flux, such as when someone moves house or changes their job (Wood, Tam, & Witt, 2005), a social influence based campaign may have greater success when timed to correspond with these life changes.

Social Dilemma Models. Traditional social dilemma models emphasize the role of past experience with commons actors, such as with tit-for-tat strategies (Dawes, 1980). More recent social dilemma theorising has incorporated actors' norms (Ostrom, 2000) into their models. This thesis' research offers additional insight in to the role past experience and norms can play to influence social dilemma outcomes. First, past experience has the power to create new implied norms; thus past commons decisions can influence future decisions. Second, because groups often seek positive distinctiveness from each other, groups of actors may contrast away from the actions of a perceived rival, not because it is in their best material interest, but because of deductive social influence. Where possible, social dilemmas may have better outcomes where a superordinate identity can be fostered, expanding the sphere of concern to include other actors and making unsustainable choices less appealing.

Normative Models. While norms have been portrayed as weak predictors of behaviour (Ajzen, 1991, Armitage & Conner, 2001) the conclusion from the social identity approach and this research is that norms matter, but they are complex, overlapping, and only particular norms are influential. Group norms are attached to

particular groups, and group identities are fluid in both their meaning and salience. Thus, theoretical models and intervention campaigns that use norms must be careful to target relevant ingroup norms, and to be aware that group members have the power to induct new norms among themselves; conceptualising norms as static across society is unlikely to be successful. Because people then to underestimate normative influence (Cialdini, 2005), subtle measures may be needed to accurately assess the role that norms play.

More research is needed to investigate these possibilities, but there is now little doubt that group identities contribute to environmental behaviours in subtle yet meaningful ways. When integrated into more traditional models of environmental behaviour, both explanatory power and behavioural influence may be increased even further.

Practical Implications

The first chapter of this thesis reviewed a few of the most pressing environmental concerns today: climate change, loss of biodiversity, and the depletion of natural resources. At this point, it is worth reminding ourselves of how everyday environmentally-relevant behaviours contribute to these problems. The EPA (2006) considers the following domains of everyday behaviour to have the most environmental impact for carbon emissions: heating/cooling, electricity consumption, and transportation. Material goods and food also have significant embedded environmental costs. Because many environmental problems are inter-connected, the same behaviour can help with several overlapping problems. For example, conserving fuels such as coal, oil, and gas can help with all three problems by lowering carbon emissions, requiring fewer wild areas to be cleared for resource extraction, and by leaving more of the resource for others. While pro-environmental intentions can depart from pro-environmental impacts (Whitmarsh, 2009), the dependent variables used in this thesis

correspond very well to the kinds of behaviours people need to change cause less environmental degradation, namely heating, electricity use, transportation, and consumption. The looming environmental crises will not be easy to solve, but at least the behavioural measures used in this research are aimed in the appropriate direction.

The results of this line of research suggest several practical applications for designing and implementing pro-environmental campaigns or interventions. Most public campaigns have focussed on individual-level variables, such as knowledge, economic incentives, or attitudes. As reviewed in Chapter 1, most of these approaches have seen only modest success. Increasing individual knowledge often does little to nothing to increase behaviours (Ester & Winett, 1982; Geller, 1981; Geller, Erickson, & Buttram, 1983; Hirst, Berry, & Soderstrom, 1981; McDougall, Claxton, & Ritchie, 1983) and environmental attitudes typically account for about 12% of the variance in pro-environmental behaviour (Hines, Hungerford, & Tomera, 1986/87). As campaigners in other fields have noted, working to change individual-level attributes while social attributes remain opposed to change is unlikely to be successful (Hornik, 1989, 1997). Some interventions have realised the importance of harnessing social power, such as competitions (Siero, Bakker, Dekker, & van den Burg, 1996) and social marketing campaigns (McKenzie-Mohr, 2000; McKenzie-Mohr & W. Smith, 1999), but these interventions do not provide a theoretically robust account of how and why social influence occurs. In each of these three chapters, environmental behaviour was not only predicted using social identity principles, but influenced as well. This was done with both future intentions and self-reported behaviours on a range of items. In Chapters 4 and 6, simple comparative feedback was used as the manipulation, and though the effect size of the change in behaviour was fairly modest, it was comparable to established manipulations, and relatively substantial given the simplicity of the feedback manipulation. Similar manipulations could easily be scaled for mass media

campaigns. In Chapter 5, which looked at small-group discussion, the effect size was very robust. Discussion content alone accounted for as much as 25% of the variance in future behaviour, while adding values to the model increased this to 50% of variance in behaviour. This level of explanatory power in a manipulation is very rare for environmental campaigns and far exceeds the explanatory power of established measures like the New Ecological Paradigm (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000) and Stern's Value-Belief-Norm model (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Because few campaigns in the past have fully taken advantage of social influences, these implications offer a new package of tools for those working with the public to promote pro-environmental behaviours.

Our results provide two broad sets of interventions that can be used to influence environmental behaviour: deductive social comparisons and inductive group interaction. In the present studies, both of these types of interventions led to relatively more environmental behaviour or relatively less, depending on conditions. Therefore, it is critically important that they be applied in the appropriate settings to achieve a desirable outcome. When implementing deductive processes to affect behaviour change, it is important to consider the audience that will receive the social comparison. Comparisons imply a group norm, and how people respond to that norm depends on their level of identification. Based on the results from Chapter 4, as an individual's group identification grows stronger, their behaviour will match the norm implied by the comparison more strongly. This effect lasted at least one week after the initial comparison. Low-identifiers, however, tended to contrast away from the norm, but this effect was short-lived. If a campaigner is creating a message that will go out to people with mixed strength of group identification, such as most public media, a comparison may have mixed results, as high- and low-identifiers react in opposing ways. If the targeted behaviour is a one-off action, such as voting or lowering the boiler thermostat,

then the short-lived effect from low-identifiers is likely to be more pronounced than for long-term behaviours, like turning off lights and appliances. However, if the campaigner is able to reach primarily high-identifiers, such as those who subscribe to a particular magazine or watch a particular television show, than positive comparisons are likely to be more effective. Particular caution must be exercised if the negative comparison group might receive the message, as this would likely be detrimental; using more general intergroup comparisons may be more desirable than targeting specific, identifiable groups, as the positive effects for the ingroup could be retained without disparaging another group.

Additionally, comparison group was found to be a critical factor in how feedback is interpreted. Based on my research and others' (Rabinovich et al., 2008), intergroup comparisons appear to evoke self-stereotyping in contrast away from the comparator, for strong identifiers at least. Positive comparisons led to more environmental behaviour while negative comparisons led to less. However, this was only the case for intergroup comparisons. For comparisons within a group, the effect was reversed, with positive intragroup comparisons leading to less behaviour. I theorised this occurred because group members felt they achieved the normative goal implied by past performance and could relax their efforts. This boomerang effect has been observed with individuals' feedback (Schultz et al., 2007), but my research has found a similar effect operating at the group level, where positive feedback about the group as a whole reduced individual members' behavioural intentions. In support of the interpretation that the boomerang effect is caused by people overachieving beyond normative standards, other researchers have been able to reduce the effect by coupling positive descriptive feedback with a positive injunctive norm (a smiley face) to reinforce the desirability of that behaviour (Schultz et al., 2007). Campaigners must be careful when providing positive feedback; if this feedback communicates that one's group has

actually exceeded some previously defined ingroup standard (e.g., as suggested by past behaviour), then it can lead to disengagement.

Another important consideration is who delivers the message, and whether the message may be perceived negatively. Past research has found that intervention messages that are deemed too controlling or offensive may produce reactance and spark an increase in undesirable behaviour in response (Dickerson, Thibodeau, Aronson, & Miller, 1992). In Study 4, several participants reported that they found the national stereotyping measure to be offensive, and the pattern of responses was not as predicted. Removing the offensive measures seemed to reduce reactance and resulted in the expected pattern. Similarly reactive effects may occur when critical feedback is delivered by an outgroup rather than ingroup source (Hornsey, 2005; Hornsey & Esposo, 2009; Rabinovich & Morton, 2010). Delivering feedback via ingroup sources may be the best means to boost credibility. This is especially true for government-sponsored communications. In case studies in the US, government environmental regulators have sometimes been viewed as hypocritical outsiders, eliciting resistance in the people they are trying to reach (Brook, Zint, & De Young, 2003; Opotow & Brook, 2003). Many people identify the government as having responsibility for dealing with climate change (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007) yet many also feel that governments have accomplished little in this regard. Governments may be able to elicit more pro-environmental behaviour from citizens if the government is seen as being more pro-active regarding its own pro-environmental behaviours, and if they can successfully portray its message as applying to a super-ordinate group that includes both the government and citizens. Failing that, using an ingroup source, such as people similar to the audience, may be more likely to produce a positive effect than a government source seen as an outgroup.

The other intervention tool suggested by this research is small-group discussion. The domain of conservation psychology is marked by modest effect sizes, and short-lived successes. Considering conservation psychology's limited success in interventions, the magnitude and duration of effect of small-group discussion is impressive, and worthy of both further research and practical implementation. Study 3 found that the more participants discussed environmental behaviours, the more likely they were to value the environment one week later and to engage in pro-environmental behaviour. Notably, these effects remained when controlling for initial values, suggesting a causal rather than just correlational role for discussion. In addition the correspondence between values and action was increased through discussion (as evidenced by comparison of Studies 1 and 3), again suggesting some added value of discussion over and above existing individual orientations. These findings are broadly consistent with research of opinion-based groups that has found facilitator-led group discussion to be a way to promote anti-prejudice and pro-human rights activism behaviour (McGarty, Khalaf, Blink, Gee, & Stone, 2007; Thomas & McGarty, 2009).

When implementing these inductive processes, intervention designers may presume that they can easily harness discussion to promote pro-environmental behaviours. They may be correct in this assumption, but only under certain circumstances. My research suggests that discussion only promotes behaviour when the content actually focuses on environmental behaviours. Based on the results of Study 3, off topic discussion may send the message that environmental behaviours are not valued and lead to a subsequent decrease in the desired behaviour. In extreme cases, discussion may also allow new groups to organise and form a cohesive group identity based in opposition to the pro-environmental goal. This appears to be the case with the climate change denial movement, which has evolved into a fully fledged social movement of its own. The Internet may have played a role in allowing these groups to

flourish, as it provides a forum for discussion between people who may otherwise encounter few others that share their goals. While promoting discussion may not be suitable for a campaign targeting the whole public, it would be likely to have a very positive effect if discussions can be led by a facilitator to stay on topic. This kind of intervention would be well-suited to schools or businesses, where several interested individuals could act as both facilitator and ingroup member. Although it was not directly investigated in the present research, it also seems likely that discussion effects would only occur when interaction is within a defined and meaningful group boundary. Engaging in interaction with members of an outgroup is more likely to create polarisation rather than consensus around new local norms.

Future Research

This research has led me to believe that both social comparisons and discussion can work to inform group norms, which guide environmental behaviour. However, although the results were generally supportive of the hypotheses, I cannot empirically demonstrate that norms specifically were the process behind the behavioural change. Future research should aim to empirically isolate the processes at work behind these effects.

Many of these findings were surprisingly durable over time, beyond what the traditional social identity approach might predict. To further test how well these manipulations lead to internalisation, researchers could use social comparisons and then later test behavioural intentions after either increasing the salience of the manipulated identity or an irrelevant identity. If behavioural intentions are relatively stable across salience conditions, then any comparison effects will have been internalised to the individual self. If intentions only increase when the relevant identity is salient, the effect will have been internalised to that identity only, while if intentions remain unchanged, the effect will not have been internalised.

While the results in this thesis have been promising and have high internal validity, the results have not yet been quantified in objective, real-world behavioural measurements with a sample that represents the broader population. Although both behavioural intentions and self-reports on a variety of specific past behaviours were measured, actual behaviour was not measured. At a minimum, it would seem important to replicate these effects with actual behaviour of some kind as a dependent measure; indeed, researchers in this area have recently demonstrated that the effects of intergroup comparisons can be seen in patterns of actual behaviour such as signing environmental petitions and taking information leaflets about environmental issues (Rabinovich et al., 2008). A field study with the general population would further increase the external validity of these theories and allow for a more accurate quantification of the kinds of behavioural change these experimental manipulations can produce.

More broadly within the domain of conservation psychology, I propose that one of the reasons conservation psychology has historically achieved only low predictive power of environmental behaviour is that behaviour is a product of both individual factors and social group norms together, but traditional approaches only measure individual factors. Based on my results, and others' (Terry & Hogg, 1996; Terry, Hogg, & McKimmie, 2000; Terry, Hogg, & White, 1996), it seems likely that when social factors and individual factors are congruent with each other, behaviour will be much more predictable by psychological variables. In much of the world today, individual pro-environmental values and attitudes are high, but social group norms are often not supportive of a pro-environmental perspective, as illustrated by the widespread environmental degradation reviewed in Chapter 1. Future research within conservation psychology should examine this interface between individual and social factors in

further detail, as the congruency of both levels of factors may allow for both substantial theoretical advancement and much more effective pro-environmental interventions.

Contribution of the Thesis

In this thesis, I have made a novel contribution to the understanding of pro-environmental behaviour, specifically by investigating the research problem from a social identity perspective. This framework provides a theoretically derived account of when and why social groups influence individual pro-environmental behaviour and suggests a range of processes that can be applied in practical interventions. While other researchers have studied environmental behaviour using social identity techniques (Fielding, McDonald, & Louis, 2008; Fielding, Terry, Masser, & Hogg, 2008; Rabinovich et al., 2008; Terry, Hogg, & White, 1999), these lines of research have been aimed primarily at advancing the understanding of aspects of social identity and self-categorization theories, rather than studying environmental behaviour in particular. Within conservation psychology as a sub-discipline, social identity principles are under-utilised, particularly in North America. This thesis is the first line of research to provide an in-depth investigation of how several aspects of social identity can influence environmental behaviour. I intend for this work to serve as a bridge between social identity theorists and conservation psychologists, with the goal of more conservation psychologists understanding how social influence can be researched and harnessed to promote desirable behaviours and for these interventions to be put into place.

Specifically, I have provided theoretically-guided explanations of how social comparisons and small-group discussions can influence pro-environmental behaviours. Within conservation psychology as a whole, there has been a tendency to adopt understandings of behaviour that do not provide an in-depth account of the social and psychological processes behind environmental behaviour, such as informational models, economic models, and to some extent, attitudinal models. The logic of "if

people have more information / more money / better attitudes and values, then they will behave in a more environmentally friendly way" has been both theoretically and empirically unfulfilling, as reviewed in Chapter 1. To be able to design successful interventions, the social and psychological processes behind behaviour must be understood. Finally, this thesis contributes guidance on new tools for practical interventions to promote real pro-environmental behaviours. The techniques derived from this thesis will need to be tested and refined to understand how they can best be deployed, but it is hoped that the research in this thesis will provide the theoretical groundwork for doing so.

Conclusion

In this thesis, I have investigated how social group influence can affect pro-environmental behaviour. To do this, I conducted five studies along three lines of research, exploring how social comparisons (intergroup, intragroup), small group interactions, and individual differences in identification with a relevant ingroup guide environmental actions. In each chapter, there was evidence of social influences interacting with, or working through, individual-level variables to guide environmental intentions and behaviours. Importantly, this kind of social influence has been under-researched in conservation psychology as a whole. The experimental manipulations used had effect sizes comparable to or greater than most established theories of environmental behaviour, and were similar in design to situations people encounter on a daily basis. Thus, I believe that accounting for the interplay between social and individual-level variables is key to predicting and influencing pro-environmental behaviour. Based on my results, I suggest both deductive social comparisons and inductive group discussion can, if implemented carefully, be used to form pro-environmental group norms. I call on psychologists studying environmental behaviours to widen their theoretical scope to include a richer understanding of social-level

variables and for pro-environmental campaigners to harness these social influences more effectively in their interventions.

– APPENDIX A –
Moderated Hierarchical Linear Modelling Tables Controlling for Values

Table A.1.
Moderated HLM Table for Volunteering with Pre-Test Values (Time 1), Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	0.056	0.104	0.541	.596
Time Talking	<0.001	0.001	-0.524	.608
Beh. Content	-0.225	0.110	-2.049	.059
Pre-test Values	0.404	0.103	3.928	<.001
Step 2				
(Constant)	0.084	0.128	0.653	.525
Time Talking	<0.001	0.001	-0.454	.657
Beh. Content	-0.243	0.121	-2.006	.066
Pre-test Values	0.406	0.104	3.903	<.001
Time×Content	<0.001	0.001	-0.373	.715

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Values are centred with $M = 0$.

Table A.2.
Moderated HLM Table for General Conservation with Pre-Test Values (Time 2), Study 3.

	γ	Std. Error	*t*	*p*
Step 1				
(Constant)	4.975	0.214	23.274	<.001
Time Talking	<.001	0.001	-0.027	.979
Beh. Content	0.206	0.220	0.939	.364
Pre-test Values	0.385	0.154	2.500	.017
Step 2				
(Constant)	4.671	0.217	21.518	<.001
Time Talking	<0.001	0.001	-0.371	.717
Beh. Content	0.425	0.204	2.083	.057
Pre-test Values	0.396	0.149	2.659	.011
Time×Content	0.002	0.001	3.030	.004

Note. Participant $N = 47$, Group $N = 17$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Values are centred with $M = 0$.

– APPENDIX B –
Moderated Regression Tables

Table B.1. *Moderated Regression Table for Volunteering (Time 1), Study 3.*

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	-0.005	0.109		-0.042	.967
Time Talking	0.000	0.001	-.209	-1.502	.138
Beh. Content	0.030	0.111	.038	0.271	.788
Step 2					
(Constant)	0.028	0.130		0.211	.834
Time Talking	0.000	0.001	-.202	-1.440	.155
Beh. Content	-0.004	0.134	-.004	-0.026	.979
Time×Content	0.000	0.001	-.068	-0.457	.649

Note. $N = 69$. To prevent multicollinearity, Time Talking and Behavioural Content of Discussion are centred with $M = 0$.
Step 1 $R^2 = .04$ ($p = .29$); Step 2 $\Delta R^2 < .01$ ($\Delta p = .65$). Final $R^2 = .04$.

Table B.2. *Moderated Regression Table for Volunteering with Pre-Test Values (Time 1), Study 3.*

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	-0.005	0.096		-0.048	.962
Time Talking	<0.001	0.001	-.104	-0.835	.407
Beh. Content	-0.103	0.102	-.128	-1.005	.319
Pre-test Values	0.425	0.095	.500	4.495	<.001
Step 2					
(Constant)	0.035	0.115		0.306	.761
Time Talking	<0.001	0.001	-.096	-0.760	.450
Beh. Content	-0.145	0.122	-.181	-1.188	.239
Pre-test Values	0.426	0.095	.502	4.490	<.001
Time×Content	<0.001	0.001	-.084	-0.642	.523

Note. $N = 69$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Environmental Values are centred with $M = 0$.
Step 1 $R^2 = .27$ ($p < .001$); Step 2 $\Delta R^2 < .01$ ($\Delta p = .52$). Final $R^2 = .27$.

Table B.3. *Moderated Regression Table for General Conservation (Time 2), Study 3.*

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	4.958	0.174		28.416	<.001
Time Talking	0.000	0.001	-.077	-0.462	.646
Beh. Content	0.375	0.177	.351	2.118	.040
Step 2					
(Constant)	4.635	0.195		23.827	<.001
Time Talking	0.000	0.001	-.111	-.726	.472
Beh. Content	0.624	0.184	.584	3.394	.001
Time×Content	0.003	0.001	.446	2.952	.005

Note. $N = 47$. To prevent multicollinearity, Time Talking and Behavioural Content of Discussion are centred with $M = 0$.
Step 1 $R^2 = .10$ ($p = .09$); Step 2 $\Delta R^2 = .15$ ($\Delta p = .005$). Final $R^2 = .25$.

Table B.4. *Moderated Regression Table for General Conservation (Time 2) with Pre-Test Values, Study 3.*

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	5.026	0.165		30.508	<.001
Time Talking	<.001	0.001	-.008	-0.052	.959
Beh. Content	0.207	0.176	.194	1.175	.246
Pre-test Values	0.453	0.165	.390	2.738	.009
Step 2					
(Constant)	4.714	0.183		25.818	<.001
Time Talking	<.001	0.001	-.045	-0.311	.757
Beh. Content	0.453	0.181	.425	2.506	.016
Pre-test Values	0.429	0.152	.369	2.825	.007
Time×Content	0.003	0.001	.425	3.030	.004

Note. $N = 47$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Pre-Test Environmental Values are centred with $M = 0$.
Step 1 $R^2 = .24$ ($p = .009$); Step 2 $\Delta R^2 = .14$ ($\Delta p = .004$). Final $R^2 = .37$.

Table B.5 *Moderated Regression Table for General Conservation (Time 2) with Time 2 Values, Study 3.*

	B	Std. Error	β	*t*	*p*
Step 1					
(Constant)	4.974	0.138		35.942	<.001
Time Talking	0.001	0.001	.138	1.003	.321
Beh. Content	0.003	0.158	.003	0.022	.983
Pre-test Values	0.660	0.127	.661	5.194	<.001
Step 2					
(Constant)	4.772	0.164		29.176	<.001
Time Talking	0.001	0.001	.092	0.683	.499
Beh. Content	0.201	0.178	.188	1.130	.265
Pre-test Values	0.583	0.127	.584	4.575	<.001
Time×Content	0.002	0.001	.276	2.123	.040

Note. $N = 47$. To prevent multicollinearity, Time Talking, Behavioural Content of Discussion, and Time 2 Environmental Values are centred with $M = 0$.
Step 1 $R^2 = .45$ ($p < .001$); Step 2 $\Delta R^2 = .05$ ($\Delta p = .04$). Final $R^2 = .50$.

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