

Evaluating a group-based sustainability intervention  
using the theory of planned behaviour

By

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## **Abstract**

Meeting the challenge of anthropogenic climate change will require widespread adoption of more sustainable behaviours. However, although attitudes towards sustainable behaviours are positive, actual change is lagging behind. Three studies explored the success of a classroom intervention programme that was intended to support individual change towards more sustainable behaviour in the domains of energy conservation and consumer responsibility. It was expected that identification with the small action groups used in the programme would have a positive effect.

The theory of planned behaviour (TPB) (Fishbein & Ajzen, 1977) and the social identity perspective (Turner, 1999) were used as a framework for analysis. Studies one and two examined the success of the intervention programme across two iterations. Behaviour measures used in study one were inadequate but effective measures were developed for the second study. The intervention programme was very successful in achieving behaviour change and improving attitudes towards and intentions to perform sustainable behaviour. The TPB was supported by both studies, although there were unexpected inconsistencies in the variables predicting intent. Contrary to expectations, there was no effect found for group identification. Differences were also found between those participants who chose to focus on energy conservation and those with a focus on consumer responsibility, suggesting that the consumption group approached environmental behaviour in a more holistic way.

Study three was a qualitative analysis of diary entries by participants in study one. A participant narrative of sustainable behaviour was constructed and related to attribution theory, particularly the Martinko and Thomson (1998) synthesis model. The narrative substantially matched the TPB but some problematic aspects of the intent construct in the TPB were identified. There was also evidence of a positive effect of group

membership that had not been captured by the group identification variable.

Potential interpretations and consequences of these findings were discussed.

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## Introduction

The fourth assessment report of the Intergovernmental Panel on Climate Change (Pachauri & Reisinger, 2007) describes a global environmental crisis that demands immediate response. Global temperature is increasing as a result of human activity, and unless this process is halted, the consequences will be dire and perhaps irreversible. To slow or halt anthropogenic climate change, policymakers and concerned organizations will need to inspire personal behaviour change on a large scale.

This research tests a classroom intervention programme designed to encourage sustainable behaviour. It is grounded in action research as originally conceived by Lewin (1946/1948), primarily in its focus on achieving real change in the lives of its participants. The research consists of three linked studies. The first study is a quantitative analysis of data gathered during the first use of the intervention programme to test for the success of the intervention and identify the correlates of success. The second study repeats this analysis on the second use of the intervention programme. The third study is a qualitative study, exploring diaries kept by participants during the intervention programme to shed light on questions raised by studies one and two.

### *The environmental crisis as a commons dilemma*

The warming climate is just one of a range of disastrous anthropogenic changes currently underway (Oskamp, 2000a). Global oil production is also expected to peak in the next few decades (Grant, 2007), forcing massive societal change. These gathering forces suggest that traumatic social transformation will soon take place. As British climate activist George Monbiot wrote in his book *Heat*, “we inhabit the brief historical interlude between ecological constraint and ecological catastrophe” (Monbiot, 2007). Of these problems, climate change demands the greatest attention because the

consequences of failure are severe, the scale of response needed is massive, and the time available in which to make change is short. Climate change is also implicated in almost all other components of the environmental crisis (Monbiot, 2007). Consequently, much time and effort is being expended to encourage personal behaviour change to address this problem. Al Gore's documentary film *An Inconvenient Truth* (David, 2006) was the first prominent public message urging individuals to respond to climate change with personal action. Since this film was brought to air, many media outlets and social institutions in New Zealand have taken on this message and guided individuals towards taking personal responsibility for mitigating climate change. For example, to mark the New Zealand-hosted World Environment Day 2008, the United Nations Environment Programme and New Zealand's Ministry for the Environment distributed a glossy brochure containing "tips for a low carbon lifestyle" under the slogan "CO<sub>2</sub> – Kick the habit!" (Ministry for the Environment, 2008). Around the same time the Victoria University of Wellington Environment Group invested heavily in a booklet of advice on how to live sustainably, with plentiful suggestions for behaviour changes to adopt (Hart, Meadowcroft & Versteeg, 2008). Even a prominent celebrity gossip magazine published a green issue in which celebrities suggested "cheap and easy ways to make your family more sustainable" (Kitchin, 2008).

There is widespread agreement that these messages are important. A national survey in April 2007 showed that 77% of New Zealanders believed climate change to be an immediate problem (ShapeNZ, 2007), and in another survey conducted during September 2007 it was shown that 94% of New Zealanders had started taking some kind of action in response to concerns about climate change (Colmar Brunton, 2007). However, despite this abundance of encouragement, the same poll showed that uptake of behaviour change has been far less than would be desired. For example, only 43% of people had reduced how much they drive their car. Additionally, the Colmar Brunton

(2007) survey did not record the extent to which each behaviour change was being pursued, so even a token effort was counted as a behaviour change. Clearly, general behaviour-change communication campaigns such as these have had only limited success despite widespread agreement with their message.

Climate change is proving to be a very difficult problem to resolve. Introducing a report concerned with the gap between climate change knowledge and responsive action, Abbasi (2006) gave this compelling summary of the difficulties:

The problem of climate change is almost perfectly designed to test the limits of any modern society's capacity for response -- one might even call it the "perfect problem" for its uniquely daunting confluence of forces:

- complex and inaccessible scientific content;
- a substantial (and uncertain) time lag between cause and effect;
- inertia in all the key drivers of the problem, from demographic growth to long-lived energy infrastructure to ingrained daily habits at the household level;
- psychological barriers that complicate apprehension and processing of the issue, due in part to its perceived remoteness in time and place;
- partisan, cultural, and other filters that cause social discounting or obfuscation of the threat;
- motivational obstacles, especially the futility associated with what is perhaps the quintessential "collective action problem" of our time;
- mismatches between the global, cross-sectoral scope of the climate change issue and the jurisdiction, focus, and capacity of existing institutions;
- a set of hard-wired incentives, career and otherwise, that inhibit focused attention and action on the issue."

(Abbasi, 2006, p17)

While the most powerful responses to climate change will come from economic and political sources, Abbasi's "perfect problem" addresses fundamental themes of social



psychology and thereby poses a challenge to psychologists. Howard (2000) and Oskamp (2000a, 2000b) both claim that psychological insights can provide useful responses to climate change problems. Many of the difficulties identified by Abbasi can usefully be understood by viewing climate change as a ‘tragedy of the commons’ (Hardin, 1968), a type of resource management problem in which the benefits of exploitation accrue to the exploiter alone while the costs are diluted among the whole population. Climate change is caused by the release of stored carbon as a by-product of energy use, a perfect fit with the commons dilemma model. The benefits of immediate exploitation of the carbon resource far outweigh the immediate costs, so rational self-interest will lead to exploitation until the resource is exhausted. Hardin was not optimistic that such commons dilemmas could be easily solved, and his best recommendation was to manage the resource through regulation and coercion. Other responses have been devised since, including several from a psychological perspective that allows for behavioural models of greater complexity than the straightforward rational self-interest of Hardin’s (1968) original formulation. Notably, in each case the researchers appealed to group effects to resolve the dilemma. One approach was proposed by Schmuck and Vlek (2003), who argued in a discussion paper that putting resource use in public view resulted in reduced exploitation, as it allowed processes such as social comparison, accountability, and norm-modelling to take place. Another approach was suggested by Kramer and Brewer (1984) who found evidence that a shared identification among users of the commons would increase co-operation and reduce exploitation. Another response to the commons dilemma came in a discussion paper by Ostrom, Burger, Field, Norgaard and Policansky (1999), who explicitly identified environmental sustainability as a “global commons” and considered moral norms to be a good way of mitigating exploitation, but argued that identification with the group of resource users would be needed for the moral norms to function. All these

psychologists point towards both the difficulty and necessity of feeling urgency and connectedness to the problem of climate change, and propose the mechanism of group-based processes as a potential carrier of this urgency.

While promising, these responses share the significant limitation of being untested beyond the laboratory. There is a dearth of research that applies psychological knowledge to resolve real-world commons dilemmas by changing behaviour, particularly in the environmental domain (Vlek, 2000). The present studies attempt to address this.

### *An intervention programme*

A classroom intervention to achieve behaviour change in the domain of environmental sustainability was developed and trialled in two iterations over the 2007 and 2008 academic years at Victoria University of Wellington. The intervention programme is the basis of the three studies described here. In both iterations, students were required to participate in a programme that would encourage them to make their behaviour more environmentally sustainable, and support their attempts to change their behaviour towards this goal. The programme required that students work in small groups to achieve behaviour change in a specific area of their choice, and was supported by information and media resources, academic outputs that encouraged engagement and reflection, and mechanisms to engage group influence processes. The programme was intended to draw on and encourage the interest and motivation that was already present among the participants. At no time did it compel participants to become more environmentally sustainable, but the overall force of the programme was designed to be difficult to resist. The programme in both iterations was for a short duration, after which time participants had an opportunity to review their performance.

These studies follow the model of action research (Lewin, 1946/1948). The intervention directly addressed the domain of concern and located itself in authentic

human experience with a focus on achieving real change in the lives of participants. Co-operation and engagement between participants and researchers was encouraged, and feedback from participants was used to improve the second iteration of the intervention programme. Participants in all studies were at all times aware of the wider context of their activities as part of an intervention programme contained within an academic course. Participants' analysis and reflection on their actions and experiences contributed to graded assignments. The advice and comments of the 2007 (study one) participants were solicited at the conclusion of their participation, and some participants volunteered to give extensive feedback and to assist in refining materials and techniques for 2008 (study two).

While this research is theoretically grounded and draws extensively on laboratory-based psychological knowledge, it is located in authentic problems of behaviour change that cannot be captured in the laboratory setting. Consequently, while this research does not have the degree of control over variables that would be possible in the laboratory, its results are directly applicable to the problem of environmental behaviour change as it exists in the real world.

Evaluating the success of the intervention programme was a key goal of this research. This goal had an additional requirement: the development of empirically-robust behaviour measures that were applicable to the population of interest and sensitive to short-term change. A related goal was to evaluate the psychological mediators of behaviour change operating through the intervention programme. This aspect of the problem was approached in terms of the disparity between attitudes and behaviours.

### *Reasoned behaviour and the environmental dilemma*

As was discussed above, widespread communication campaigns encouraging the adoption of environmentally sustainable behaviours have achieved high levels of public

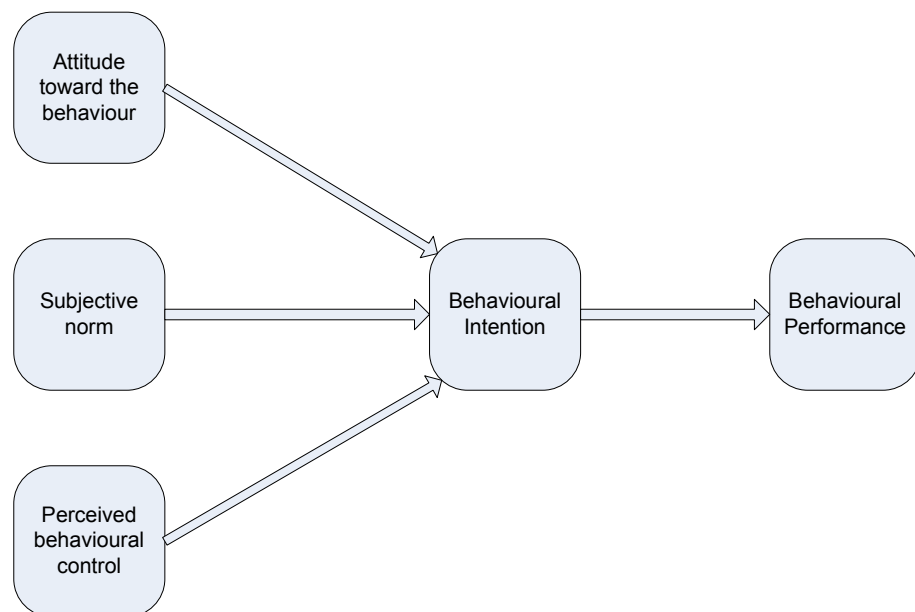
support, but actual behaviour change has lagged behind. Although public opinions are in favour of pro-environmental outcomes, this is not being reflected in private actions. This has been a familiar problem for psychology since LaPiere (1934) showed that racist attitudes were not matched by racist behaviours. LaPiere's study showed that despite receiving Chinese customers without fuss, a vast majority of hoteliers later claimed that they would refuse to serve a Chinese couple. Since this study, research across a variety of contexts has comprehensively documented the high degree of inconsistency between attitudes and behaviour (Wicker, 1969). This has also been shown in the domain of environmental sustainability, for example Scott and Willits (1994) found weak links between attitudes on the New Environmental Paradigm (NEP) scale and ecological behaviours.

Interpreting the sustainability commons dilemma as a problem of attitude-behaviour inconsistency suggested the use of a theoretical approach oriented towards that category of problem. The reasoned behaviour approach (Ajzen & Fishbein, 2005) provides a model of the relationship between attitudes and behaviour that can account for their apparent disagreement. The present research applies the reasoned behaviour approach to the intervention programme in two studies in an attempt to account for the relationship between attitudes and behaviour.

The reasoned behaviour approach comprises two linked theories, the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1977) and the Theory of Planned Behaviour (TPB) (Ajzen, 1985; Ajzen & Fishbein, 2005). The latter supplies the framework for the present study. According to these models, attitude is not the sole cause of behaviour, rather its effect is balanced against two other influences, social norms and perceived behavioural control (PBC). The relative importance of each influence varies across different applications, but in combination they should reliably predict behavioural intention, which in turn should reliably predict behaviour (Ajzen &

Fishbein, 2005). (See Figure 1.) Thus the weakness of attitude as a predictor of behaviour is explained by the presence of other influences. High attitudes may link to low behaviour because social norms and PBC are low. Conversely, low attitudes may combine with high social norms and PBC to generate a high behavioural outcome. Each of these three influences, attitudes, social norms and perceived behavioural control is derived from beliefs about the world and about the behaviours of interest. These are, therefore, intensely rational models, in which the actor is presumed to think in detail about the world and the consequences of behaviour, and then chart an ideal course based on this information.

*Figure 1.* Primary relationships in the theory of planned behaviour (Ajzen & Fishbein, 2005)



Attitudes in the TPB are the overall evaluations of the instrumental and experiential qualities of the behaviour, which in turn are based on beliefs about the merit of the behaviour's likely outcomes (Ajzen, 2002a). The attitude construct therefore includes

both affective and cognitive components (Tonglet, Phillips & Read, 2004). It is important for attitudes to be measured at the same level of specificity as the behaviour of interest (Ajzen & Fishbein, 1977), because a general attitude (say, valuing environmental sustainability) should not be expected to predict a specific behaviour (say, taking a short time in the shower). For example, Vining and Ebreo (1992) found that general environmental concern accounted for only 6% of variance in self-reported recycling behaviour, whereas specific attitudes towards recycling predicted 35% of variance. The reasoned behaviour approach, therefore, demands great care in the measurement of both attitudes and behaviour. Of course, attitudes held by a given person may not remain the same over time; however, attitudes that are stable over time are more likely to influence future behaviours (Glasman & Albarracin, 2006).

Subjective norms in the TRA and the TPB were initially conceived as the perceived opinions of important others on the value of the behaviour (Ajzen, 1991). However, over time this model of norms was found to be relatively weak as a predictor (Bozionelos & Bennett, 1999; Armitage & Conner, 2001; Ajzen, 2002a; Knussen, Yule, MacKenzie & Wells, 2004) and numerous alternatives have been proposed, such as descriptive norms, defined as the perceived performance of the behaviour by important others (Ajzen, 2002a; Ravis & Sheeran, 2004), and moral norms, defined as internalised views on what is right or wrong (Smith & McSweeney, 2007; Bamberg & Moser 2007). More radical departures from the original TRA/TPB construct have also been proposed, such as Thøgersen's (2006) alternative conceptual scheme and Wellen, Hogg and Terry's (1998) placement of norms as a subset of attitudes in a group identity context. This variety of approaches indicates that the normative component of the TRA and TPB has yet to achieve a rigorous and generally-accepted definition, and the usage of norms in the present studies should be interpreted in this light. Of particular interest in the present series of studies is the injunctive norm, which can be understood as an opinion

held within a group about what behaviours are appropriate. Research by Terry and Hogg (1996) and Terry, Hogg and White (1999) examined the role of injunctive norm as an alternative to perceived social norm when placed in relationship to group identity. This research is discussed further below.

The third component of the TPB is perceived behavioural control (PBC; Ajzen, 1985), which accounts for limitations on behavioural performance. It is a component of intent (Ajzen, 2002b), because intent should be low when an action seems difficult to complete, and higher when an action seems likely to succeed. As well as this role as an intent component, PBC has been found to serve well as a proxy measure for actual behavioural control (Sheeran, Trafimow & Armitage, 2003) as had been theorized by Ajzen (1985). This role as a proxy has resulted in a number of variations of the TPB model that predict other relationships between PBC and behaviour (not shown in Figure 1). Ajzen (1991) predicted a direct effect of PBC on behaviour with no moderation. Conversely, Ajzen and Fishbein (2005) predicted that PBC should moderate the intent-behaviour relationship with no direct effect on behaviour. Ajzen (1985) allowed for the possibility of both. Research has supported both relationships: Webb and Sheeran (2006) found that changes in intention had a larger effect on behaviour when volitional control was high, showing a moderation effect of PBC, while a direct effect of PBC on behaviour was found by Albarracín, Johnson, Fishbein and Muellerleile (2001). There is therefore some ambiguity about perceived behavioural control, which appears as a predictor of intent, a moderator and/or a predictor of behaviour in the same model.

The Theory of Planned Behaviour has been applied frequently to pro-environmental and sustainability-oriented behaviour and has shown considerable utility in this domain. Bamberg and Moser (2007) conducted a meta-analysis of attitude-behaviour studies dealing with pro-environmental behaviour and developed a model that was substantially similar to the TPB, with the TPB relationships among attitudes, PBC, intention and

behaviour all being confirmed.

The majority of published reasoned behaviour studies in the environmental domain only test the model as far as intention, and do not measure behaviour. (This is a common limitation of reasoned behaviour research due to the difficulty in measuring behaviour.) Kaiser and Scheuthle (2003) tested the sufficiency of the TPB in measuring the sustainable intentions of German-speaking Swiss across a broad range of specific behaviours, and found that with extensive question sets for each variable, the TPB achieved impressive explanatory power. Intention-based support for the model has also been shown in specific behavioural domains. In the recycling domain, Tonglet et al. (2004) and Davis, Phillips, Read and Iida (2006) surveyed recycling intentions in the U.K., as did Cheung, Chan and Wong (1999) among Hong Kong students, and in each case there was support for the TPB. In the domain of transport behaviours, De Groot and Steg (2007) found that the TPB gave a very good account of intention to use a park-and-ride facility in the Netherlands. In the domain of consumer choices, Kalafatis, Pollard, East and Tsogas (1999) found the TPB provided a good explanation of consumer intention to make environmentally friendly purchase decisions, with social norms dominating intention prediction in the UK sample and perceived behavioural control being the key predictor in the Greek sample.

Some studies have measured pro-environmental behaviour as well as intention, particularly in the domain of transport choices, where the TPB has been found to be a good model of behaviour among German (Bamberg, Ajzen & Schmidt, 2003) and Swiss (Kaiser, Wölfling, & Fuhrer, 1999) samples. Heath and Gifford (2002) used the TPB to analyse the success of a large sustainability intervention, making universal bus passes available to students in order to promote use of public transport, and found that the TPB gave a good account (albeit one that was improved by an alternate group-based measure of norms).



Participants in the intervention programmes were expected to begin with pro-sustainability attitudes that did not transition into behaviour. In terms of the commons dilemma, participants were expected to approve of behaviours that would preserve the resource in principle while continuing to exploit the resource in practice. The intervention programme was expected to reduce attitude-behaviour inconsistency, and it was expected that the TPB would give a good account of the relationship between participant attitudes, intentions and behaviour.

### *Group identification as a moderator of change*

Oskamp (2000a, 2000b) identified the fundamental problem in the environmental crisis as a failure of individual motivation, and among several motivational approaches discussed the use of organised group activity to build a sense of collective efficacy. Oskamp's suggestions were in reference to large grassroots organisations for political change, but the general point was that collectivity can be applied to the problem of social change. This point is not new. The use of groups to achieve behaviour change echoes the very early days of the action research paradigm (Bargal, 2006) and such early action research studies as Lewin's (1947/1959) 'housewife' study, in which the interpersonal effects among a group of housewives were harnessed to encourage them to add new foods to the meals they prepared for their families. The present research follows in this tradition of harnessing group effects to achieve behaviour changes that are beneficial to society.

The influence of group membership on behaviour is also addressed by another theoretical approach, the social identity perspective (Turner, 1999). This encompasses two linked theories, social identity theory (Tajfel, 1981) and self-categorization theory (Turner, 1982; Turner, Hogg, Oakes, Reicher & Wetherell, 1987). The latter is of most relevance to the present research. At the core of both of these theories is the notion that we identify with groups to which we perceive we belong, and that we categorize

ourselves as members of these groups/categories. Self-categorization theory holds that we have multiple self-perceived group identities, only one of which is active at any single moment. Different categories become more or less salient as a situation changes, and our social identity depends on the category that is most salient at the time. Self-categorization theory is also an account of behaviour. In contrast with the TPB which portrays behaviour as rational and reasoned, behaviour in self-categorization theory is driven by the appropriate norms of the salient category. As the salient category changes, the norms that are active also change, and behaviour shifts accordingly.

As was noted above, an important component of the intervention programme was the use of small groups. A third strand of the present research, then, is examining the potential of small action groups to act as a lever for improving the relationship between attitudes and behaviour. Small groups have previously been shown to be a useful tool for achieving environmental behaviour change by Staats, Harland and Wilke (2004), whose EcoTeam Program brought groups of 3-8 households together to improve environmental practices, meeting regularly for a period of months and reporting back to each other on their progress. A longitudinal study of the programme's use among households in the Netherlands found that it was a success, with a significant increase in environmental behaviour that was sustained over a year after the programme's conclusion. Analysis on the specific domain of transport behaviour found that in cases where social influence was strongly experienced within the group, intent had a direct effect on behaviour irrespective of habits, whereas when social influence was weak, intent only influenced behaviour when habit was weak. In this way, a strong group improved the relationship between intention and behaviour.

The series of studies outlined in this thesis adopted a similar model to Staats et al. (2004) where an intervention programme was used to support participants as they formed small action groups and sought to achieve greater levels of environmentally

sustainable behaviour in their lives. Based on the findings above it was expected that membership in the small task-oriented action groups would support behaviour change and generate a closer association between good intentions and subsequent behaviour.

As has been noted, the theory of planned behaviour is applied to the environmental behaviour in this study, but self-categorization theory is invoked to account for the group effects. This research therefore explores a practical integration of these theoretical approaches. The social identity approach has previously been combined with the TPB by a number of researchers, most notably Terry and colleagues (Terry & Hogg, 1996; Wellen et al., 1998; Terry et al., 1999; Terry, Hogg & McKimmie, 2000; Smith, Terry & Hogg, 2007; Fielding, Terry, Masser & Hogg, 2008) who used social identity to address the weakness of the norm construct in the TPB. Social norms have been shown to be the weakest component of that theory (Terry & Hogg, 1996; Armitage & Conner, 2001) and the social identity approach offers a different way of conceptualizing norms that has proved fruitful for Terry and colleagues. In self-categorization theory, all norms are located in groups, and the salience of the group determines their influence; it follows that norms derived from behaviourally relevant groups should be more important to behaviour than the TPB formulation of norms from people who are personally important but not necessarily salient at the time of behaviour. An improved measure of norms should result in better prediction of behavioural intent, and such an effect was found (Terry & Hogg 1996; Terry et al., 1999). However, this effect of salience has consequences beyond the prediction of intent. Group salience should also moderate the relationship between intent and behaviour. Such an effect is a prediction of self-categorization theory (e.g. Turner et al., 1987). The more salient a group is, the more that group's behavioural norms become activated and the more likely it is that group-appropriate behaviours are undertaken. In this way, membership in a salient group should serve as a moderator of the intention-behaviour relationship.

There is room in the theory of planned behaviour for a group effect to moderate the relationship between intent and behaviour. A meta-analytic review of 161 reasoned behaviour studies (Armitage & Conner, 2001) found that intent predicted behaviour at rates of around 22% on average, a figure that rose to around 27% when a direct effect of PBC was included, leaving a very large proportion of variance unexplained. Thus, the TPB's explanatory power is far from comprehensive, and a great deal of the variance in behaviour is not accounted for by intention. The present studies test the prediction that a group effect will reduce the unexplained variance in this relationship by interacting with the intent measure so it becomes more predictive.

There are a number of additional reasons to expect that a group effect would moderate the intent-behaviour relationship. There is a long tradition of research showing how working in groups can improve problem-solving (e.g. Maier, 1978; Laughlin, Hatch, Silver and Boh, 2006), and efficacy is increased by sharing new approaches and additional expertise. These improvements should reduce the amount of effort required to achieve a goal. Even when social loafing is in effect, overall summed work on the task increases (Karau & Williams, 1993). For tasks where the amount of work does not scale linearly with group size, such as seeking out consumer information that can be shared with all members, collective effort can dramatically reduce the effort burden for each actor. Group reduction of effort should therefore moderate the intention-behaviour relationship, as the presence of a supportive group makes it easier to complete a given behaviour.

Furthermore, an increase in efficacy should also improve volitional control (as measured by PBC) by providing additional resources with which to complete a task, again with the effect of moderating the intent-behaviour relationship by making it easier for the actor to carry out their intentions.

Groups can also moderate the intent-behaviour relationship by fortifying the actor's

resistance to countervailing forces. Simply identifying as a group member makes a person both exert and experience pressure to conform to group-based norms and values (Turner, 1999). In the environmental domain, actively engaging in pro-environmental behaviours beyond what is typical for society is by definition a minority position, and subjects the actor to consistent pressure from the majority. Breaching broad social norms can be an intimidating and unpleasant experience (Garfinkel, 1967), there are costs to maintaining deviant opinions (Cartwright & Zander, 1960) and when a minority is clearly identifiable it will be subjected to significant pressure from the majority (Latané, 1981). However, minority positions can sustain themselves in the face of such opposition through collective reinforcement. Latané (2000) also proposed a dynamic social impact theory that uses ordinary social impact processes to account for the formation of resilient cells in which a minority opinion is sustained. An action group can therefore resist external pressure and preserve its own socially deviant norms. For example, this can manifest as members offering simple emotional support to each other, so no member feels isolated and difficulties can be shared with sympathetic listeners. Without this resource actors could easily be discouraged and decide to conform to the majority again. The group should therefore moderate the intent-behaviour relationship through this process as well; the more effective a group is at insulating its members from countervailing forces, the more likely it is that intent will survive unchanged through to the final behaviour.

The group effect also enhances an individual member's ability to influence others. An increase in numbers is a straightforward way to increase minority influence, and a group that consistently and inventively maintains its behaviours is even more influential (Maass & Clark, 1984; Cialdini & Sagarin, 2005). Groups who collectively engage in a behaviour also communicate to outsiders that their behaviours are achievable and successful, even if they are not necessarily acceptable (Rivis & Sheeran, 2004; Cialdini

& Sagarin, 2005). This group effect should moderate intent for behaviours that involve social influence, making it more likely that intentions can be carried out.

Group membership should also moderate the intent-behaviour relationship by increasing commitment to goals. Members of a group whose fates are mutually interdependent will overcome differences to work together (Sherif, 1961) and will become more committed to the goal. McKimmie et al. (2003) found that cognitive dissonance was reduced when behaviour was supported by a group, and social identity theory (Turner, 1982; Turner, 1999) predicts that points of difference about a category with which you identify will become the basis of self-esteem judgments and will be seen as important and valuable. A consequence of this is that motivation to perform will increase if the category's status is threatened by competition, for example Siero, Bakker, Dekker and Van Den Burg (1996) found that workgroups trying to save energy were much more successful if they were given information about the performance of other groups. Strong identification of members with their group will engender a collective sense of responsibility. Kramer and Brewer (1984) found that group identification mitigated resource exploitation in a commons dilemma, and Karau and Hart (1998) found that social loafing was low within cohesive groups, indicating a desire to protect fellow group members that increased motivation and commitment. An actor with high commitment is more likely to follow through on intentions to perform a behaviour, thus groups as producers of commitment should moderate the intent-behaviour relationship through this role as well.

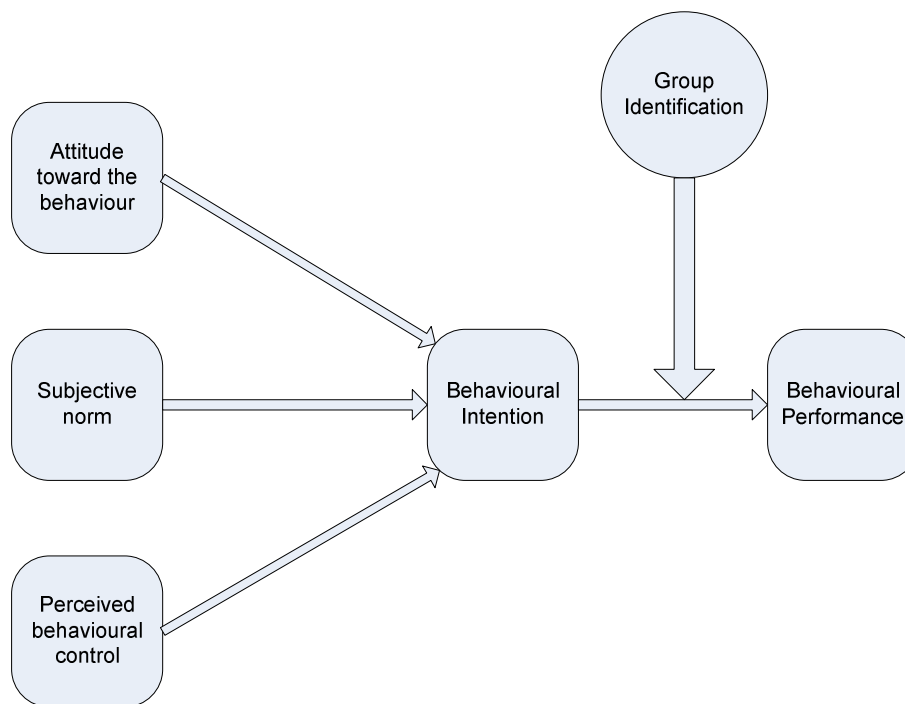
Group salience was earlier discussed as a specific group effect. However, salience for the group was not directly measured or manipulated in the present study. The intervention was expected to achieve high levels of group salience, and any effect of salience was expected to be captured within the group identification measure.

Group identification has already been found to have a moderation effect on a

relationship in the TPB. Research by Terry and Hogg (1996) and Terry et al. (1999) investigated how a very similar measure of group identification moderated the effect on intention of group-derived injunctive norms (what the group thinks of the behaviour) and perceived behavioural control. Terry and Hogg (1996) looked at the health behaviours of Australian students, using the student body as a whole as their reference in-group. They found that group-derived injunctive norms predicted intention, but only for those who identified with the group; they also found that perceived behavioural control predicted intention, but this was much stronger for those who did not identify with the group. This was explained by the fact that group norms are factors that belong to the group and take on more significance as the group becomes more relevant, whereas PBC is a factor that belongs to the person and takes on greater significance as the group becomes less relevant. Terry et al. (1999) repeated these results while looking at recycling behaviour, finding that group identification moderated the norm-intent relationship (when identification was high) and the perceived control-intent relationship (when identification was low). There was no test of whether group identification would influence the intent-behaviour relationship. Although the reference groups in these studies were large-scale social categories rather than small face-to-face groups with a particular rationale, these findings suggested that group identification can hold a moderating role in the theory of planned behaviour.

The present research presumed membership in small, task-related action groups would be perceived as a continuum rather than a binary (member/non-member) condition (Hinkle, Taylor, & Fox-Cardamone, 1989). The degree of membership was measured by the extent to which the participant identified with their group. Group identification was expected to tap into all the group effects discussed above, and thereby to moderate the intention-behaviour relationship. In terms of the TPB, group membership should positively moderate the intent-behaviour relationship (see Figure 2).

*Figure 2. Group identification relationship to the theory of planned behaviour*



In terms of interpreting the results of the present studies, it should be noted that other effects of groups are also anticipated. Some aspects of the group effect - the enhancement of behavioural control discussed above, conformity pressures that enforce social norms (Cartwright & Zander, 1960) - would in theory be captured by standard TPB predictor questions for PBC and norms if such questions were carefully designed and asked at the right time. In the present studies, the TPB predictors were measured before groups were formed, suggesting that the predictors would under-predict intention and intention would underestimate final disposition. As this would not be captured in the predictors, any such effect would be expected to appear in the data as a direct effect of groups on both intention and behaviour.

Finally, in order to validate the group identification measure, group-derived injunctive norms were included in studies one and two. This made it possible to test



Terry and Hogg's (1996) finding that group identification was a moderator of the relationship PBC and injunctive norms had with intent.

### *The present studies*

The present research examines the success of a programme of intervention that was performed on two successive intakes into a second-year social psychology class at Victoria University of Wellington, New Zealand. The goal of the programme was to improve the environmental behaviours of the participants. The first and second studies both used surveys to uncover the correlates and mediators of the behavioural effects of the intervention programme. The third study explored qualitative data gathered during the first study to investigate some questions raised during the first two studies.

It was expected that the intervention programme would be successful in improving behaviour in the sustainability domain, specifically in the domain chosen by the participant group as a point of focus.

It was also expected that the theory of planned behaviour would give a good account of the intervention programme data, specifically that behavioural intention would predict behaviour and mediate the relationship between attitudes and behaviour.

A novel prediction was also tested in these studies based on the use of groups. The intervention programme used a range of small artificially-created groups with a focus on specific environmental action. It was expected that the more a participant identified with their action group, the more they would follow through on their sustainable intentions with sustainable behaviour. Specifically, it was expected that group identification would moderate the intent-behaviour relationship by reducing effort requirements, improving behavioural control and problem-solving resources, increasing commitment to goals, and increasing ability to resist outside forces and to influence others. This prediction appears to be previously untested in the literature.



## Study One

In this first study, participants were asked to undertake a period of environmental action in their own lives alongside a small group of colleagues sharing the same goal. The study was longitudinal, with key variables recorded both before and after the period of action, although analysis of theory of planned behaviour variables was only possible in cross-sections of the data at the beginning and the end. Participants were asked to choose a domain of environmental action on which to focus, either energy use at home or consumer responsibility, and to make an effort to improve their performance in that focus domain. In what follows, “domain” refers to the areas of action, energy use and consumer responsibility, and “focus domain” refers to the domain chosen by the participant for their behaviour change activity.

The intervention and all surveys also included two other domains, recycling/waste responsibility and transport behaviours, but these are excluded from analysis because few participants chose these options (recycling domain  $n=14$ , transport domain  $n=4$ ), making statistical inference impossible.

This study encountered significant difficulties with the behaviour measures used. There is a general absence of valid bottom-up measures of behaviour in these domains, particularly measures that are applicable to a student population and sensitive to a short time-frame. For this reason, analyses involving the behaviour measures used should be treated as pilot findings only. These difficulties are discussed in more detail in the Materials/Equipment section below.

### *Effect of the Intervention*

This intervention programme was expected to successfully achieve behaviour change in the focus domain. Specifically, it was expected that performance scores in the focus domain should improve between the beginning and end of the programme.

Hypothesis 1: Behavioural performance should improve in the focus domain.

This series of studies was also concerned with the frequent failure of stated intentions to correlate with behaviour. It was expected that the intervention programme would result in better alignment of intent with behaviour.

Hypothesis 2: Correlation between intent and performance (BI-BP) should increase in the focus domain.

### *TPB Expectations*

This series of studies used the theory of planned behaviour as a framework, and support for the TPB model was expected.

Hypothesis 3: Attitude towards the action, subjective norms, and perceived behavioural control should predict intent

Hypothesis 4: Intent should predict performance and mediate the effect of other predictors on performance.

### *Effect of Groups*

Participant identification with their action group was expected to produce a number of moderation effects. Research by Terry and Hogg (1996) and Terry et al. (1999) included group-based injunctive norms as an additional predictor of intent. They found that group identification positively moderated the contribution to intent of group-based injunctive norms and negatively moderated the contribution of perceived behavioural control. The same effects were expected in the present study.

Hypothesis 5: Group identification should moderate the effect of perceived behavioural control on intention, such that PBC should be more strongly related to intention for low-identifiers than for high-identifiers.

Hypothesis 6: Group identification should moderate the effect of group-based injunctive norms, such that these norms should predict intent, but more so for participants who identify strongly

with the group.

The present study also proposed an additional role for group identification as a moderator of the relationship between intent and behaviour. It was expected that strong identification with an action group would be associated with a greater contribution of intent to performance. Accordingly, the correlation between intent and behaviour was expected to be greater where group identification was high.

Hypothesis 7: Within the focus domain, the correlation between intent and performance (BI-BP) should increase where group identification is high.

Hypothesis 8: Group identification should moderate the intent-behaviour link, such that the contribution of intent to performance is greater where group identification is high.

## **Method**

### *Participants*

The study was delivered as part of a semester-long laboratory stream for a second-year social psychology course at the Victoria University of Wellington in 2007. Participants were students enrolled in the course. This was a longitudinal study and not all participants completed all components. Participants in the course were divided into lab groups of approximately 18 students at the beginning of the study, and as part of the study were arranged into smaller groups of 3-7 members (hereafter *action groups*). 157 participants formed groups of interest in the present study, of whom 112 provided data at later stages. Participants were 74% female and the mean age was 20.8 years (s.d. 5.5). 60% reported living in a flat-share situation with peers, 22% reported living at home with parent/guardian, 10% lived in shared student accommodation and 8% lived alone or with partner/children. 10% reported membership in an environmental group such as Greenpeace or the Royal Forest & Bird Protection Society of New Zealand.

## *Materials/Equipment*

Participants completed surveys on four occasions:

Time One ( $t1$ ): pretest during the first lecture of the semester, before the beginning of the intervention

Time Two ( $t2$ ): four weeks after  $t1$

Time Three ( $t3$ ): six weeks after  $t2$

Time Four ( $t4$ ): two weeks after  $t3$ , twelve weeks after initial pretest survey at  $t1$

Except as otherwise noted, responses to all survey questions were on 7-point Likert-type scales. Surveys included a mixture of positively- and negatively-phrased items. Negatively-phrased items were reverse weighted during coding.

A full list of variables with explanatory notes is given in Table 1. Measurement questions from each survey are presented in full in Appendix One.

*Theory of Planned Behaviour measures:* At  $t1$  and  $t4$ , a set of questions for each behaviour domain measured attitudes towards domain behaviours (Attitude), perceived norms surrounding domain behaviours (Norms), perceived control over ability to perform domain behaviours (PBC), and intent to perform domain behaviours (Behavioural Intent, BI). The attitude question sets related to the dimensions negative-positive, useless-useful and unimportant-important (e.g. “I think that reducing the environmental impact of the goods and services I purchase and use would be” with response options from “1. Completely useless” to “7. Extremely useful”). The subjective norm question sets asked about approval of the behaviours from four reference groups: people at home, people at university, peers, and society at large. (e.g. “Most people in my household want me to reduce the environmental impact of the goods and services I purchase and use” with response options from “1. Strongly agree” to “7. Strongly disagree”). Single-question measures were used for perceived

behavioural control (“How much control do you have over the environmental impact of the goods and services you purchase and use?” with response options from “1. Total control” to “7. No control”) and behavioural intent (“In the next two weeks I intend to reduce the environmental impact of the goods and services I purchase and use” with response options from “1. Strongly agree” to “7. Strongly disagree”). Note that the single question for PBC was worded to explicitly address those aspects of PBC connected to locus of control and not those connected with self-efficacy (Armitage & Conner, 1999).

Additionally, in the survey at  $t3$  measures were taken of group-based injunctive norms. Four questions were used for the measure, recording the participant’s perceptions of their fellow group members’ opinion of the action’s worth (GrpInjunctive). The four questions directly asked about the opinions of the group members (e.g. “The rest of my group believes our actions were a waste of time and effort” with response options from “1. Strongly agree” to “7. Strongly disagree”).

*Behavioural performance measures:* Participants responded to a series of questions about their environmentally-relevant behaviours at  $t1$  and again at  $t4$ . Participants were asked for specific details about specific activities in different environmental domains, giving their answer in appropriate units. These questions were drawn from a number of online “carbon calculators” designed to help homeowners compute the carbon footprint of their household. In the domain of home energy use, participants were asked ten questions, and in the domain of consumer responsibility, participants were asked four questions. A review of responses revealed the majority of these questions to be ambiguous in their construction (“Do you attempt to reduce the number of plastic bags you use from the grocery?”), too demanding for a student population to change over a short intervention (“Do you have low flow shower heads installed in your household?”), or too specific to be answered without preparation (“How many times did your

household use a washing machine the past week?”). Only a few questions survived after the review process, the majority having been discarded. It had been intended that an index of performance would be constructed from all surviving questions but attempts to do so generated alpha values below .30, far below the point of acceptable reliability for an index measure (.70). Instead it was decided to select one of the surviving questions in each domain and use that as an indicator of performance. The indicator questions were selected because of all the surviving measures in each domain they best approximated a normal distribution. In the energy use domain, the indicator question asked how many short, medium or long showers the participant took in a week, and converted the responses into an approximation of shower-minutes-per-week by counting short showers as five minutes, medium showers as ten minutes, and long showers as fifteen minutes. In the domain of consumer responsibility, the indicator question asked the percentage of the participant’s food that was locally produced and/or organic.

These scores (weekly shower minutes, percentage of local/organic food) were standardised to  $z$  at  $t1$ . In order to measure the movement in each score between  $t1$  and  $t4$ , scores at  $t4$  were standardised by subtracting from each the  $t1$  mean and dividing the result by the  $t1$  standard deviation, effectively treating each  $t4$  score as a special instance of  $t1$ . The shower time score was used as a score for energy use behavioural performance (hereafter, EnergyBP). The local/organic food score was used as a score for consumer responsibility behavioural performance (hereafter, ConsumeBP). It is important to note that these measures have low construct validity, due to the large number of questions that had to be excluded from each, and that the use of single indicators violates the requirement to measure intent and behaviour at the same level of specificity (Ajzen & Fishbein, 2005). As a result, analyses that make use of the behavioural performance measures should be treated with great caution and as a pilot study only.



*Group Identification:* In the survey at *t3*, immediately after the conclusion of the group action, the nine-item Group Identity Scale (Hinkle et al., 1989) was used to measure the extent to which participants identified with their action group (GrpIdentity). The nine questions all take the form of statements to which the participant indicates their degree of agreement (e.g. “I feel held back by this group” with response options from “1. Strongly agree” to “7. Strongly disagree”).

All statistical analysis used SPSS 16.0 For Windows.

Table 1. List of variables (study 1)

Variable/Time	Definition	# Items	$\alpha^1$	Example item
Performance (BP) <i>t1, t4</i>	Behavioural Performance based on specific questions - Energy - Consume	1 1	- -	“Approximately what percentage of your food is locally produced and/or organic?”
Intention (BI) <i>t1, t4</i>	Behavioural Intent in the indicated domain over the next two weeks.	1	-	“In the next two weeks I intend to reduce the amount of energy used in my household.”
Attitude <i>t1, t4</i>	Attitude towards behaviours: - Energy - Consume	3 3	.781 .817	“I think that reducing the amount of energy used in my household would be: [very negative – very positive]”
Norms <i>t1, t4</i>	Social norms around behaviours: - Energy - Consume	4 4	.725 .823	“Most people in my peer group want me to reduce the amount of energy used in my household.”
PBC <i>t1, t4</i>	Perceived control of behaviours: - Energy - Consume	1 1	- -	“How much control do you have over the environmental impact of the goods and services you purchase and use?”
GrpIdentity <i>t3</i>	Identification with group	9	.912	“I am glad to belong to this group.”
GrpInjunctive <i>t3</i>	Injunctive norm - evaluation of rest of group’s opinion of the action’s worth	4	.863	“The rest of my group believed in what it was doing.”

1.  $\alpha$  is Cronbach’s alpha. An alpha of 0.70 is taken to indicate that the items measure a single latent variable. When a measure was repeated at *t1* and *t4*, the alpha is for the *t1* instance of the measure only.

### *Procedure*

At the start of the semester (*t1*), participants completed a detailed survey. This survey was administered at the point of first contact between participants and experimenters. It included measures of TPB components (attitudes, subjective norms, perceived behavioural control, intentions and behaviour) in reference to the two domains of interest (energy use at home, consumer responsibility). It also included a number of other questions that are not included in the present study but clearly signalled an environmental focus, including measures of belief in global warming, adoption of the New Ecological Paradigm (NEP) (Dunlap, Van Liere, Mertig, & Jones, 2000), and the participant's sense of environmental empowerment. Also included were questions relating to the alternative domains of recycling/waste responsibility and transport energy use, which were not analysed in the present study due to low participant selection of these as focus domains.

The first two laboratory classes in the course were spent on environmentally-themed content. In the third laboratory class (*t2*, four weeks after *t1*), participants in each laboratory were asked to arrange themselves into action groups of five to seven people to undertake an environmental task. First, the entire class was asked to divide themselves between those interested in working on 'the energy we use', and those interesting in working on 'the things we consume'. Once these general preferences were expressed, participants were given a free hand to form action groups as they pleased, with the only requirement that no group could be smaller than 3 members or larger than 7 members. Observation suggested that action groups within each category formed primarily based on immediate proximity, for example, due to where participants were sitting.

Each action group was then asked to choose a specific environmental domain within their general preference. This domain would become that group's focus. Two domains

were selected by enough participant groups to be included in this analysis, being household energy use (“Energy”, N=100) and consumer responsibility (“Consume”, N=57). Participants who chose the recycling (N=16) or transport (N=4) options participated fully in the intervention programme but are excluded from subsequent analysis.

Finally, the new groups decided on a particular action within their chosen focus domain. Each action group discussed among its members and decided upon an action to improve their behaviour in this domain. Groups were permitted to choose very broad or very specific actions as they saw fit. Over the following six weeks, participants recorded their efforts to carry out the chosen action in diary entries on an online forum shared with fellow action group members. Instructors and course materials stressed that there was no assessment incentive to successfully carry out the action, and marks would be awarded for their retrospective analysis of the experience rather than for good environmental behaviour. These instructions were given to partially mitigate the effect of demand characteristics on the participants. There was, however, a clear expectation that some minimum of effort would be required to ensure the participant would have something to discuss in later assignments. Participants were encouraged to choose an action that they were genuinely interested in performing, even if it was for non-environmental motives such as saving money. A variety of actions were chosen, but the most common choice was for members with an energy domain focus to undertake all steps possible to reduce electricity use in their household.

The group action period lasted for six weeks. At its conclusion (*t3*) participants completed another survey recording the degree to which they identified with their action group, the extent to which they believed they lived up to the group action, their assessment of how well fellow group members lived up to the action, and their assessment of fellow group member opinions of the worth of the action. At this stage,

although the group action proper was completed, action groups still faced several group tasks such as reporting back to the class.

Two weeks afterwards (*t4*) participants concluded group-based activities with a final presentation to the class on their experiences. At this time they completed another survey that repeated all the same measures as the *t1* survey.

## **Results**

### *Data Preparation*

Means and standard deviations for variables are given in Table 2. As noted previously, Behavioural Performance (BP) scores for each domain were based on questions about specific behaviours. A large number of questions were asked but on review, most components of the behaviour measures were found to be unsuitable for analysis. The weaknesses of many measures were obvious, for example, in response to one question asking “how many appliances do you have plugged in at your house”, the reported mean scores increased dramatically despite an abundance of testimony in behaviour diaries to the diligent unplugging of many devices. On reflection it was obvious that participants had severely underestimated the number of appliances when they first responded. The second, higher, estimate was likely to be much more accurate, but would also be useless in terms of generating a meaningful contrast with the score at the beginning. This question was therefore not useful to the measurement of behaviour in study one. Complications such as this affected a majority of behaviour items. As an alternative, two robust items were chosen to represent all behaviour, shower time for the energy domain and percentage of locally-bought food for the consume domain. This violated the requirement to measure attitude and behaviour at the same level of specificity (Ajzen & Fishbein, 1977) but was unavoidable in this case. (To increase the listwise N, where the percentage of locally-bought/organic food was indicated as zero at

*t4* but no answer had been given at *t1*, the *t1* score was treated as zero. It was presumed that participants who were not purchasing any organic or local food at *t4* had also not been purchasing any at *t1*. Two scores were changed in this way.)`

Responses to these two items used different scales. In order to allow comparison between domains, scores for all questions at *t1* were standardised to *z*. To preserve longitudinal differences, scores from *t4* were standardised to the same scale as *t1*, using the mean and standard deviation of the question at *t1*. Thus, each standardized *t4* score shows its distance in *t1* standard deviations from the *t1* mean, allowing straightforward comparison between *t1* and *t4* data.

Table 2 also shows the t-score for a paired-sample t-test for all of the longitudinal variables, with significance indicated. As can be seen, all variables except perceived behavioural control (PBC) increased significantly from *t1* to *t4*.

Tables 3 to 6 show the listwise correlations of variables in the two performance domains, divided between energy-focus and consume-focus participants.

Table 2. Descriptive statistics (study 1 variables)

Variable	Time	N	Mean <sup>1</sup>	SD	t <sup>2</sup>
Performance (BP) – Energy	<i>t1</i>	112	.000	1.00	-2.34*
	<i>t4</i>	112	.204	1.04	
Performance (BP) – Consumption	<i>t1</i>	96	.000	1.00	-2.49*
	<i>t4</i>	109	.332	0.96	
Intention (BI) – Energy	<i>t1</i>	112	4.32	1.41	-5.31**
	<i>t4</i>	112	5.04	1.12	
Intention (BI) – Consumption	<i>t1</i>	112	4.03	1.46	-6.84**
	<i>t4</i>	111	4.92	1.18	
Attitude – Energy	<i>t1</i>	112	5.36	0.96	-5.84**
	<i>t4</i>	112	5.93	0.91	
Attitude – Consumption	<i>t1</i>	112	5.45	0.95	-3.47**
	<i>t4</i>	111	5.79	0.91	
Norms – Energy	<i>t1</i>	111	3.80	1.01	-2.87**
	<i>t4</i>	112	4.07	1.02	
Norms – Consumption	<i>t1</i>	111	3.87	1.06	-3.47**
	<i>t4</i>	111	4.23	0.92	
PBC – Energy	<i>t1</i>	112	4.17	1.29	0.63
	<i>t4</i>	112	4.08	1.59	
PBC – Consumption	<i>t1</i>	112	4.62	1.27	-0.98
	<i>t4</i>	111	4.77	1.44	
Group Identification	<i>t3</i>	105	5.49	0.92	-
Group Injunctive Norm	<i>t3</i>	105	5.15	1.02	-

1. Scores for all items except behavioural performance are on a scale from 1-7.

2. Significance test for change in the variable between *t1* and *t4*

\* Δ is significant at the 0.05 level (2-tailed), \*\* Δ is significant at the 0.01 level (2-tailed).

Table 3. Within-domain correlations for energy-focus participants in the energy domain (study 1)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.310*	.123	.091	.019	.604**	.199	.279*	-.047	-.018	.111	.231
2. Intention, <i>t1</i>	1.00	.597**	.406**	.124	.152	.307*	.468**	.169	.160	.216	.195
3. Attitude, <i>t1</i>		1.00	.275*	-.057	-.043	.246	.386**	.186	-.077	.147	-.098
4. Norms, <i>t1</i>			1.00	.084	.060	.219	.368**	.462**	.205	.164	.161
5. PBC, <i>t1</i>				1.00	.069	-.118	-.092	.130	.202	.021	.119
6. Performance <i>t4</i>					1.00	.232	.228	.029	.142	.182	.396**
7. Intention, <i>t4</i>						1.00	.689**	.314*	.307*	.355**	.329**
8. Attitude, <i>t4</i>							1.00	.342**	.173	.327**	.246
9. Norms, <i>t4</i>								1.00	.402*	.204	.183
10. PBC, <i>t4</i>									1.00	.297*	.365**
11. Grp Identification										1.00	.323**
12. Grp Injunctive Norm											1.00

Listwise deletion, *n*=63; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).



Table 4. Cross-domain correlations for energy-focus participants in the consume domain (study 1)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.142	.122	-.056	.076	.467**	.153	.255	-.052	-.041	.024	.177
2. Intention, <i>t1</i>	1.00	.384**	.440**	.460**	.243	.535**	.447**	.189	.242	.319*	.251
3. Attitude, <i>t1</i>		1.00	.338*	.140	.247	.417**	.508**	.155	.013	.120	.111
4. Norms, <i>t1</i>			1.00	.065	-.026	.165	.349*	.536**	-.021	.302*	.238
5. PBC, <i>t1</i>				1.00	.255	.496**	.300*	.198	.521**	.210	.150
6. Performance <i>t4</i>					1.00	.313*	.288*	-.052	.222	-.022	.130
7. Intention, <i>t4</i>						1.00	.544**	.331*	.216	.244	.248
8. Attitude, <i>t4</i>							1.00	.346*	.218	.320*	.389**
9. Norms, <i>t4</i>								1.00	.102	.270	.264
10. PBC, <i>t4</i>									1.00	.375**	.382**
11. Grp Identification										1.00	.771**
12. Grp Injunctive Norm											1.00

Listwise deletion, *n*=53; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

Table 5. Within-domain correlations for consume-focus participants in the consume domain (study 1)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.460**	-.139	-.078	.094	.362*	.330	.124	.073	.290	.291	.409*
2. Intention, <i>t1</i>	1.00	-.065	.266	.414*	.420*	.359*	.306	.237	.314	.075	.036
3. Attitude, <i>t1</i>		1.00	.429*	.275	-.121	-.145	.301	.151	.133	.119	-.006
4. Norms, <i>t1</i>			1.00	.095	-.028	.089	.229	.193	.053	.012	.042
5. PBC, <i>t1</i>				1.00	.287	.439*	.455**	.234	.588**	.290	.165
6. Performance <i>t4</i>					1.00	.353*	.265	.091	.307	.096	.089
7. Intention, <i>t4</i>						1.00	.453**	.464**	.718**	.425*	.358*
8. Attitude, <i>t4</i>							1.00	.592**	.537**	.395*	.337
9. Norms, <i>t4</i>								1.00	.586**	.278	.208
10. PBC, <i>t4</i>									1.00	.331	.257
11. Grp Identification										1.00	.868**
12. Grp Injunctive Norm											1.00

Listwise deletion,  $n=32$ ; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

Table 6. Cross-domain correlations for consume-focus participants in the energy domain (study 1)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.065	.005	.056	.211	.622**	.135	.133	.258	.095	-.213	-.039
2. Intention, <i>t1</i>	1.00	.430**	.438**	.002	.134	.426**	.236	.239	-.181	.020	.078
3. Attitude, <i>t1</i>		1.00	.615**	-.078	.022	.125	.253	.102	.051	.046	.016
4. Norms, <i>t1</i>			1.00	.131	.078	.117	.319*	.484**	.122	-.055	.008
5. PBC, <i>t1</i>				1.00	.059	.018	-.156	.141	.390*	-.101	-.107
6. Performance <i>t4</i>					1.00	.007	.069	.234	-.075	.076	-.004
7. Intention, <i>t4</i>						1.00	.354*	.238	.382*	.368*	.296
8. Attitude, <i>t4</i>							1.00	.578**	.328*	.327*	.389*
9. Norms, <i>t4</i>								1.00	.377*	.101	.184
10. PBC, <i>t4</i>									1.00	.437**	.199
11. Grp Identification										1.00	.646**
12. Grp Injunctive Norm											1.00

Listwise deletion,  $n=41$ ; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

### *Intervention Effects*

The first set of hypotheses tested whether the intervention programme as a whole had been successful in achieving change. It had been hypothesised that participant performance would improve in the focus domain (hypothesis 1). To test this prediction, a mixed-design ANOVA was performed on the behavioural performance scores with time (*t1* and *t4*) and performance domain (“Energy” and “Consume”) as within-subjects variables and domain focus (again, “Energy” and “Consume”) as a between-subjects variable. This analysis found a main effect for time ( $F(1)=15.06$ ,  $p<.001$ ,  $\eta^2=.14$ ) indicating that performance scores improved significantly between *t1* and *t4*. The three-way interaction, time\*performance domain\*domain focus, showed a marginal effect ( $F(1)=3.85$ ,  $p=.053$ ,  $\eta^2=.04$ ) suggesting that the performance improvement pattern was different between the focus groups.

The pattern of performance change over time is shown in Figures 3 and 4. Performance in the energy domain improved similarly for both focus groups. The energy focus group mean score increased from .01 to .22, while the consume-focus group achieved almost as much increase, -.01 to .18, even though this wasn’t their domain of interest. The pattern was different in the consume domain, where the consume focus group achieved an enormous increase, .00 to .66, but the energy-focus group achieved much less, from .00 to .11. Although the trend was for an increase overall (hence the main effect of time), the pattern of improvement was different between the focus groups, with energy-focus participants improving in their domain of interest but not much in the other domain, while consume-focus participants improved in their domain of interest and in the other domain as well. Hypothesis 1 was supported, but a pattern of difference between focus groups was revealed.

*Figure 3. Performance over time in the energy domain by focus group (study 1)*

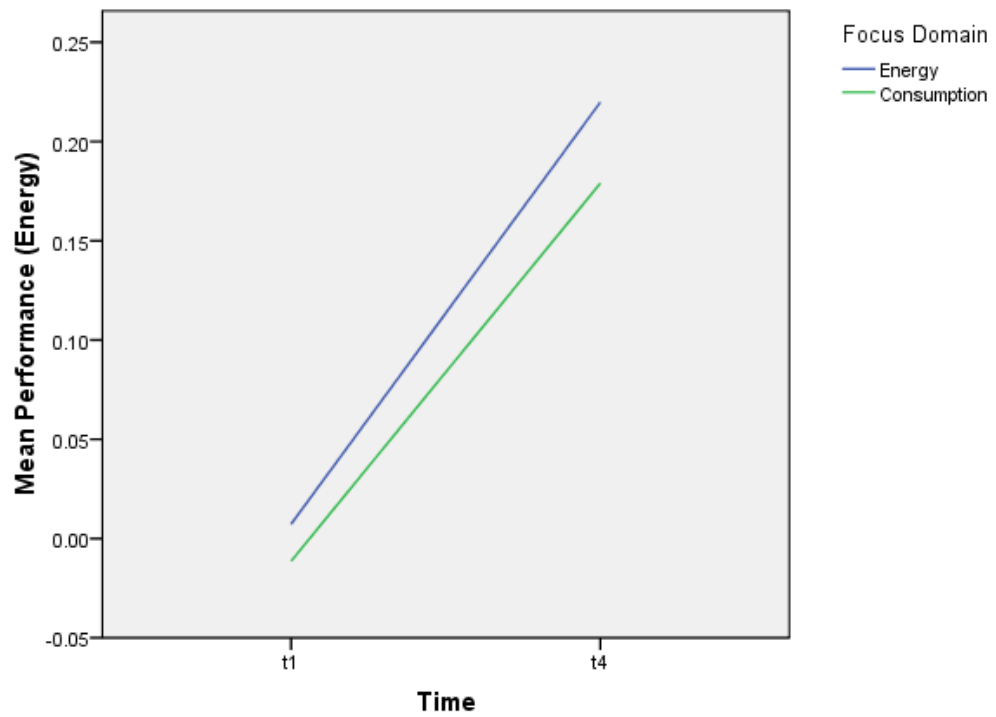
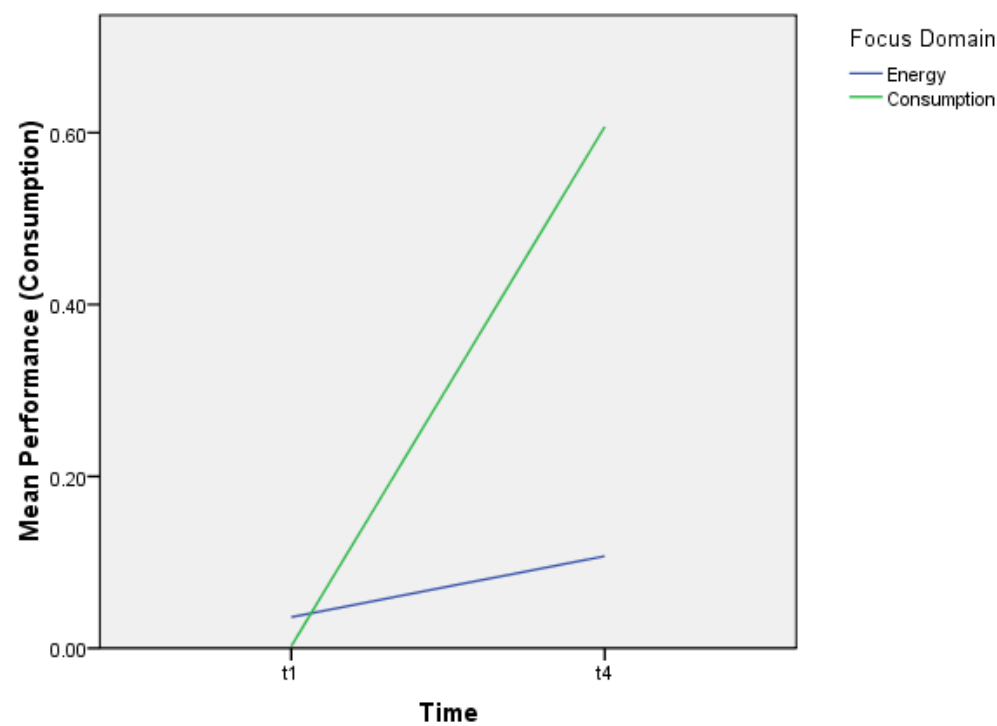


Figure 4. Performance over time in the consume domain by focus group (study 1)



The relationship between intent and performance has often been found to be weak, but it was expected that the intervention programme would increase the correlation between intent and performance (hypothesis 2). Note that this analysis uses cross-sectional data, linking intent and performance at *t1*, and in a separate analysis, intent and performance at *t4*. Cross-sectional analysis is common in the TPB literature (Armitage & Conner, 1999). Product-moment correlations between intent and behaviour for each domain (see Tables 3 to 6) were compared using Cohen and Cohen (1983)'s procedure, which compares *z*-scores generated from Fisher's *r*-to-*z* transform. Note that the pairwise *n* was used for these comparisons, giving a higher sample size than that shown in Tables 3 to 6 which used listwise deletion. Contrary to expectations, no significant changes in correlation were found. Hypothesis 2 was not supported.

Given the appearance of difference between the focus groups, an analysis of the distinction between these groups was conducted. Discriminant analysis using TPB predictors and performance scores from *t1* (before the groups were formed) showed no strong association between group choice and predictors ( $F_{(10, 84)}=0.582$ ,  $p=.824$ ). Further analysis at *t4* adding in the group identification and group injunctive norm variables again found no strong association ( $F_{(12, 89)}=1.512$ ,  $p=.135$ ). This indicated that there were no systematic associations between focus choice and scores for TPB variables, group identity or group injunctive norm. However, it has been shown that the pattern of performance improvement in the two domains clearly differed between the focus groups, and for this reason the two focus groups were treated separately in all subsequent analysis.

As noted previously, all results in this section that involve the behavioural performance measures should be treated as pilot findings only.

### *Testing the Theory of Planned Behaviour model*

The theory of planned behaviour (TPB) states that attitudes towards the behaviour, perceived social norms surrounding the behaviour, and perceived control over the behaviour do not influence behavioural performance directly but instead are mediated by behavioural intent. It had been hypothesised therefore that attitude towards the action, subjective norms and perceived behavioural control would predict intent (hypothesis 3) and intent would predict performance and mediate the effect of the other predictors on performance (hypothesis 4).

In each domain, regression analyses were performed to predict behavioural intention at *t1* and *t4* from attitudes, norms and perceived behavioural control. Due to the pattern of difference found earlier between focus groups, these regression analyses to predict intention were performed separately for consume-focus participants and energy-focus participants. Standardized betas and R-squares are given in Table 7 for energy-focus participants and in Table 8 for consume-focus participants.

The model was significant in the energy domain and the consume domain for both focus groups, although there were observable differences in the pattern of overall model significance. In particular, the model appeared to explain intent better for the energy focus group than for the consume focus group. For the energy focus group in the energy domain the model accounted for 44% of variance at *t1* ( $F_{(3,63)}=16.46$ ,  $p<.001$ ), and 48% at *t4* ( $F_{(3,64)}=20.01$ ,  $p<.001$ ). For the energy focus group in the consume domain the model accounted for less variance, 35% at *t1* ( $F_{(3,63)}=11.52$ ,  $p<.001$ ), and 39% at *t4* ( $F_{(3,64)}=13.71$ ,  $p<.001$ ). For consume-focus participants, the model was less powerful. It accounted for 22% of variance in energy domain intention at *t1* ( $F_{(3,40)}=3.75$ ,  $p=.018$ ), and 20% at *t4* ( $F_{(3,40)}=3.29$ ,  $p=.030$ ). In the consume domain the model accounted 23% of variance at *t1* ( $F_{(3,40)}=3.89$ ,  $p=.016$ ), and 41% at *t4* ( $F_{(3,39)}=9.02$ ,  $p<.001$ ). This was further evidence of differences between participants in the two focus groups.



The TPB makes no specific predictions about the relative weight of attitudes, social norms and PBC as predictors of intention, instead expecting that the weights will be different for different applications of the model. The pattern of predictor significance in these results showed a complicated pattern of difference across time, across the two performance domains, and between the two focus groups. For energy-focus participants, attitude held constant as a significant predictor in the energy domain, while norms became a less significant predictor over time and PBC became a more significant predictor over time; for the same participants in the consume domain, attitude became significant as a predictor while PBC lost that status, and norms held steady as significant predictors. For energy-focus participants then, hypothesis 3 was generally supported, although with a few predictors not performing quite as expected. The pattern was quite different for the other focus group. Hypothesis 3 was not supported for consume-focus participants; for them, attitude was a significant predictor only for energy intention at *t4*, norms were a significant predictor only for consume intention at *t1*, and PBC was a significant predictor only for consume intention at *t4*.

It is quite difficult to make sense of this unusual pattern of results, and it should also be noted that this cannot be attributed to the weakness of the behavioural measures, which were not used in this analysis.

Table 7. Regression analyses on behavioural intention in the two domains for energy-focus participants

	Time 1		Time 4	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.544**	.439**	.642**	.484**
Norm	.254*		-.020	
PBC	.151		.212*	
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.198	.354**	.367**	.391**
Norm	.409**		.357**	
PBC	.272**		.101	

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

Table 8. Regression analyses on behavioural intention in the two domains for consume-focus participants

	Time 1		Time 4	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.213	.219*	.358*	.198*
Norm	.306		-.054	
PBC	.033		.237	
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	-.120	.226*	.094	.410**
Norm	.474**		.113	
PBC	.201		.529**	

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

To complete testing of the TPB model, it was necessary to investigate whether intent predicted performance and mediated the effect of attitudes, norms and PBC on performance (hypothesis 4). As has been noted, the performance measures used in this study were insufficient and as such this analysis can only be considered a pilot for subsequent study.

To predict behavioural performance (BP) at *t1* and *t4*, hierarchical regression analyses were performed again splitting the participants into focus groups to account for the differences observed in prior analyses. Cross-sectional analyses were performed, so relationships between the variables at *t1* were analysed in one analysis, and at *t4* in another analysis. Intent (BI) was the sole predictor at step 1, and at step 2 attitudes, norms and perceived behavioural control were added to the model. The additional predictors (attitude, norms and PBC) were not significant for any domain at either *t1* or *t4*, regardless of focus group. Standardized betas and R-squares for step 1 of this analysis only are given in Table 9 and Table 10; step 2 has been excluded for reasons of clarity. At *t1* performance in the focus domain was predicted by intent for both focus groups, and performance in the other domain was not. This is interesting because these measures were taken before the choice of focus was made; it appears that there was a predisposition to choose a focus on a domain in which intent and behaviour were already in alignment.

After the intervention, at *t4*, performance was predicted by intent in the consume domain only, regardless of focus. The increase in alignment between intent and behaviour for energy-focus participants could reflect a process of education through the intervention so they were better able to connect their intentions to the specific behaviours that concerned them. Harder to explain for these participants is the loss of significance in the intent-behaviour relationship in their focus domain. The specific nature of the measures used suggests one possible explanation; as the final intent

measure was for intent going forward after the intervention period, and the final behaviour measure was taken to measure the last weeks of the intervention period, it is possible the reduction reflects participants changing their behaviours at the end of the programme. They had been striving to take short showers during the period of action, and their behaviour scores reflected this, but after the period ended they meant to indulge themselves in longer showers, so their intent scores reflected this. For the other group, intent to consume locally-made and organic food may not have experienced this “rebound” effect. It is impossible to know with certainty if this is the cause of this finding; once again, this points to the weakness of the behavioural measures in the present study, and as with all analyses involving these measures, this can only be considered a pilot finding.

Hypothesis 4 predicted that intent should mediate the effect of other predictors on performance. However, a linear regression performed on behavioural performance with intention excluded showed no main effect for any of the predictors attitude, social norm and PBC. There were, in fact, no effects for intent to mediate, so this aspect of hypothesis 4 was not supported. The intent measure was however a significant predictor of performance in several conditions, so that aspect of hypothesis 4 was supported in part. Overall, hypothesis 4 had only partial and ambiguous support in study one.

*Table 9.* Step one of regression analysis of behavioural performance at t1 and t4, for energy-focus participants

	Time 1		Time 4	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.315**	.099**	.192	.037
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.183	.033	.331**	.110**

Step 2 added the predictors attitude, social norm and perceived behavioural control. These predictors did not significantly improve the model and did not present a main effect on behavioural performance. They have been omitted for clarity.

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

*Table 10.* Step one of regression analysis of behavioural performance at t1 and t4, for consume-focus participants

	Time 1		Time 4	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.049	.002	.054	.003
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.477**	.228**	.368*	.136*

Step 2 added the predictors attitude, social norm and perceived behavioural control. These predictors did not significantly improve the model and did not present a main effect on behavioural performance. They have been omitted for clarity.

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

### *Moderating effects of group identification in the focus domain*

Based on the research of Terry et al (1999), it had been hypothesised that group identification would moderate the effects of some predictors on intention. It was expected that group identification would moderate the effect of perceived behavioural control on intention, such that PBC would be more strongly related to intention for low-identifiers than for high-identifiers (hypothesis 5), and it was expected that group identification would moderate the effect of group-based injunctive norms, such that these norms would predict intent, but more so for participants who identified strongly with the group (hypothesis 6). Note that the intervention programme asked action groups to focus on one domain at the expense of the other, so these group effects were expected to apply only to the focus domain.

Hypotheses 5 and 6 were examined together. Interaction terms were mean-centred to limit multicollinearity and a hierarchical regression was performed on behavioural intent, adding the basic TPB terms, then group-related terms, and finally interaction terms. The analysis was split on domain focus due to the observed differences between focus groups. One exceptional case was excluded from the analysis. Results are shown on Tables 11 and 12.

Contrary to the findings of Terry et al (1999), there was no interaction effect for group identification and injunctive norm for either focus group. For the energy focus group only, there was a significant interaction effect for group identification and PBC, but this did not match expectations from the findings of Terry et al. (1999), as the effect of this interaction was positive whereas it had been expected to be negative. In this study, participants who had a low level of group identification found that higher PBC linked to lower intention. Terry et al. (1999) found that, for participants who had a low level of group identification, higher PBC was linked to higher intention. As such, even though the interaction was significant it was not in the expected direction. Neither

hypothesis 5 nor hypothesis 6 were supported.

The prediction most central to this series of studies concerned the relationship between intent and behaviour and the role of group identification in affecting this relationship. Hypothesis 7 had predicted that the correlation between intent and performance would improve over time in the focus domain. These correlations are shown in Table 13. Once again, these analyses involve the weak behavioural performance scores and can only be considered pilot findings. Changes in  $r$  were compared for participants with high group identification against those with low group identification (splitting on the mean score), but there was no evidence that correlations increased for those with high group identification. Hypothesis 7 was not supported. Of note, against expectations it was found that high-identification consume-focus participants had a significant intent-performance correlation at  $t1$  but low-identification consume-focus participants did not. This is interesting because when  $t1$  measures were taken groups had not yet been formed. Here, it seemed that participants whose intent and performance correlated in the consumption domain, and who went on to choose consumption as their focus domain, were predisposed to identify with their group. This suggests, once again, that there were differences between participants that preceded their choice of domain focus. This finding will be considered in discussion.

*Table 11.* Hierarchical regression analysis of intent in the energy domain for energy-focus participants

Step		$\beta$ (final)	$R^2$	$\Delta R^2$
1	Attitude	.567**	.447**	-
	Subjective Norm	.017		
	PBC	.119		
2	Group Identification	-.075	.474**	.027
	Grp Injunctive Norm	.157		
3	Identification x Injunctive	-.035	.526**	.052
	Identification x PBC	.251*		

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

*Table 12.* Hierarchical regression analyses of intent in the consume domain for consume-focus participants

Step		$\beta$ (final)	$R^2$	$\Delta R^2$
1	Attitude	.000	.489**	-
	Subjective Norm	.001		
	PBC	.555**		
2	Group Identification	.321	.539**	.050
	Grp Injunctive Norm	-.066		
3	Identification x Injunctive	.180	.575**	.036
	Identification x PBC	.048		

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level



*Table 13. Change in intent-performance correlations by group identification*

	Time 1		Time 4		Significance of correlation difference	
	r	n	r	n	z	p (2-tailed)
<i>High group identification...</i>						
Energy-focus participants in the energy domain	.286	34	.262	35	-	> 0.05
Consume-focus participants in the consume domain	.550*	17	.425*	22	-	> 0.05
<i>Low group identification...</i>						
Energy-focus participants in the energy domain	.124	25	.229	27	-	> 0.05
Consume-focus participants in the consume domain	.361	16	-.007	18	-	> 0.05

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

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

It had been hypothesised that group identification would moderate the intent-behaviour link, such that the contribution of intent to performance would be greater where group identification was high (hypothesis 8). This hypothesis was to be tested with hierarchical regression analyses restricted to the focus domain at *t4*; because group effects were predicted to operate only in the focus domain, and groups had not been formed at *t1*. As noted above, there was no evidence of a significant intent-behaviour link for energy-focus people in the energy domain at *t4* but for consume-focus people in the consume domain at both times such a link had been found. At step 1 the model (BI, Attitude, Norms, PBC) repeated the earlier analysis for hypothesis 4. At step 2, group identification (GID) was added to the model, and at step 3 the interaction term (BI\*GID) was added. The interaction term was constructed as a straightforward multiplication of centred BI and GID scores to limit multicollinearity.

For this analysis, group identification at *t3* was applied to *t4* data. This creates some interpretation concerns, as it refers to interaction between group identification during the six-week action period, and intention to continue the action going forward without the group. This construction was not ideal, but *t4* intent served as a reasonable proxy for an measure of intent across the environmental action. Regardless of these limitations, the regression model was not significant for either energy-focus participants in the energy domain, or consume-focus participants in the consume domain. No interaction effect was found on behavioural performance. Hypothesis 8 was not supported using the pilot measures of behaviour.

## **Discussion**

These results display greater complexity than had been anticipated. It had been expected that the differences between the focus domains would be relatively minor, but it is clear that they are associated with quite different patterns of results. However, these differences did not obscure three general findings: that the intervention programme was

successful in improving environmental performance; that the theory of planned behaviour gave a good account of behavioural intention; and that group identification did not moderate the intent-behaviour relationship.

### *Effectiveness of the intervention programme*

The success of the intervention programme was clear with significant increases in focus domain performance (hypothesis 1) as well as in behavioural intention, attitudes towards the sustainability behaviours, and perceived social norms around sustainable behaviours. This is a valuable finding that indicates a structured programme of behaviour change can be successful in achieving comprehensive change in the opinions and actions of participants.

The observed performance improvement was not accompanied by an improved correlation between performance and intent (hypothesis 2), suggesting that intent to engage in sustainable behaviours was increasing at about the same pace as performance of those behaviours.

Some unexpected patterns were discovered in the results. In particular, analysis revealed that there were differences between the participants who chose to focus on energy use and those who chose to focus on consumer responsibility. Energy-focus participants improved their energy behaviour only, but consume-focus participants improved their consume behaviour and their energy behaviour as well. Consume-focus participants successfully achieved a behaviour change that was broader than requested, while energy-focus participants were successful within their focus domain only. It is impossible to determine from this finding alone whether this was due to differing characteristics of participants in the two groups (perhaps consume-focus participants were more capable at managing multiple strands of behaviour change), or to some characteristic of the domains and the relationship between them (perhaps energy use behaviour change is naturally facilitated by consumer responsibility behaviour change).

### *Theory of Planned Behaviour*

The TPB was found to give a good account of intention, but behaviour was not explained well by the model. The theory of planned behaviour anticipates that attitudes, norms and PBC should predict behaviour but that intent should serve as a mediator for the predictors. However, attitudes, norms and PBC were not significant predictors of behavioural performance for either focus group in either domain. That was the only uniform result. For consume-focus participants, intent was found to predict behaviour at *t1* and *t4* in the consume domain, but not at all in the energy domain; for energy-focus participants, intent was found to predict only consume behaviour at *t4*, and only energy behaviour at *t1*. It is not immediately clear why this pattern should be so, and it is simplest to treat this result with caution due to the weakness of the performance measures.

With regards to the prediction of intention, the model was effective but the specific weighting of different predictors varied in unexpected and complex ways across domain, focus group and time. For energy-focus participants, attitude predicted intention in the energy domain at both *t1* and *t4*, and in the consume domain at *t4* only. For consume-focus participants, attitude predicted intention only in the energy domain and only at *t4*. Thus attitude was a much more potent predictor of intent for energy-focus participants than for consume-focus participants.

Social norms were significant predictors of intention in the consume domain at *t1* for both consume- and energy-focus participants. This had dropped to insignificance by *t4* for consume-focus participants, but remained highly significant for energy-focus participants. Norms were not significant in the energy domain except for energy-focus participants at *t1* only, becoming insignificant thereafter. This indicates that norms had much more influence on responsible consumption than on energy conservation, and that consume-focus people stopped attending to the influence of norms by the end of the

intervention.

Perceived behavioural control was similarly unimportant in the energy domain, achieving significance only at *t4* and only for energy-focus participants. In the consume domain, however, consume-focus participants went from an insignificant PBC contribution at *t1* to a very significant PBC contribution at *t4*, indicating an increased understanding of the importance of PBC in consumption behaviours, as discussed above. Conversely, for energy-focus participants PBC in the consume domain was significant at *t1* but became insignificant at *t4*, indicating that energy-focus participants stopped putting much emphasis on PBC as an influence on behaviour. Overall, the TPB model was not clearly supported in either focus domain, but it was a better fit for energy-focus participants than for consume-focus participants.

Any attempt to explain these different patterns must first address the limitations of the variable measures for behavioural intent and behavioural performance. Regrettably, both of these measures were problematic in this study. The measure of performance was derived from two specific behaviours that did not necessarily correspond with the action chosen by the group; likewise the measure of intent measured a general intent in the action domain rather than a specific intent to perform the measured behaviours. Thus there are multiple sources of error in the data. For example, it is entirely possible that an action group may have chosen to focus on actions that were not measured, with the result that even diligent efforts would be measured as low performance. Similarly, it is possible that a participant may have had little intent to improve behaviour on a large scale, recording a low intent score, but may have had a high intent to perform the specific actions chosen by the action group. An additional problem arises from the timing of behaviour measures. At time one and time four, an intention measure was taken at the same time as a behavioural performance measure. The substantial activity between these times meant it was most suitable to treat intent and performance in these

two instances as sequenced cross-sectional data, rather than attempting to link time one intent with time four performance. Armitage and Conner (1999) identified the limitations of this sort of cross-sectional design, two of which are of concern for the present study: 1) the possibility of consistency biases, where responses for all TPB measures are given in a more consistent way than would occur in a longitudinal design; and 2) the measurement of past behaviour as a proxy for behaviour post-intention. Armitage & Conner (1999) found that cross-sectional data was just as valid as longitudinal data but their study did not include any intervention or other activity between measures, whereas this study included a full programme of intervention and activity between time one and time four, so those findings could not be expected to hold true. Together, this collection of concerns mean that strong conclusions cannot be drawn from this study.

With these ambiguities in mind, it is clear that there can be no definitive explanation of the pattern of results in the test of the theory of planned behaviour. The pattern observed may result from the accumulation of errors from these variables. This is an important caveat for the interpretation advanced here. Nevertheless, assuming that the findings are not simply the result of error, an examination of possible explanations suggests that there were three sources of difference: characteristics of the behaviour domain, the effect of the intervention programme across time, and characteristics of the participants as manifested in their choice of focus.

Some differences appeared to be based in the characteristics of the two domains. It appeared that in the energy domain, attitudes were the main driver for intention, while in the consume domain, norms and perceived control drove intention. This could be because energy use behaviours tend to be less public and more concerned with the decisions that individuals make about their own use of appliances and other devices, with less scope for norms and perceived control to play a role, while consumption

behaviours for the student sample tended to involve low financial resources and negotiation with flatmates or housemates, resulting in a greater role for norms and some obvious control limitations. It is therefore possible that there was a domain effect: attitude is a more significant predictor of intention in the energy domain than it is in the consume domain, while the reverse is true for norms and PBC. The TPB expects the relative importance of the three predictors to differ across applications (Ajzen & Fishbein, 2005) so this is not in conflict with theory.

The intervention programme also resulted in significant change over time. In both focus groups, control became a significant predictor of intention in the focus domain when it had not been at the beginning of the programme. This could indicate that participants had low understanding of the constraints under which they were operating, but over the course of the programme the information they had about these constraints improved and they became more salient and contributed more to intention. Likewise, in both focus groups social norms began as significant predictors of intention but dropped away by the end of the course. This could reflect the fact that action groups provided a new reference group which could have diluted the influence of broader social norms, similar to the process suggested in dynamic social impact theory (Latané, 2000). Additionally, the effect of cognitive dissonance (Festinger & Aronson, 1960a) suggests that since particular behaviours are promoted by the structure of this intervention, then attitudes will increase to become associated with behaviour. It is therefore possible that there was a time effect: attitude and PBC become more significant over time, while norms become less significant.

Differences in participant characteristics were apparent even in the initial data set. Before participants formed groups, there were differences between those who would later decide to focus on energy and those who would choose consumer responsibility. Although a discriminant analysis found that the focus groups could not be discriminated

by a variate function at this stage, regression on intention demonstrated that those who would go on to choose consumer responsibility had a weaker relationship between the TPB predictors and their intentions than those who would go on to choose energy use reduction. In fact, for consumer-focus participants at this early stage, only social norms for consumption had a role in predicting intent. In contrast, for those who would go on to choose energy use reduction, attitude predicted their energy use intentions, PBC predicted their consumption intentions, and norms predicted both. It may be there is a participant effect: TPB predictors are less significant for consume-focus participants than for energy-focus participants. This would go some way to explaining the pattern of results, but it is difficult to identify why this should be so. It may be that some other variable, unmeasured in the present study, is taking more of a role in predicting intent at the expense of attitudes, perceived social norms and perceived behavioural control. Alternatively, there may be measurement problems with the questions.

The reasons for the observed differences cannot be definitively resolved in this study. However, it is possible to say that a combination of the three effects discussed above (domain, time and participant) would produce a pattern very like that which was found for the regression on intention. If a matrix is generated showing the intersection of these effects, it will closely match the pattern of significance shown in Tables 9 and 10. The only anomalous cell is PBC at *t4* in the consume domain for energy-focus participants. From the above effects we would expect PBC to be significant because it is in the consume domain (domain effect), it has had the chance to become more significant over time (time effect), and it is being measured for energy-focus participants for whom the TPB model is more applicable (participant effect). However, despite this threefold expectation PBC was not found to be a significant predictor of intention in this case. With the exception of this anomaly, and of the lack of rationale for the participant effect, the three effects proposed above appear to provide a good



explanation for the complex pattern of significance found in this study.

### *Group Identification*

In direct contrast to expectations, group identification was not found to moderate the intent-behaviour relationship (hypothesis 7), nor was high group identification associated with and increase in intent-performance correlations (hypothesis 8). Hypotheses based on prior research that predicted a role for group identification moderating predictor relationships with intention (hypotheses 5 and 6) were also unsupported. Even accounting for the weakness of the behaviour measures, this calls into question the group identification measure and the operationalization of groups in this study.

Hypotheses 5 and 6 were based on successful findings by Terry and Hogg (1996) and Terry et al. (1999) that group identification would have a moderating role in the TPB. The lack of support for these hypotheses suggests that the variables used in this study were not equivalent to those used by Terry and colleagues. In that research, group identification was conceptualised as a sense of membership in the very large category of ‘students at this university’. This contrasts with the present study in which the group was a very small category of ‘people in my small action group’. The moderation effects found by Terry and colleagues may not be applicable to a different type of group.

Terry and Hogg (1996) and Terry et al. (1999) found that group-based injunctive norms had a greater effect on intention for high identifiers. This was explained with reference to a tendency among high group-identifiers to be more likely to act in concert with a group norm. This explanation is an unproblematic reference to social identity expectations (Turner et al, 1987) and the logic would still be expected to apply to the action group context. However, this was not found to be the case. It was also expected that PBC should have a greater effect on intention for low identifiers because intention for low-identifiers is determined by independence and autonomy, and PBC forms a

component of these concepts. This logic does not seem directly applicable to the type of group used in the present study. In this research participants engaged in their actions in their personal contexts, independent of the group. They were supported by an intervention programme that extended beyond the group, providing additional context and motivation. On reflection, then, the lack of support for hypothesis 5 is not surprising. However, as noted above, the type of group could not explain the failure to support hypothesis 6. A closer examination of the group identification measure itself is therefore appropriate.

The action groups in this study existed in an uncertain middle ground between the artificial and the real. The groups were created in laboratory sessions, required for a class assignment, formed out of strangers and had a definite expiry date attached, so they clearly have links to the minimal groups paradigm (Turner, 1982; Berkowitz, 1994). In fact it was a design goal for these groups that no participant should feel bound to engage with them beyond the minimum level required for assignment co-ordination. This was to ensure that there were no disadvantages for students with a preference to work alone or who found themselves in groups with people they did not get on with. However they also possessed some aspects of real-world groups, lasting for approximately two months and (as they were enacted by most participants) involving multiple interconnected goals that extended beyond the laboratory and into the personal lives of the members; an appropriate point of comparison is with the groups of children on summer camp in Sherif's (1961) Robber's Cave experiment. It was expected that this structure would result in a variety of levels of group identification. Some groups would find they had compatible personalities or attractive members and would come together well, resulting in high levels of group identification, while other groups would not experience compatibility or attraction and would have low levels of group identification. As expected, group identification levels did vary substantially between

different groups. At the high end, group members became friends and allies with relationships that extended beyond the context of the group task. At the low end, group members formed no bonds at all and treated the group entirely as an extended formal exercise within the learning context. There was diversity on group identification scores as expected, so lack of score diversity is not a good explanation for the lack of effect.

Another explanation could be the staged nature of group formation. It is possible that even high-identification groups did not complete enough of the process of becoming groups to manifest the full range of group effects expected. There have been numerous models of group formation that require certain stages to be complete before all the attributes of groups manifest themselves. Sarri & Galinsky (1974) presented a model of group development intended for the social work paradigm, in which only moderate group cohesion is possible until there is some kind of challenge to the group structure forcing revision and thereafter allowing greater cohesion (and perhaps the full range of effects discussed in this study). Cartwright & Zander (1960) presented a model in which high group cohesion was one of a range of prerequisites to the adoption or formation of group norms. More recently, McGrath (1997) argued that groups had to develop local dynamics (basic functioning to meet member and task needs) before developing global dynamics (group-level properties that could include the range of effects discussed in this study). In all of these cases, there are stages of development required before full group effects come into play, and a failure of the action groups to reach a sufficiently advanced stage of group existence could explain the lack of effect. However, this explanation seems unlikely for two reasons. Firstly, a subset of the group effects of interest in this study have been demonstrated in the minimal-group paradigm, in which groups do not have time or circumstance to move through several stages. Secondly, the level of identification recorded in this study was well above neutral (on a seven-point scale: mean=5.49, s.d.=0.92), supporting the idea that groups were well-

formed.

It is possible that participants responded to perceived demand characteristics in the study and evaluated their group identification in implicit comparison to other groups they observed, or to other task groups they had experienced in the past, or other such points of reference. This could have had the effect of inflating GID scores. However, even if this was the case, the inflated scores would still be expected to show an effect (even if reduced); furthermore, there is no compelling reason to discount participant responses as being anything other than genuine. As such, this explanation is not considered to be likely.

The group identification measure was also limited in that it did not account for groups that formed strong identities but did not value the group task, that is, action groups who formed norms around the idea that the task was not worth performing. In these cases high identification would not necessarily relate to task performance. Given that the intervention was structured so as not to compel participants to pursue behaviour change, the possible formation of non-performative norms is supported by research showing that a behaviour can become normative simply because it requires little cognitive effort and appears to work for the group (Kerr & Tindale, 2004). However, although the alignment of groups with their tasks was not precise enough to make group identification an unambiguous indicator of group influence on task performance, this explanation for the weakness of the measure is also unconvincing. Table 2 shows that group norms about the tasks clearly tended to be positive, much more so than other perceived social norms. It is unlikely that non-performative norms were in place for more than a minority of participant groups.

These limitations cannot fully explain the failure of the group identification measure to moderate the effect of injunctive norms on intent (hypothesis 6) or the effect of intent on behaviour (hypothesis 8), or to affect the correlation between intent and behaviour

(hypothesis 7). The failure of the latter hypotheses, at least, may be due to the weakness of the behavioural performance measures. Further analysis of these hypotheses in a later study with better behaviour measures is appropriate.

### *Conclusion for study one*

The important findings from study one are that the intervention programme was successful, that the theory of planned behaviour model was effective as far as intent, and that the expected effect of group identification was not found. Additionally, participant differences were clearly observed between focus groups.

Several methodological weaknesses, notably the measures of behavioural performance, hampered this study. These were addressed in Study Two, a new iteration of the present study with many methodological improvements. Study Two was expected to add weight to findings thus far demonstrated, provide a more definitive set of tests of predictions involving behavioural performance, and give some insight into the ambiguities and unexpected findings of this study.



## Study Two

This intervention programme for study two was broadly similar to the programme used for study one, but had been modified in a number of ways. The most significant changes were, 1) moving the programme of action from one long period to two short periods, in order to avoid some scheduling issues that had concerned participants in study one; and 2) moving from four choices of domain focus to two options only, either energy use at home or consumer responsibility (the latter including aspects of waste management). Other domain focus options were removed due to a very low selection rate in study one.

There were significant methodological improvements to the surveys used in this study. Most importantly, behaviour measures used in this study were vastly improved over those in study one. Also of importance, measures of the intent-performance relationship were taken to allow longitudinal analysis as opposed to the stepped cross-sectional analysis used in study one, a significant methodological improvement (Armitage & Conner, 1999).

### *Effect of the Intervention*

It was expected that once again the intervention programme would successfully achieve behaviour change in the focus domain. Specifically, it was expected that performance scores in the focus domain would improve between the beginning and end of the programme:

Hypothesis 1: Behavioural performance should improve in the  
focus domain.

It was expected once again that the intervention programme would result in better alignment of intent with behaviour when measured cross-sectionally. This hypothesis had not been supported in study one, possibly due to the weakness of the behavioural

performance measures.

Hypothesis 2: Correlation between intent and performance (BI-BP) should improve in the focus domain.

### *TPB Expectations*

The pattern of results in the previous study did not give unequivocal support to the theory of planned behaviour, in that behavioural performance was not predicted by intent. In the present study, the behaviour measures used were significantly improved over those used in study one. It was therefore predicted that with these better measures in place the TPB model would be supported in full.

Hypothesis 3: Attitude towards the action, subjective norms, and perceived behavioural control should predict intent

Hypothesis 4: Intent should predict performance and mediate the effect of other predictors on performance.

### *Effect of Groups*

The validity of the group identification measure was to be established by replicating a group identification effect found by Terry & Hogg (1996) and Terry et al. (1999). However, study one had found no evidence that group identification moderated the contributions of PBC and group-derived injunctive norms to intention. Although the failure of the PBC moderation could be explained, the failure of the injunctive norm moderation could not. The group identification measure in this research should be comparable to the group identification measure used by Terry and colleagues, and if this is the case then the injunctive norm effect should be found in this study. For this reason, despite the failure in study one, it was again predicted that an effect would be found in this study. A second failure to replicate this effect would cast significant doubt over the operationalization of group identification in these studies.

Hypothesis 5: Group identification should moderate the effect of



group-based injunctive norms, such that these norms should predict intent, but more so for participants who identify strongly with the group.

A novel hypothesis in this series of studies was that group identification should moderate the relationship between intent and behaviour. This effect was not found in study one, but with the development of better behaviour measures, it was expected that the hypothesis would this time be supported. For the same reasons, a correlation between intent and behaviour was expected in this study despite a negative result in the previous study.

Hypothesis 6: Within the focus domain, the correlation between intent and performance (BI-BP) should be stronger where group identification is high.

Hypothesis 7: Group identification should moderate the intent-behaviour link, such that the contribution of intent to performance is greater where group identification is high.

## **Method**

### *Participants*

The study was delivered as part of a semester-long laboratory stream for a 200-level social psychology course at the Victoria University of Wellington in 2008. Participants were students enrolled in the course. 216 students participated overall, of whom 182 supplied performance data at the beginning and end of the study. The sample was 75% female and the mean age was 20.4 years (S.D. 5.0). 60% reported living in a flat-share situation with peers, 25% reported living at home with parent/guardian, 6% lived alone or with partner/children, and 9% lived in a student hostel. These percentages were extremely close to the distribution in study one.

## *Materials/Equipment*

Participants completed surveys on five occasions:

- Time Zero (t0): during the first lecture of the semester
- Time One (t1): two weeks after t0
- Time Two (t2): two weeks after t1
- Time Three (t3): four weeks after t2
- Time Four (t4): two weeks after t3

A full list of variables with explanatory notes is given in Table 14. Except as otherwise noted, responses to all questions were on 7-point Likert-type scales. Items were varied so some were positively phrased and some negatively; negative instances were reverse weighted during coding. Measurement questions from each survey are presented in full in Appendix Two.

*Theory of Planned Behaviour measures:* At  $t0$  and  $t4$ , a set of questions for both behaviour domains measured: attitudes towards domain behaviours (Att), perceived norms surrounding domain behaviours (Norm), perceived control over ability to perform domain behaviours (PBC), and intent to perform domain behaviours (BI). The attitude (Att) questions asked if the behaviour was good, satisfying, pleasant and worthwhile. The subjective norm (Norm) question sets used as referents family and peers. Perceived behavioural control (PBC) questions asked if the behaviour was “up to me” and whether impact on the environment could be reduced “if I wanted to”. Intent (BI) questions asked whether the behaviour was intended and expected.

In the survey at  $t2$ , immediately after the conclusion of the first action period, and again at  $t4$  after the conclusion of the second period, two questions were asked on the actor’s perspective of the group’s opinion of the behaviour action, this being a measure of the injunctive norm (GrpInjunctive).

*Behavioural performance measures:* There were four measures taken of behavioural performance, before and after both of the two-week “action periods” undertaken by participants. Each measure consisted of a series of questions scored on a 7-point Likert-type scale with “Never” and “Always” as the anchors. Each question was related to the frequency of a specific environmentally-sustainable behaviour. For energy use behaviours, questions asked about behaviour in shared spaces at home as well as private spaces, and included hot water usage, heating, cooking behaviour and other appliances. For consumer responsibility behaviours, questions asked about cooking habits, grocery shopping behaviours, and how packaging and waste were avoided or dealt with.

*Group identification measure:* In the survey at  $t_2$ , immediately after the conclusion of the first action period, and again at  $t_4$  after the conclusion of the second period, a five-item version of the Group Identity Scale (Hinkle et al., 1989) was used to measure the extent to which participants identified with their action group (GrpIdentify).

Statistical analysis used SPSS 16.0 For Windows and Medgraph v1.0.

Table 14. List of variables (study 2)

Variable/Time	Definition	Items	$\alpha^1$	Example Item (s)
Performance (BP) <i>t1, t2, t3, t4</i>	Behavioural Performance based on specific questions - Energy - Consume	21 19	.690 .764	“When it gets cold in the living area, how often do people in your household put on more clothes rather than using the heater?”
Intention (BI) <i>t0, t1, t4</i>	Behavioural Intent in the indicated domain. - Energy - Consume	2 2	.914 .907	“In the next two weeks I intend to reduce the amount of energy I use.”
Attitude <i>t1, t4</i>	Attitude towards behaviours: - Energy - Consume	4 4	.799 .845	“Reducing the environmental impact of my consumption behaviour would be pleasant.”
Norms <i>t1, t4</i>	Social norms around behaviours: - energy - consume	[2] <sup>2</sup> [2] <sup>2</sup>	.206 <sup>2</sup> .569 <sup>2</sup>	“My family think it’s a good idea to reduce the environmental impact of our consumption behaviour.”
PBC <i>t1, t4</i>	Perceived control of behaviours: - Energy - Consume	2 2	.569 <sup>3</sup> .644 <sup>3</sup>	“The amount of energy I use is mostly up to me.”
GrpIdentity <i>t2, t4</i>	Identification with group	5	.876	“I am glad to be in this group.”
GrpInjunctive <i>t2, t4</i>	Injunctive norm - evaluation of rest of group’s opinion of the action’s worth	2	.516 <sup>3</sup>	“The rest of my group thought our action made a difference to the big picture.”

1.  $\alpha$  is Cronbach’s alpha. An alpha of .700 is taken to indicate that the items measure a single latent variable. When a measure was repeated at *t1* and *t4*, the alpha is for the *t1* instance of the measure only.

2. Alpha for the norm measure in the energy domain was extremely low. Throughout the analysis norms were decomposed into separate items, peer- and family-based norms.

3. Alphas for these measures were low, with all attendant problems of validity.

### *Procedure*

Participants, who had been divided into lab groups of approximately 22 students, were asked to arrange themselves into smaller groups of 3-7 members (hereafter *action groups*) to undertake an environmental task. 216 students participated in this stage. Each action group was asked to choose an environmental domain on which to focus, either energy use (“Energy”, N=133) or smarter consumption (“Consume”, N=83), and to support each other to improve their behaviour in this domain. Over the following two weeks, participants recorded their efforts in diary entries on an online forum shared with fellow group members. Group bonding was facilitated by requiring each group to conduct a group norm-breaking activity (Garfinkel, 1967) with an environmental theme during this period in addition to the behaviour-change activity.

A three-week break followed in which participants left on university holidays. On their return a second action period began, again lasting for two weeks. For this second action period participants were asked to choose with their groups some way of taking advantage of their status as a group. The responses to this request varied widely, but some common themes were adding elements of in-group competition and establishing an active reminder system for group members. The specific nature and success of these additional interventions is not further explored in the present study.

Note that throughout this programme of activity there was no assessment incentive to carry out the behaviour. Participants were told they would receive marks for retrospective analysis of why they did or did not succeed at following through on their stated intentions, and the experimenters were formally indifferent as to whether or not participants pursued environmentally sustainable behaviour. Of course, this by no means insulated participants from experimenter effects that may have promoted zeal for the environmental cause, but it should have reduced their effect.

At the start of the semester ( $t_0$ ), participants completed a survey which included

measures of TPB components aside from behaviour (attitudes, subjective norms, perceived behavioural control, intentions and also moral norms) in reference to two domains (energy use at home, consumer responsibility). It also measured adoption of the New Ecological Paradigm (NEP) (Dunlap et al., 2000) and the Environmental Attitudes Inventory (Milfont & Duckitt, 2007). This survey was administered at the point of first contact between participants and experimenters.

The first laboratory class session was spent on a social norm-breaking exercise and a review of psychological aspects of the environmental crisis. The second class session introduced action groups ( $t1$ , two weeks after  $t0$ ). Participants were advised about the project they were undertaking and asked to divide between those interested in working on ‘the energy we use’, and those interesting in working on ‘the things we consume’. Once preferences were expressed, participants were given a free hand to form action groups as they pleased, with the only requirement that no group could be smaller than 3 members or larger than 7 members. Once again, observation suggested that action groups within each category formed primarily based on immediate proximity.

The new groups were then advised of the task, to seek behaviour change over the following two weeks and then again for another two weeks after the intervening holiday period. They were given a list of specific behaviours that would be queried by the behaviour measure questions, so there would be no confusion about the aspects of the domain that were being measured. They were introduced to an online environment in which they could report on their progress and share encouragement and information as they saw fit. In their new groups, participants decided how to approach the task.

Additionally, groups were given another assignment in which they were asked to break a social norm as a collective, and to choose a social norm linked to environmental behaviour. This additional assignment was expected to assist group bonding and to demonstrate the power of acting collectively as opposed to acting alone.

Finally, participants were asked to complete an online survey consisting of the behaviour measures and measures of intent in each domain.

For the two weeks following participants worked on their behaviour change, recording a minimum of three diary entries in their online discussion forum to meet course requirements. In the laboratory session that followed (*t2*), participants completed another survey of the behaviour measures and also measures of social support and identification.

There was a period of mid-term exams and then a holiday break. In the week after the holidays, another laboratory session was held (*t3*) and the second action period began. Participants completed another behaviour survey. two weeks thereafter (*t4*), the second action period ended. Participants completed a final behaviour survey, and also recorded social support and identification measures, Environmental Attitudes Inventory scores, and TPB predictors and intent for the future.

## **Results**

### ***Data Preparation***

Means and standard deviations for variables are given in Table 15 and intercorrelations are given in Tables 16 – 19. Performance scores for the consumption domain failed Levene's test for homogeneity of variance, so all performance scores in both domains were log-transformed before analysis. For some analyses, performance scores needed to be compared across time and across domain. In order to allow comparison between domains, scores for all questions at *t1* were standardised to *z*. To preserve longitudinal differences, scores from subsequent times were standardised within each domain to the same scale as *t1*, using the mean and standard deviation of the question at *t1*. Thus, each standardized score shows its distance in *t1* standard

deviations from the *t1* mean, allowing straightforward comparison between *t1* and subsequent data.

Table 15 also shows the t-score for a paired-sample t-test for all of the longitudinal variables, with significance indicated. As can be seen, all variables except consumption norms and intention increased significantly. It is important to note here that intention is being compared between *t0* and *t4*, which were the beginning and end of the intervention. If intention is compared between *t1* and *t4*, which were the beginning and end of the action periods, no significant increase is found in either domain. This suggests that intent increased in the very early stages of the intervention and held relatively stable thereafter.

PBC in both domains also had alphas below .70, but not overly distant from that point. The previous study had only used a one-question measure for PBC. The PBC measure showed an increase from *t1* to *t4* in this study, unlike in study one.

The norm measures in this study also had low alphas, unlike in the previous study. The questions used to derive the measure in the present study were different from those used in study one. Instead of using four reference groups, only two were used. The study one reference groups were “housemates”, “peers”, “people at Victoria University of Wellington” and “society at large”. The study two reference groups were “family” and “peers”. The low alphas suggest that family and peers are not homogenous in their views of the behaviours of interest. The two norm reference groups were treated as separate measures in analysis.

Unexpectedly, the injunctive norm measure had a low alpha in this study, .516 at *t2* and .570 at *t4*. In study one, this measure had a high alpha of .863 at the equivalent of *t4*. The two questions used in the present study were very similar to questions in study one, but two other questions that were included in the measure in study one were omitted this time due to concerns over survey length. This appears to have reduced the



reliability of this measure.

Study one had found some signs that there were differences between focus group members. To examine this study's participant groups, a discriminant analysis was performed on the *t0/t1* TPB predictors and performance scores, and found that there was an association between choice of focus and predictor scores ( $F_{(14, 161)}=2.99$ ,  $p<.001$ ,  $\eta^2=.20$ ). A MANOVA on these variables with focus domain as the fixed factor found the association was significant on two specific variables, intention to consume responsibly ( $F_{(1, 174)}=10.77$ ,  $p=.001$ ,  $\eta^2=.06$ ) and peer-based social norms about energy use ( $F_{(1, 174)}=5.58$ ,  $p=.019$ ,  $\eta^2=.03$ ). The discriminant analysis had found that these were the largest discriminating variables with respective standardised  $\beta$ s of 1.005 and .469 and canonical variate correlation coefficients of .488 and .351. Consume-focus participants were higher than the energy-focus participants in both consume intention (mean=5.10, s.d.=1.15 for energy-focus, mean=5.66, s.d.=.97 for consume-focus) and peer-based energy norms (mean=4.70, s.d.=1.23 for energy-focus, mean=5.12, s.d.=1.05 for consume-focus) in the scores recorded before the focus decision was made.

The same analysis was performed on the *t4* TPB predictors and performance scores, with group identification and group injunctive norm scores also included. These scores were recorded after focus choice and the completion of the intervention. Again a significant association between predictor variables and choice of focus group was found ( $F_{(14, 148)}=2.75$ ,  $p=.001$ ,  $\eta^2=.21$ ). The effect size was very close to that of the *t0/t1* data and a MANOVA showed the association was significant for four variables, particularly performance of responsible consumption ( $F_{(1, 161)}=8.14$ ,  $p=.005$ ,  $\eta^2=.05$ ) and peer-based social norms about consumption ( $F_{(1, 161)}=7.19$ ,  $p=.008$ ,  $\eta^2=.04$ ), but also perceived control over consumption and the group injunctive norm. Neither of the variables that discriminated between groups at *t1* were significant discriminators in this analysis, although peer-based energy norms approached significance ( $p=.072$ ). Also approaching

significance were energy-domain performance ( $p=.070$ ) and consume-domain attitudes ( $p=.057$ ).

Unlike the first study, then, there were clear signs of distinction between the two focus groups, particularly in the consume domain at  $t4$ . As with the previous study, the two focus groups would be analysed separately to account for these differences.

Table 15. Descriptive statistics (study 2)

Variable	Time	N	Mean <sup>1</sup>	SD	t <sup>2</sup>
Performance (BP) – Energy	<i>t1</i>	206	4.73	1.00	-12.30**
	<i>t2</i>	195	5.14	0.89	
	<i>t3</i>	198	5.08	0.91	
	<i>t4</i>	190	5.36	0.91	
Performance (BP) – Consumption	<i>t1</i>	206	3.67	1.00	-7.69**
	<i>t2</i>	195	3.87	1.05	
	<i>t3</i>	198	3.90	1.01	
	<i>t4</i>	190	4.01	1.09	
Intention (BI) – Energy	<i>t0</i>	186	4.19	1.49	-10.83**
	<i>t1</i>	206	5.63	1.08	
	<i>t4</i>	163	5.54	1.12	
Intention (BI) – Consumption	<i>t0</i>	186	3.97	1.36	-12.78**
	<i>t1</i>	206	5.32	1.11	
	<i>t4</i>	163	5.43	1.17	
Attitude – Energy	<i>t0</i>	186	5.28	1.04	-4.53**
	<i>t4</i>	163	5.70	0.98	
Attitude – Consumption	<i>t0</i>	186	5.42	1.05	-4.40**
	<i>t4</i>	163	5.75	0.92	
Family Norm – Energy	<i>t0</i>	186	5.30	1.52	-2.35*
	<i>t4</i>	163	5.56	1.18	
Family Norm – Consumption	<i>t0</i>	186	5.13	1.40	-1.22
	<i>t4</i>	163	5.28	1.30	
Peer Norm – Energy	<i>t0</i>	186	4.85	1.18	-1.33
	<i>t4</i>	163	5.12	1.13	
Peer Norm – Consumption	<i>t0</i>	186	4.59	1.22	-2.26*
	<i>t4</i>	163	4.91	1.21	
PBC – Energy	<i>t0</i>	186	5.44	1.05	-2.73**
	<i>t4</i>	163	5.67	0.85	
PBC – Consumption	<i>t0</i>	186	5.31	1.07	-3.11**
	<i>t4</i>	163	5.63	0.92	
Group Identification	<i>t2</i>	195	5.82	0.90	-2.35*
	<i>t4</i>	190	5.93	0.93	
Group Injunctive Norm	<i>t2</i>	195	4.92	1.03	-3.80**
	<i>t4</i>	190	5.20	1.01	

1. Scores for all items are on a scale from 1-7.

2. Significance test for change in the variable between *t1* and *t4* for performance scores and *t0* and *t4* for other scores.

\* Δ is significant at the 0.05 level (2-tailed), \*\* Δ is significant at the 0.01 level (2-tailed).

Table 16. Within-domain correlations for energy-focus participants in the energy domain (study 2)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.029	.219*	.088	.054	.343**	.009	.011	-.010	-.076	-.042	.089
2. Intention, <i>t1</i>	1.00	.474**	.048	.117	.286**	.557**	.523**	.412**	.311**	.135	.376**
3. Attitude, <i>t0</i>		1.00	.226*	.137	.243*	.465**	.638**	.290**	.189	.043	.297**
4. Norms, <i>t0</i>			1.00	.074	.075	.118	.118	.394**	-.092	-.036	.207
5. PBC, <i>t0</i>				1.00	.146	.024	-.020	-.005	.355**	.069	-.100
6. Performance <i>t4</i>					1.00	.420**	.325**	.212*	.231*	.172	.419**
7. Intention, <i>t4</i>						1.00	.730**	.447**	.554**	.043	.608**
8. Attitude, <i>t4</i>							1.00	.521**	.409**	.072	.466**
9. Norms, <i>t4</i>								1.00	.264*	.147	.418**
10. PBC, <i>t4</i>									1.00	.083	.365**
11. Grp Identification										1.00	.287**
12. Grp Injunctive Norm											1.00

Listwise deletion, *n*=89; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

Table 17. Cross-domain correlations for energy-focus participants in the consume domain (study 2)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.234*	.223*	.384**	-.008	.639**	.180	.145	.185	.043	.071	.054
2. Intention, <i>t1</i>	1.00	.373**	.160	.006	.320**	.607**	.612**	.451**	.378**	.159	.454**
3. Attitude, <i>t0</i>		1.00	.284**	.292**	.237*	.415**	.607**	.260*	.073	.026	.195
4. Norms, <i>t0</i>			1.00	.233*	.333**	.268*	.210*	.500**	.174	-.058	.212*
5. PBC, <i>t0</i>				1.00	.138	.221*	.216*	.171	.382**	.048	.165
6. Performance <i>t4</i>					1.00	.336**	.299*	.385**	.132	.236*	.289**
7. Intention, <i>t4</i>						1.00	.774**	.572**	.588**	.066	.631**
8. Attitude, <i>t4</i>							1.00	.524**	.464**	.016	.484**
9. Norms, <i>t4</i>								1.00	.458**	.115	.446**
10. PBC, <i>t4</i>									1.00	-.011	.420**
11. Grp Identification										1.00	.287**
12. Grp Injunctive Norm											1.00

Note that Group Identification and Group Injunctive Norm are here based on groups with a focus in the energy domain, not the consume domain.  
Listwise deletion,  $n=89$ ; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

Table 18. Within-domain correlations for consume-focus participants in the consume domain (study 2)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.393**	.167	.129	-.079	.862**	.386**	.349*	.142	.176	-.225	-.142
2. Intention, <i>t1</i>	1.00	.484**	.214	.017	.473**	.601**	.471**	.006	.151	.051	.086
3. Attitude, <i>t0</i>		1.00	.592**	.251	.217	.635**	.660**	.092	.345*	.205	.382**
4. Norms, <i>t0</i>			1.00	.340*	.240	.284*	.312*	.254	.099	.164	.398**
5. PBC, <i>t0</i>				1.00	.111	.179	.253	.033	.281*	.265	.356**
6. Performance <i>t4</i>					1.00	.473**	.446**	.172	.326*	-.120	.112
7. Intention, <i>t4</i>						1.00	.803**	.274*	.492**	.151	.274*
8. Attitude, <i>t4</i>							1.00	.325*	.609**	.215	.380**
9. Norms, <i>t4</i>								1.00	.291*	.072	.213
10. PBC, <i>t4</i>									1.00	.179	.311*
11. Grp Identification										1.00	.460**
12. Grp Injunctive Norm											1.00

Listwise deletion,  $n=52$ ; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

Table 19. Cross-domain correlations for consume-focus participants in the energy domain (study 2)

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Performance, <i>t1</i>	.520**	.336*	.230	.022	.768**	.474**	.373**	.231	.162	-.006	.091
2. Intention, <i>t1</i>	1.00	.447**	.116	.382**	.462**	.578**	.490**	.127	.316*	.225	.229
3. Attitude, <i>t0</i>		1.00	.349**	.171	.288*	.471**	.643**	.086	.091	.138	.253
4. Norms, <i>t0</i>			1.00	.112	.224	.150	.214	.373**	.104	.088	.243
5. PBC, <i>t0</i>				1.00	.048	.407**	.418**	.172	.562**	.199	.323*
6. Performance <i>t4</i>					1.00	.489**	.364**	.219	.315*	.072	.255
7. Intention, <i>t4</i>						1.00	.823**	.370**	.335*	.116	.228
8. Attitude, <i>t4</i>							1.00	.466**	.392**	.091	.318*
9. Norms, <i>t4</i>								1.00	.376**	.102	.278*
10. PBC, <i>t4</i>									1.00	.157	.279*
11. Grp Identification										1.00	.460**
12. Grp Injunctive Norm											1.00

Note that Group Identification and Group Injunctive Norm are here based on groups with a focus in the consume domain, not the energy domain.  
Listwise deletion, *n*=52; \* significant at the 0.05 level (2-tailed), \*\* significant at the 0.01 level (2-tailed).

### *Intervention Effects*

As with study one, the first set of hypotheses tested whether the intervention programme as a whole had been successful in achieving change. It had been hypothesised that participant performance would improve in the focus domain (hypothesis 1). To test this prediction, a mixed-design ANOVA was performed on the behavioural performance scores with time ( $t1$ ,  $t2$ ,  $t3$  and  $t4$ ) and performance domain (“Energy” and “Consume”) as within-subjects variables and domain focus (either “Energy” or “Consume”) as a between-subjects variable. The data failed Mauchly’s test of sphericity, so the Greenhouse-Geisser correction was used for the analysis. Every main effect and all but one interaction effect were found to be significant.

A main effect for time was found ( $F_{(3, 480)}=73.24$ ,  $p<.001$ ,  $\eta^2=.31$ ) indicating that performance scores changed significantly over the intervention. Contrasts showed that performance scores improved across the two action periods (action period one,  $F_{(1,160)}=92.15$ ,  $p<.001$ ,  $\eta^2=.37$ , and action period two,  $F_{(1,160)}=42.66$ ,  $p<.001$ ,  $\eta^2=.21$ ) but not across the break ( $F_{(1,160)}=.48$ ,  $p>.05$ ,  $\eta^2<.01$ ). A main effect of performance domain was also found ( $F_{(1, 160)}=345.95$ ,  $p<.001$ ,  $\eta^2=.68$ ), indicating that energy scores were significantly higher than consumption scores. The time by performance domain interaction was significant ( $F_{(3,480)}=3.02$ ,  $p<.037$ ,  $\eta^2=.02$ ), particularly during the break ( $F_{(1,160)}=7.76$ ,  $p=.006$ ,  $\eta^2=.46$ ) when energy scores dropped while consumption scores continued to increase.

A significant between-subjects effect was also found for domain focus ( $F_{(1,160)}=4.42$ ,  $p=.037$ ,  $\eta^2=.03$ ), indicating that focus groups overall performed differently (with consume-focus participants performing better than energy-focus groups). Each focus group had its own pattern of performance across domains, such that energy-focus participants had a large difference between their energy performance



and their consumption performance, while consume-focus participants had very little difference. This was represented in the data as a significant interaction of domain focus and performance domain ( $F_{(1, 160)}=7.41$ ,  $p<.007$ ,  $\eta^2=.04$ ). There was, however, no difference in how the focus groups improved over time.

The three-way interaction, time\*performance\*focus, easily achieved significance ( $F_{(3,480)}=12.40$ ,  $p<.001$ ,  $\eta^2=.07$ ), which suggested that the way domain performance changed over time differed between the two focus groups. Contrasts showed that this effect was found in the two action periods (action period one,  $F_{(1, 160)}=11.40$ ,  $p=.001$ ,  $\eta^2=.07$ , and action period two,  $F_{(1,160)}=10.92$ ,  $p<.001$ ,  $\eta^2=.06$ ) but not during the break ( $F_{(1, 160)}=.11$ ,  $p>.05$ ,  $\eta^2 < .01$ ). This indicates that for energy-focus participants in the first and second action periods, energy performance improved more rapidly than consumption performance, while for consume-focus participants the two improved at about the same rate. In the break period, both focus groups performed about the same.

This overall pattern is the same as in the previous study: participants with an energy focus improved their energy performance much more than their consumption performance, but consume-focus participants improved their performance similarly in both domains. The pattern of change is shown in Figures 5 and 6. Hypothesis 1 was supported, and the pattern of difference between focus groups was found once again, providing clear evidence across two studies that consume-focus participants differed from energy-focus participants.

It was expected that the intervention programme would increase the correlation between intent and performance (hypothesis 2). The participants were split by domain focus, and product-moment correlations between intent and behaviour for each domain were compared using Cohen and Cohen (1983)'s procedure, which compares  $z$ -scores generated from Fisher's  $r$ -to- $z$  transform. A change in intent-performance correlation was observed in the energy domain for energy-focus participants (at  $t1$ ,  $r=.029$ ,  $p>.05$ ;

at  $t4$ ,  $r=.420$ ,  $p<.001$ ) and this was found to be significant,  $z=-2.75$ ,  $p=.006$ . There was no equivalent effect for energy-focus participants in the consume domain, nor for consume-focus participants in either domain. Hypothesis 2 was therefore only supported for energy-focus participants. (Note that this analysis uses cross-sectional data, linking intent and performance at  $t1$ , and intent and performance at  $t4$ . Cross-sectional analysis is not as valid as longitudinal analysis for this type of study but it allows direct comparison with study one findings.)

Figure 5. Performance over time in the energy domain by focus group (study 2)

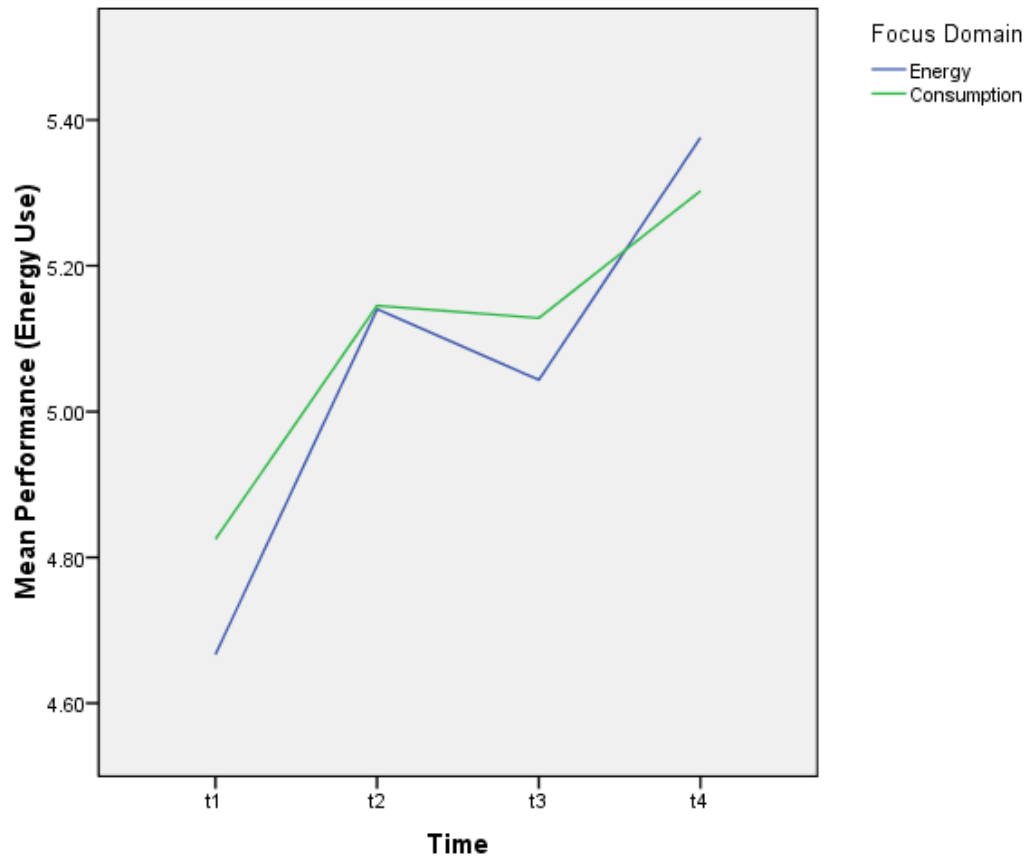
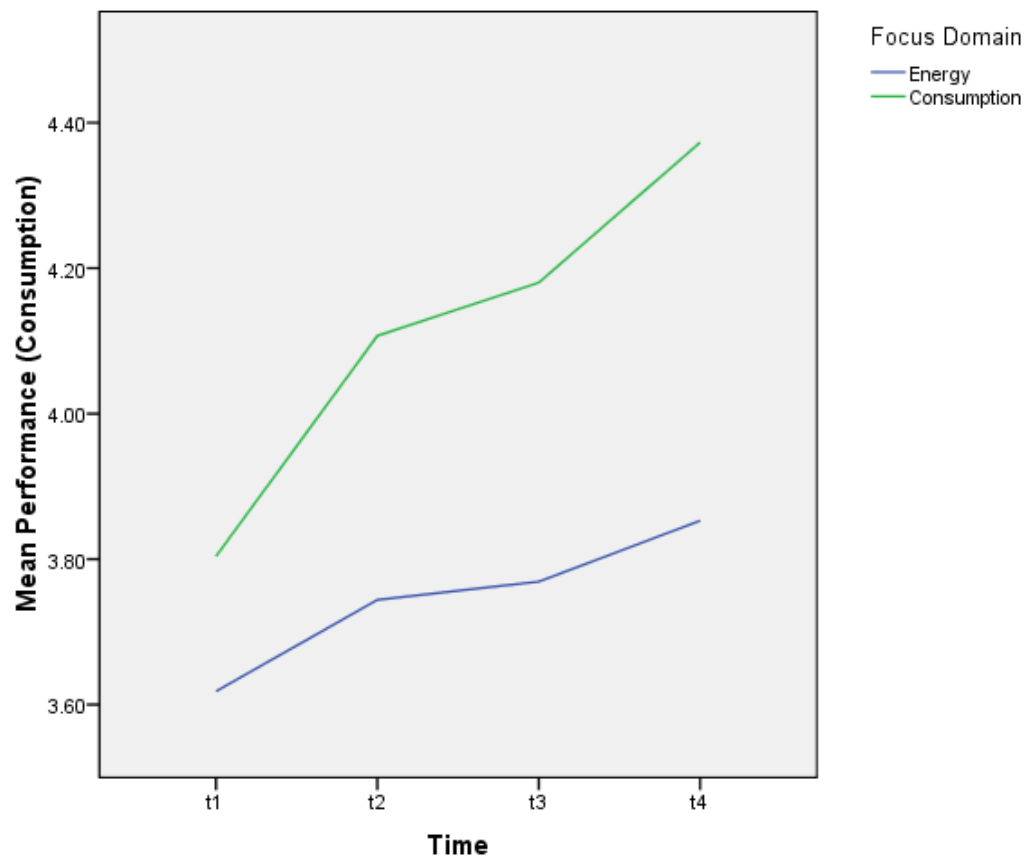


Figure 6. Performance over time in the consume domain by focus group (study 2)



### *Testing the theory of planned behaviour (TPB) model*

In accordance with the theory of planned behaviour (TPB) it was hypothesised that attitude towards the action, subjective norms and perceived behavioural control would predict intent (hypothesis 3) and intent would predict performance and mediate the effect of the other predictors on performance (hypothesis 4). These hypotheses had found only partial support in study one, and a complex pattern of effects was suggested that could not easily be explained. Regression analyses were performed for each focus group in both domains to predict behavioural intention at  $t0$  and  $t4$  from attitudes, norms and perceived behavioural control. Standardized betas and R-squares are given in Table 20 for energy-focus participants and in Table 21 for consume-focus participants.

The model of intent prediction from attitudes, norms and PBC was significant in the energy domain and the consume domain for both focus groups, although as with study one there were observable differences in the pattern of overall significance. For the energy focus group in the energy domain the model accounted for 29% of variance at  $t0$  ( $F_{(4,115)}=11.45$ ,  $p<.001$ ), and 58% at  $t4$  ( $F_{(4,97)}=33.42$ ,  $p<.001$ ). For the energy focus group in the consume domain the model accounted for similar amounts of variance, 36% at  $t0$  ( $F_{(4,115)}=16.32$ ,  $p<.001$ ), and 67% at  $t4$  ( $F_{(4,97)}=48.57$ ,  $p<.001$ ). For consume-focus participants, the model accounted for 36% of variance in energy domain intention at  $t0$  ( $F_{(4,61)}=8.43$ ,  $p<.001$ ), and 63% at  $t4$  ( $F_{(4,56)}=23.52$ ,  $p<.001$ ). In the consume domain the model accounted for 44% of variance at  $t0$  ( $F_{(4,61)}=12.15$ ,  $p<.001$ ), and 64% at  $t4$  ( $F_{(4,56)}=25.29$ ,  $p<.001$ ). Thus, and in contrast to the findings in study one, the model performed similarly across performance domain for both focus groups and improved over time, performing better at  $t4$  than at  $t0$ . Taken together, these results amount to very good support for hypothesis 3, that the theory of planned

behaviour model would predict intent.

Note that this analysis used predictor scores at  $t0$  to predict intention at  $t0$ . This cross-sectional analysis is directly comparable to that of study one. However, in the present study there was also an intention score taken at  $t1$ , the exact beginning of the action periods, two weeks after  $t0$ . The  $t1$  measure was taken closest to actual performance of the behaviours and as shown in Table 15, there was a significant increase in intent between  $t0$  and  $t1$ . Further regression analyses showed that the  $t0$  measures did predict intent at  $t1$  as well, but accounted for less variance, between 14% and 29% depending on the focus group and domain. This lower level of prediction is not in contradiction to the theory of planned behaviour, which expects that the association between attitudes, social norms and PBC should lessen as the time gap between them increases (Ajzen, 1985). However, it is important to note this lower level of prediction as it is the  $t1$  measure of intent (rather than the  $t0$  measure) that is used in analyses following as a predictor of behaviour.

It is notable that the amount of variance explained was much greater in this study than in study one. The pattern of predictor significance was also different as compared to study one. The most obvious difference is the increased importance of the attitude predictor in this study, which was consistently significant across time, focus group and performance domain, when it had not been such a consistent or strong predictor in study one. Also of note was a change in the effect of perceived behavioural control. PBC effects in the energy performance domain were consistent with study one: PBC became significant over time for energy-focus participants but remained non-significant throughout for consume-focus participants. however, PBC effects in the consume performance domain were markedly different, in fact showing precisely the opposite pattern of significance and non-significance. Similarly, norm effects differed from study one. In study one, norms had been of low or no significance in the energy

domain, but highly significant in the consume domain. The revised norm measures in the present study found no effect in the energy domain, as in study one, but in contrast to study one, effects in the consume domain were low or absent entirely.

This pattern of effects does not match the study one results. Indeed, of the three suggested effects that would account for the pattern of prediction in study one, not one was supported by these results.

Table 20. Regression analyses on behavioural intention in the two domains for energy-focus participants

	Time 0		Time 4	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.500**	.285**	.514**	.580**
Norm (family)	.030		.117	
Norm (peers)	.049		.031	
PBC	.033		.314**	
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.503**	.362**	.534**	.667**
Norm (family)	.103		.045	
Norm (peers)	.034		.157*	
PBC	.141		.290**	

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level



Table 21. Regression analyses on behavioural intention in the two domains for consume-focus participants

	Time 0		Time 4	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.476**	.356**	.743**	.627**
Norm (family)	.069		-.042	
Norm (peers)	-.127		.092	
PBC	.182		.043	
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Attitude	.409**	.444**	.764**	.644**
Norm (family)	.118		-.078	
Norm (peers)	.029		.136	
PBC	.308**		.019	

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

To complete testing of the TPB model, it was necessary to investigate whether intent predicted performance and mediated the effect of attitudes, norms and PBC on performance (hypothesis 4). In study one, this had been tested with two cross-sectional analyses. This study was constructed so a longitudinal analysis could be performed, however, cross-sectional analyses were also conducted for purposes of comparison with study one.

For the longitudinal analysis, a hierarchical regression analysis was performed to predict behavioural performance (BP) at  $t4$ . Intent (BI) as measured at  $t1$  was the sole predictor at step 1, and at step 2 attitudes, norms and perceived behavioural control (as measured at  $t0$ ) were added to the model. The participants were again split into their focus groups for this analysis. Analysis showed that the TPB predictors from step 2 (attitude, norms and PBC) were not significant for any domain, regardless of focus group. Standardized betas and R-squares for step 1 of this analysis only are given in Table 22. Intent is shown to be a significant predictor of performance, accounting for just under 10% of variance in behaviour for energy-focus participants, and over 20% of variance in behaviour for consume-focus participants. Note that the  $R^2$  for consume-focus participants is very close to the mean effect found in Armitage and Conner's (2001) meta-analysis.

Table 22. Step one of longitudinal regression analysis of behavioural performance by intent

	Energy-focus participants		Consume-focus participants	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.307**	.094**	.480**	.231**
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.299**	.089**	.474**	.224**

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

When intent was excluded from the longitudinal regression analysis, one predictor had a near-significant direct effect on performance: energy attitude for energy-focus participants ( $\beta=0.185$ ,  $p=.071$ ). The theory of planned behaviour predicts that this effect should be mediated by intention, so to test this a mediation analysis was conducted using MedGraph v2.0 (Jose, 2003). As expected and in accordance with the predictions of the theory of planned behaviour, the relationship between attitude and performance was mediated by intention (Sobel's  $z=2.20^*$ ), although the mediation was only partial. The relationship between attitude and performance was weaker when intention was present as a mediator ( $\beta=0.22^*$ ) as compared to when it was unmediated ( $\beta=0.44^{***}$ ), but it was not reduced to insignificance. (There were of course significant relationships between attitude and intention,  $\beta=0.43^{***}$ , and intention and performance,  $\beta=0.31^{**}$ .) Although this is not strong support for the mediation hypothesis, the weakness of  $t0$  variables in predicting  $t4$  behavioural performance meant this hypothesis could not be tested more robustly. Combined with the intent-performance findings above, this amounts to support for hypothesis 4, that intent would predict performance and mediate the effect of other predictors on performance.

To enable direct comparison with study one, cross-sectional analyses were also performed. The same steps were used, with intent (BI) was the sole predictor at step 1, and attitudes, norms and perceived behavioural control added at step 2. Four separate analyses were performed, splitting on focus domain and performing one analysis on the  $t0/t1$  cross section of data and another on the  $t4$  cross-section. As with the longitudinal findings in this study and the findings in study one, there was no direct effect for the step 2 predictors (attitude, norms and PBC) for any domain at either  $t1$  or  $t4$ , regardless of focus group. Standardized betas and R-squares for step 1 only are given in Tables 23 and 24.

*Table 23. Step one of cross-sectional regression analysis of behavioural performance by intent, for energy-focus participants*

	<i>Time 1</i>		<i>Time 4</i>	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	-.004	.000	.386**	.149**
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.233*	.054*	.330**	.109**

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

*Table 24. Step one of cross-sectional regression analysis of behavioural performance by intent, for consume-focus participants*

	<i>Time 1</i>		<i>Time 4</i>	
<i>Energy domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.503**	.253**	.491**	.242**
<i>Consume domain</i>	$\beta$	$R^2$	$\beta$	$R^2$
Intent (BI)	.379**	.144**	.490**	.240**

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

Again, a pattern of difference can be noted between the focus groups. At *t1*, intent was found not to be a strong predictor for energy-focus participants whereas it was a strong predictor for consume-focus participants. At *t4*, intent was a strong predictor for both focus groups. This is a different pattern to the results of study one, and as this study has much stronger behaviour measures it should be considered the better result.

When intent was excluded from the cross-sectional regression analysis, a main effect of attitude on behavioural performance was found in several time/domain/focus group conditions. The theory of planned behaviour predicts that these effects should be mediated by intention, so to test this mediation analyses were conducted using MedGraph v1.0 (Jose, 2003). Analyses were conducted for each combination of time, domain and focus group, and it was expected that in each case where intention was a strong predictor of performance it would mediate the attitude-performance relationship. Beta weights for the effect of attitude on performance with and without the intention mediator are shown in Table 25, along with significance information. As expected and in accordance with the predictions of the theory of planned behaviour, the relationship between attitude and performance was fully mediated by intention for energy-focus participants at *t4* in both domains, and for consume-focus participants at *t1* in both domains and *t4* in the energy domain. Of the three instances where significant mediation was not found, two were very narrow misses: energy-focus participants in the consume domain at *t1* and consume-focus participants in the consume domain at *t4*. Only energy-focus participants in the energy domain at *t1* showed no suggestion of mediation. Overall, there is good support for a mediation effect in the cross-sectional data.

Table 25. Effect of mediation by intent on cross-sectional attitude-performance relationship

	$\beta$ (no mediator)	$\beta$ (with mediator)	Sobel's $z$	$p^1$
<i>Energy-focus</i>				
<i>participants</i>				
Energy domain at <i>t1</i>	0.173	0.213*	-0.933	0.350
Energy domain at <i>t4</i>	0.287*	0.032	2.741	0.006
Consume domain at <i>t1</i>	0.209*	0.149	1.734	0.083
Consume domain at <i>t4</i>	0.251*	-0.009	2.397	0.016
<i>Consume-focus</i>				
<i>participants</i>				
Energy domain at <i>t1</i>	0.319*	0.112	2.669	0.008
Energy domain at <i>t4</i>	0.331**	-0.151	3.146	0.002
Consume domain at <i>t1</i>	0.215	0.091	2.026	0.043
Consume domain at <i>t4</i>	0.452***	0.181	1.792	0.073

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

\*\*\* Significant at the 0.001 level

Overall, cross-sectional data also shows good support for hypothesis 4, that intent would predict performance and mediate the effect of other predictors on performance, with the notable exception of energy-focus participants in the energy domain at *t1*, where this did not seem to hold true. As has been shown, intent was not a good predictor of performance for energy-focus participants at *t1*, so it was therefore unable to moderate the attitude-performance relationship. These results are quite different from those of study one, where there were no attitude effects to mediate and the intent-performance relationships were less consistent, which reinforces the importance of having valid and reliable behavioural measures as was achieved in the present study.

#### *Moderating effects of group identification in the focus domain*

Despite a negative result in study one, it was expected that group identification would moderate the effect on intention of group-based injunctive norms, such that these norms would predict intent more for participants who identified strongly with the group (hypothesis 5). To test this hypothesis, interaction terms were mean-centred to limit multicollinearity and a hierarchical regression was performed on behavioural intent, adding the basic TPB terms, then group-related terms, and finally interaction terms. An interaction between intent and PBC was included for comparison with study one, although this was not expected to be significant. The analysis was performed split on domain focus due to the observed differences between focus groups.

Results are shown on Tables 26 and 27. Again, contrary to the findings of Terry et al (1999), there was no interaction effect for group identification and group-based injunctive norm, although injunctive norm was found to be a significant direct predictor of intention for the energy-focus group. Hypothesis 5 was not supported. As expected, no interaction effect was found for group identification and PBC.



*Table 26.* Hierarchical regression analysis of intent in the energy domain for energy-focus participants

Step		$\beta$ (final)	$R^2$	$\Delta R^2$
1	Attitude	.438**	.580**	-
	Subjective Norm - Family	.110		
	Subjective Norm - Peers	-.022		
	PBC	.291**		
2	Group Identification	-.056	.624**	.045**
	Grp Injunctive Norm	.242**		
3	Identification x Injunctive	.096	.636**	.012
	Identification x PBC	-.088		

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

*Table 27.* Hierarchical regression analyses of intent in the consume domain for consume-focus participants

Step		$\beta$ (final)	$R^2$	$\Delta R^2$
1	Attitude	.767**	.644**	-
	Subjective Norm - Family	-.090		
	Subjective Norm - Peers	.137		
	PBC	.038		
2	Group Identification	.035	.644**	.000
	Grp Injunctive Norm	-.023		
3	Identification x Injunctive	.024	.651**	.007
	Identification x PBC	.079		

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

Hypothesis 6 had predicted a correlation difference between high and low levels of group-identification. Correlation coefficients for the relationship between intent at *t1* and performance at *t4* were calculated, and comparisons were made between participants with high group identification and those with low group identification, splitting on the mean score for identification. The correlations are shown in Table 28. As can be seen, there was no evidence of stronger correlations for high-identity participants, and in fact the trend was clearly in the opposite direction (although not to the level of significance). Hypothesis 6 was therefore not supported.

Finally, it was hypothesised that group identification would moderate the intent-behaviour link, such that the contribution of intent to performance would be greater where group identification was high (hypothesis 7). This hypothesis had not been supported in study one. In contrast to study one, longitudinal analysis was used in the present study and good evidence had been found of substantial links between intent and behaviour.

This hypothesis was tested within each focus domain using hierarchical regression analyses. At step 1 behavioural intention (as measured at *t1*) and group identification were added to the model, and at step 2 the interaction term was added. The interaction term was constructed as a straightforward multiplication of centred intention and identification scores to limit multicollinearity. The results of this analysis are shown in Tables 29 and 30. As with study one, the predicted interaction effect was not found for either focus group, nor was there any main effect of group identification. Hypothesis 7 was not supported.

Table 28. Change in intent-performance correlations by group identification

	Low group identification		High group identification		Significance of difference p (2-tailed)
	r	n	r	n	
Energy-focus participants in the energy domain	.379*	40	.257*	74	> 0.05
Consume-focus participants in the consume domain	.614**	26	.292	42	> 0.05

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

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

*Table 29.* Hierarchical regression analysis of behavioural performance at t4 in the energy domain for energy-focus participants

Step		$\beta$ (final)	$R^2$	$\Delta R^2$
1	Behavioural Intention	.290**	.104**	
	Group Identification	.181		
2	Intention x Identification	-.077	.109**	.005

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

*Table 30.* Hierarchical regression analyses of behavioural performance at t4 in the consume domain for consume-focus participants

Step		$\beta$ (final)	$R^2$	$\Delta R^2$
1	Behavioural Intention	.381**	.196**	
	Group Identification	-.043		
2	Intention x Identification	-.199	.224**	.028

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

## Discussion

The trend of study two's results was very similar to that of study one. There was, once again, extremely strong evidence of participants successfully changing their behaviour during the intervention; the general predictions of the theory of planned behaviour were supported, although there was some ambiguity in the detail of this support; and as with study one, no evidence was found for the predicted effect of groups.

Of particular note, the improvements to the behaviour measures between study one and study two were successful. The new measures were internally consistent, reliable across a series of re-tests, and had a high degree of construct validity. They were self-report scores but drew on a number of specific behaviours and were reported by participants who were motivated to attend to their own behaviour. As a consequence, findings involving the improved measures can be assigned much higher validity than in study one. Furthermore, the use of longitudinal rather than cross-sectional analysis was a significant improvement in methodology and increased the validity of the study (Armitage & Conner, 1999).

Adjustments to the norm measure did not deliver such a positive outcome. Reference groups for the norm measure were reduced from four to two, one of which was a new group. These changes were made after consultation with participants in the prior study. The resulting measure had a low alpha, extremely low in one instance. On reflection it was clear that the low alpha was because the two reference groups communicated different norms to the participants: family and peers held different opinions on the behaviours. This meant that the composite norm measure was not reliable and in analyses it was replaced by the two component scores treated independently. Other changes to variables passed without difficulty, namely the

reduction of the group identity measure from nine questions to five, the increase from one to two questions for measures of intent and perceived behavioural control, and from three to four questions for the measure of attitude.

### *Effectiveness of the intervention programme*

As with study one, the intervention was highly successful (hypothesis 1). Once again, behavioural performance improved significantly for participants over the course of the intervention. In fact, comparison of improvement in the focus domain between the two studies reveals that standardised performance increase is much greater in this study, particularly in the energy domain, which saw a rise of just over half a standard deviation in study one but of nearly a full standard deviation in this study. Table 31 shows standardized performance scores for the two studies side-by-side (comparing only *t1* and *t4* scores). This could mean that the revised intervention programme in study two was more successful than the original, or that the revised behaviour measures better captured performance increases than the single-item measures of study one, or a combination of these two explanations.

Also in line with study one, the pattern of performance increase differed between focus groups. Once again, energy-focus participants improved their performance in the energy domain much more than their performance in the consume domain, but consume-focus participants improved similarly in both domains. That this pattern has been robust enough to recur in two studies drawing on different participants and using different behaviour measures is very strong evidence that the pattern is reliable and based on a predictable effect. This is also just one piece of a set of evidence that energy-focus participants differed from consume-focus participants, as was found to be the case in study one.

Hypothesis 2 was also a test of the effectiveness of the intervention programme.

This hypothesis predicted that the intent-performance correlation would improve in the focus domain. This effect was not found at all in study one but was found in one condition in this study, in the energy domain for energy-focus participants only. Outside this condition it appeared that intent to engage in sustainable behaviours was increasing at about the same pace as performance of those behaviours, but their overall relationship wasn't becoming any more accurate. In this one condition, it appeared that, while intent to engage in energy conservation and energy conservation itself were both increasing overall, they were also becoming more closely aligned. This difference could be due to the characteristics of the participants, or it could be because a focus on energy conservation is qualitatively different in some way to a focus on consumer responsibility.

*Table 31.* Standardized mean performance scores in studies 1 and 2

Variable <sup>1</sup>	Study	<i>t1</i>	<i>t4</i>
Performance (BP) – Energy	1	.000	.204
	2	.000	.920
Performance (BP) – Consumption	1	.000	.332
	2	.000	.436

1. Standard deviations ranged from 0.91 to 1.04



### *Theory of Planned Behaviour*

The TPB was again found to give a good account of the prediction of intention, and this time with the stronger behaviour measures its account of the prediction of behaviour was also clearly supported. This study is clearly in support of the TPB as a good way of explaining some of the variance in behaviour in the environmental domain; an increase in intention was associated with an increase in behaviour (although perhaps a smaller increase, Webb & Sheeran, 2006). The amount of variance explained was in line with other TPB studies (Armitage & Conner, 2001).

However, the distribution of predictive weight among attitudes, social norms and perceived behavioural control was not straightforward and was also inconsistent with study one. The most notable change is finding attitude to be a significant predictor of intent in all conditions in study two, when it was only significant for the energy-focus domain in study one. This may be the result of the use of better attitude measures for this study. The number of attitude questions in this study increased from three to four, and the question terms were chosen based on consultation with an advisory group of participants in study one. On the face of it, then, it appears this advice was effective in generating more useful measures of attitude for this domain and population.

More perplexing are the changes observed in how PBC predicted intent. In their own right, explanations can be offered for changes in the significance of PBC as a predictor: a loss of significance of PBC could reflect an increasing determination to rise above control limitations; an increase in PBC significance could reflect a transition from low awareness of control limitations to greater awareness, or an increase in self-efficacy (Bandura, 1982) whereby involvement in the intervention programme built up the participants' ability to take control of their circumstances. However, these types of explanation are extremely unlikely in the present case

because the predictive role of PBC reversed completely between study one and study two. Table 32 shows the beta-weight for PBC as a predictor of intent in the two studies. As can be seen, in study one PBC was a significant predictor at time one only for energy-focus participants and at time four only for consume-focus participants, whereas in study two this pattern was exactly reversed. Although there was a change in the measurement of both PBC and intent, increasing to two questions from one in both cases, this does not seem sufficient to explain this reversal. There were no dramatic adjustments to the timing of the measurements, the instructions given, or the surrounding context. As this research was not conducted in a controlled laboratory setting, it is possible that there were other influences at work in study two that were absent in study one, but it is impossible to identify what these may have been. I am unable to offer an explanation for this reversal, and consequently cannot offer any meaningful interpretation of the importance of PBC as a predictor of intent.

The norm measures did not appear to have significant roles in the prediction of intention or behaviour in this study. Although there were problems with the coherence of the measure, as discussed above, these should not have prevented either the peer or family-based measure from having an effect if either had a role to play. It is reasonable then to conclude that social norms based on the opinions of peers and family did not influence participant intent or behaviour in the present study. This is in sharp contrast to the performance of norms in study one, where they were found to be important predictors of intent in the consume domain (Table 33 shows the beta-weight for norms as a predictor of intent in the two studies, using peer-based norms for the present study as the alternative had no significant effects at all). It was speculated that this was because many participants were students who would need to negotiate consumption decisions with their housemates or family. This logic is still sound in the present study, but no effect of norms was found, casting doubt on this rationale for the study one

effect. It is possible that the revised intervention programme better equipped participants to resist the normative influence of their friends and family, but this is not a particularly likely explanation, as the changes from the first version of the programme were not major and were not specifically targeted at this result. It is perhaps more likely that the norm effect in study one was derived from reference groups not included in study two, such as ‘society at large’ and ‘people at home’. However, this simply begs the question why those reference groups should be important while family and peers are not. Again, I can offer no explanation for this inconsistency between studies.

Overall, the pattern of TPB predictor effects is less complex than that found in study one and gives a more coherent and consistent picture that suggests attitude and, to a lesser extent, control are the main predictors of intent. Attitudes and norms remain relatively constant across time, domain and focus group in this study, while the importance of PBC does vary. This could be accounted for as a difference between the two participant groups in how they learn to engage with their perceptions of control; perhaps energy-focus participants need to learn about the importance of control in environmental behaviours, while consume-focus participants do not; perhaps consume-focus participants become motivated to pursue behaviours as symbolic actions or identity statements, regardless of whether they believe they can control these behaviours. This highly speculative explanation relies solely on differences between participants, which contrasts dramatically with study one in which three separate effects were needed to account for the patterns found among the predictors.

Further complicating this picture is that the three effects that appeared to be at work in study one are absent in study two, while the effect apparently present in study two was not present in study one. These differences are difficult to explain. Although the survey questions for these measures did change, the overall structure of the

intervention and the methodology used for these measurements were very similar from study to study. There is no particular reason to presume that the participant pool was significantly different from one study to the next, and the size of the sample was large enough in all cases that sampling bias is not a very likely explanation for changes such as these. As noted above, this research was not conducted in a laboratory environment and as such it is impossible to rule out any number of extraneous variables that may have brought about these differences between studies one and two. Overall, while the TPB model overall appears to be a good fit with the data in both study one and study two, the specific patterns of predictor significance seemed to vary in unexpected ways and with an inconsistency between the studies that cannot be explained based on the information at hand.

*Table 32.* PBC prediction of intent in the consume performance domain in studies one and two

	Study one	Study two
Time one	$\beta$	$\beta$
Energy-focus participants	.272**	.141
Consume-focus participants	.201	.308**
Time four	$\beta$	$\beta$
Energy-focus participants	.101	.290**
Consume-focus participants	.529**	.019

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

*Table 33.* Norm prediction of intent in the consume performance domain in studies one and two

	Study one	Study two
Time one	$\beta$	$\beta$
Energy-focus participants	.409**	.034
Consume-focus participants	.474**	.092
Time four	$\beta$	$\beta$
Energy-focus participants	.357**	.157*
Consume-focus participants	.113	.019

\* Significant at the 0.05 level

\*\* Significant at the 0.01 level

The peer-derived norm measure was used for study two.

### *Group identification*

An important result of both the present study and study one is the overall lack of effect of group membership (operationalized as group identification). It had been expected based on prior research that group identification should moderate the contribution of group-based injunctive norms to intent (hypothesis 5), and it was also hypothesised that group identification should moderate the intent-behaviour relationship (hypothesis 7). However, neither of these effects were found in this study, nor in study one with the exception of an interaction effect for one focus group. It had also been speculated that group-based effects on the predictors of intent might appear in the data as a direct effect of groups, but this was not found either. The group identification variable was shown to have no explanatory role in the present data. The entirety of group identification effects found in these two studies were, in study one, a weak but significant interaction effect of group identification and PBC on intent (but only for energy-focus participants in their focus domain); and nothing at all for the present study.

This presents a significant challenge to the arguments discussed in this study for the existence of a group-based effect. As previously discussed, the semi-artificial nature of groups in this intervention may have been problematic; it is also possible that a participant's level of group identification is not a good measure of the extent to which the participant is subject to group effects. The mean level of group identification was higher even than that in the first study (on a seven point scale: mean= 5.93, s.d.=0.93, comparing to mean=5.49, s.d.=0.92 in study one), indicating that the overwhelming majority of participants identified positively with their group. There could have been a ceiling effect, with only just over one standard deviation between the mean score and the highest possible score, which may have contributed to

the failure of the group identification measure.

The consequences and implications of the group identification findings will be discussed further in sections following.

### *Conclusion for quantitative studies*

Although these studies have not shown the predicted effects of group identification, they have given robust evidence of the efficacy of the intervention as a framework for successful behaviour change, and the pattern of performance improvement was shown to be consistent across this study and the previous study in terms of showing differences between the two focus groups. These studies have also supported the theory of planned behaviour model as a good account of the production of intention and behaviour, although with much ambiguity about the specific roles of predictors in the model.

With those three clear results established, a number of questions remain. The following study attempts to find insights and answers to some of these questions from a qualitative analysis of diary entries completed by participants as part of their assignment work.





## Study Three

During the intervention programmes, participants described their attempts to be more environmentally sustainable in online diaries that were accessible to their fellow group members. This provided a body of qualitative data through which to investigate questions that arose from studies one and two. Firstly, the intervention programme was found to be successful, but the TPB model only accounted for a small amount of behavioural variance; what, then, was driving this improvement? Secondly, the group identification measure did not moderate the intent-behaviour relationship; what role might the group have had in participant experiences? The two focus questions can be explored in the same analysis. The diary entries did not ask participants to reflect on the nature of their ties to their groups, but they did ask for thoughts about what was making behaviour change easier or more difficult. By examining this content key influences on behaviour can be identified, including any influence from the group.

The overall framework of this analysis is that of constructive realism, as articulated by Hwang (Hwang, 2003; Hwang, 2004). This analytical framework argues that we have no access to the actuality of the world, and that everything we engage in as reality is in fact constructed as a worldview. The worldview of the person in ordinary life, the lifeworld, is substantially different to the worldview of the scientist, the scientific microworld. In the present study, the lifeworld is the participant's perspective of their experience, whereas the scientific microworld is the theory of planned behaviour and its account of behavioural production. The two worldviews have different rationales:

“There is a fundamental difference between the rationality used for constructing a microworld and that used in a lifeworld. In their lifeworlds, people emphasize the importance of ‘substantive rationality’, which refers to the value of ends or results judged from a particular position. It is completely different from the ‘formal rationality’ for

constructing scientific microworlds used by Western scientists...”  
(Hwang, 2003)

They also differ in terms of their utility. A scientific microworld is used to describe the nature of the world, but the lifeworld is used to orient the individual towards meaning in their world, directing itself towards core questions such as “who am I?” and “how do I find salvation?” Hwang (2003) calls for an awareness of the differences between lifeworlds and scientific microworlds, and advocates for close readings of cultural symbols as a way to achieve closer rapport between them. In the context of the present study, then, Hwang advises researchers to attend to the versions of experience put forward by participants and test the scientific microworld of the TPB against these. Accordingly, the aim of this research is to develop an understanding of how the participants understood their own agency during the intervention programme.

## **Method**

### *Participants*

This study was completed in parallel to study one. Participants were 177 students divided into action groups of 3-7 members. 72% were female and the mean age was 21 years (s.d. 5.8). This was a student population, and most participants lived in environments in which many decisions would have to be negotiated with housemates (60% reported living in a flat-share situation with peers, 22% reported living at home with parent/guardian, 10% lived alone or with partner/children, and 8% lived in a student hostel).

### *Materials/Equipment*

Diary data were collected using the Discussion Board application within Blackboard Academic Suite software, which was the primary support software at the institution and as such was familiar to all participants (although few had experience

with the discussion board function). Access to each discussion board was restricted to group members and tutors. Participants could access the board from the internet or any computer on campus.

### *Procedure*

As part of the activities recounted in Study One, participants were required to record their efforts to carry out the group's chosen action in diary entries on an online forum shared with fellow group members. Over six weeks they were required to make a minimum of eight separate posts of at least 25 words, no two of which could be made on the same day. Relevant instructions were as follows:

Your behaviour change diary will be a series of messages you will post on your team forum. Every diary entry should answer these questions:

- What have I done towards my team's action since the start of the assignment/since my last entry?
- What difficulties and barriers did I encounter?
- What conversations have I had about this action with people outside 221? How did they go?
- What, if any, discoveries have I made?

Entries can be as short as 25 words, or as long as you like.

You and your team will need to use this forum for your diary entries, but you can also use it to post conversations that you all can read, perhaps to support each other or share information.

Variations were soon evident in the ways groups used their team forum. Some groups used their forum for individual diary entries only, whereas other groups engaged in discussion and idea-sharing. Within groups, individuals varied in the frequency and length of their posts. Mean separate postings by individual were slightly over the course-required minimum (mean=9.63, s.d.=2.96), and indicative word count across all posts showed participant response varied greatly but on average was far in excess of the minimum required (mean=1863.66, s.d.=956.79). (Note that indicative

word count included system-created words such as date information and “posted by” fields, responsible for perhaps 10% of the total). This produced a substantial body of raw data, almost 330,000 words. Diary entries were anonymized before analysis.

### *Analysis*

The data gathered were vivid and extensive, with several significant assets. Firstly, the dataset as a whole was enormous. What it lacked in depth and guidance was balanced by sheer size. This meant we could have confidence that the dataset would include significant diversity of subjects and represent the target population well. Secondly, participants were largely unguided in the process of generating content for their diaries. Diary entries often bore little relationship to the questions that had been asked in the assignment guideline. Some participants wrote long reflective passages, others stream-of-consciousness musings, others very brief updates on their progress. Some groups were very interactive, with members making frequent reference to the experiences of others in the group, or replying to each others’ diary entries with comments and feedback. Other groups exhibited no online interaction at all, and each diary entry appeared entirely self-contained and gave no indication that the participant was even a member of a group. This freedom to engage with the diary task in a variety of ways provided room for reflection and insight and ensured that participant responses were not over-determined by the demands of the exercise. However, it also meant participants produced only as much talk as they saw fit on each subject, and they generally did not provide extensive detail.

Given the contrived nature of the diary exercise and the potential for social judgement from peers and tutors, it was expected that participant accounts would be post-hoc rationales for behaviour rather than accurate descriptions of behavioural influences (Potter, 1996). However, it was assumed that description of a lifeworld

(Hwang, 2003) derived from these accounts would still be of use as a point of comparison with the TPB. The TPB itself is a highly rational model that assumes important behavioural motivators can be captured through direct survey questions, and to meet it on its own terms, participant diary accounts were treated as holding the same level of validity. As such a relatively positivist approach was used rather than the positional interpretations used in more contemporary forms of discourse analysis (Potter, 1996).

With this in mind we approached the complete dataset. A simple taxonomy was used for a first coding pass over the data. For each participant in turn, their diary entries were read and a code was attached to every comment that described something that helped or hindered the performance of environmental tasks. If the comment related to a helping factor, it was coded as a facilitator, and if the comment related to a hindrance, it was coded as a barrier. If the comment related to internal and dispositional effects, it was coded as a motivational factor, and if the comment related to external and uncontrollable effects, it was coded as a structural factor. While this was framed as a descriptive coding task, there is an analytical component to any coding decision, no matter how prosaic or descriptive it might appear at first (Holliday, 2002). Acknowledging this, the first coding pass was intended firstly to provide a way to begin working with what was a very large set of data; and secondly, to identify ambiguities and apparent contradictions that would lead the way into an analytical second pass over the data.

As was expected, this simple taxonomy proved to give a poor account of the data. A number of influences could not be simply categorized as either structural or motivational (e.g. financial factors), and there were signs of asymmetry between facilitators and barriers (not having enough time was a barrier, but an abundance of free time seemed to be associated with distractions and not with any facilitative

effect). These problems gave a starting point for a second pass over the data. Using a thematic analysis approach (Braun & Clarke, 2006), I approached the references in each of the four failed categories and coded very simple units of meaning such as “need to be well-organised to act” and “feels good to be enviro-friendly”. When it seemed no new units of meaning would be found in a category I moved on to the next. Throughout this process, codes were constantly being evaluated and combined (or, less often, separated). At the conclusion 66 separate codes remained.

These were arranged into provisional themes, which were reviewed to see how well they were supported, then revisions were made as connections and distinctions became apparent. Several iterations of this process were performed until my analysis stabilised around eight separate groups of codes. Notably, codes reflecting social influence of varied kinds were not placed in their own group, but were scattered among all groups. No rationale was found for treating social influences as distinct from other types of influence discussed by participants. By the same logic, financial concerns appear in two separate themes, as it was concluded that financial matters were addressed in two distinct ways by participants.

Refer to Table 34 for some examples of codes used and the influence categories into which they were placed.

*Table 34.* Examples of codes used in thematic analysis of behavioural diaries

Code	Influence Category
Knowing what to do	Personal capacity
Not enough time	Resource availability
Limited options available	Task difficulty
Not my responsibility	Personal interest
Shame and embarrassment	Social reference
Get something non-enviro out of it	Cost/benefit
Laziness	Effort
Encountering reminder messages	Frame of mind

## Results

### *Categories of influence*

Eight themes, each representing a different category of influence on behaviour, were identified in the dataset. These are detailed below. Quotes are unedited except by selection.

#### *Task Difficulty*

Unsurprisingly, participants frequently referred to the difficulty of a task as an important influence on their behaviour. Difficulties such as absent facilities, unwelcome consequences, and an absence of useful alternatives could mean that even diligent pursuit of an action would result in little overall change

Sunday, meter reading... 1804. That's an improvement on last week's difference of 1922! But not on the original difference of 1320. Oh well, extraneous factors must account for the difference, as my power saving techniques have definitely improved. (P160)

we got [purchased] heaps of packaged stuff cos it's just too hard not to (P147)

However my parents house is in a place which u cant really walk anywhere or catch public transport meaning I have been driving everywhere." (P159)

Conversely, behaviours that participants found to be easy were adopted with much more enthusiasm and success.

Discovered it is really easy to not just reduce waste at home but also at work by making small changes and a few phone calls to the right companies (P072)

#### *Personal Capacity*

Many sustainable behaviours require particular skills or special knowledge. Participants encountering gaps in their skills and knowledge understood them as important factors limiting their control.



have learnt that bread bags are recyclable which is something I didn't know so I will start recycling them from now on (P128)

It was often the case that skill or knowledge gaps could be filled by research or investigation. Some groups gathered and shared a great deal of information (for example, about the origin of different products) while others were less active on this front.

We didn't actually ask any of the stall where they get their produce from, as it is very busy, and the stall owners don't really look like they want to stay and chat. (P150)

### *Resource Availability*

Participants acknowledged that lack of money and lack of time were frequent influences on behaviour. Other resources such as special tools also sometimes caused problems by being unavailable.

Someone suggested to me today to install a heat pump!... yeah i'll be sure to do that with all the money i have lying around.... (P154)

Also when you're not at home much the time it takes to do some energy saving things isn't there. I really wanted to plant a tree, but it's looking like i'm just not going to have the time too (P155)

When participants offered excuses based on limited time, they almost without exception said this was 'just an excuse' and not really a justification for failure.

i think a major issue in my home is everyone is just too busy i know that's just an excuse but it's true (P030)

had a family commitment that came from nowhere and took up most of my holidays. But I know this is no excuse so I will give it my all and try and make up for some lost ground. (P102)

Given that time sets a fundamental limit on behaviour, it is hard to accept this comment on its face, but its frequent appearance suggests it is important. It is possible this phrase was offered as the first part of an adjacency pair (Potter, 1996), intended to provoke a reassuring response from the other parties in the conversation. However, interaction on the discussion forums was often disjointed and no post including the

phrase 'just an excuse' ever had a specific response from another group member.

### *Cost/Benefit*

The calculation of costs and benefits was mentioned by participants with great frequency, particularly weighing the environmental benefit of an action against a sustained loss of personal comfort.

being in the house while it is freezing cold is definately a challenge, but we are slowly adjusting wrapping ourselves in blankets. I think it will become more challenging as the month goes on but at the momment it is do-able. (P146)

One of my flatmates however commented on how seeing how much recycling we do produce in a week makes him feel as though our actions are really helping the environment and that it is worthwhile. (P142)

Financial costs and benefits were extremely common components of the calculation. Even the absence of a financial incentive was keenly felt.

right, after investigating my shoppin habits, in heinsight what influences me the most would be to buy the cheapest product which is best value for money (P177)

Finding it difficult to save power, especially since our power is included in our rent so there's no cash incentive to save power. (P182)

Participants presented their engagement with cost and benefit as comprehensive evaluations of the net worth of an action, but it was clear that different participants made the same calculations in different ways. One participant making a decision about buying produce might be concerned with the distance it had been transported, another with the agricultural practices used, a third with the retail environment. The calculations of costs and benefit could become extremely complicated, and were highly individualised and determined by the perspective and agenda of the participant. (Potter & Edwards, 1990).

I also recently bought a beard trimmer. It was manufactured in China of course. Again, this sounds bad but I have an excuse. I normally use razors... shipped from overseas ...by using the electric beard trimmer I am actually doing my bit for the environment by not using razors. (P049)

The cost/benefit calculation was presented by participants as being very rational and almost abstract in its removal from context. This was, to an extent, an idealised version of what costs and benefits could be seen in an action. The messy reality of performing the action in the real world was treated differently, as discussed in the effort theme.

### *Self-Presentation*

When considering whether or not to undertake an environmental action, many participants described their sensitivity to how they would be perceived and judged by others, and the steps they took to manage these perceptions. This was a process very similar to impression management (Leary & Kowalski, 1990). In particular, participants were anxious to avoid being assigned the dreaded “hippy” label by their peers:

why does doing stuff that is good for the environment generally make me end up looking/feeling like a stupid long haired hippy loser? In a society where status is determined almost entirely by consumption (house, car, clothes, bling, etc), to choose not to consume is roughly equal to social suicide. (P049)

im very close to crossing that line and becoming a full blown hippy chick and we dont want that!!!! (P072)

It was also important to avoid being judged as a nag or a hypocrite:

although this is something I wan't to do know (reduce electricity) it is fully not worth becoming a nag! (P023)

Would never think of being a nag and saying anything, altho i did sneakily turn a light or two off. (P029)

I didn't want to appear to be a hypocrite, going on about doing this and that for the climate, and then not pulling my weight. Whoops! (P150)

Participants who were worried how they would be perceived would sometimes explain their behaviour as part of an assignment, even though the assignment did not require any particular behaviour. This external attribution (Weiner, 1985) did serve to

protect them from the judgements of their peers.

I have found myself pointing out that it is all for a uni assignment, and most of the time I am embarrassed to not let them know why I am doing it! (P023)

### *Personal Interest*

Participants who expressed an interest in the environment and the importance of sustainability reported a high degree of enthusiasm for behaviour change. When personal interest was low, however, motivation often faltered:

I got a buzz out of knowing that my efforts I went to to recycle waste will somehow in some way be benefiting the entire earth. (P151)

I have come to the conclusion that recycling shouldn't have to be my concern, but that of the corporations and producers who distribute that plastics and things in the first place. It should be their responsibility, not mine because I really don't care that much. (P156)

Many participants reported that their interest originated in exposure to key media relating to climate change early in the intervention programme.

### *Frame of Mind*

Participants reported that they needed to be in the right frame of mind to carry out a behaviour, managing their attention and their emotional state. When a participant was in a bad mood, depressed or otherwise unhappy, they were more likely to fail, whereas early passion led to greater success. This in some ways parallels the findings of priming studies (Bargh, 2006) where participant behaviour is affected by nonconscious priming of a particular affective state or perception frame (Entman, 1993).

Since Thursday last week, I tried my best to avoid my regular fastfood urge! (I *do* want to have a healthier diet and save the environment?) Anyway, all was going well until today. I quit my work yesterday so I was feeling rather depressed after school today. I walked along Cuba St. and saw that twinkly (well, not really, but it's yellow) McDonald's sign.. and guess what? I went in. :( I bought my usual *BBQ & Bacon*

*Cheeseburger combo.. **UPSIZED!** I felt really good after but realized that it was a bad move. (P103)*

I had quite a few conversations in the early days of this task about the earth and what we are doing to it. Looking back now i sorta feel i had a little more passion a few weeks ago and i wanted to tell people and convert them. Now i just feel exhausted. (P159)

Many participants reported that they simply forgot to perform new behaviours. Participants spoke of breaking old habits and learning new ones, and needing to be vigilant about keeping the action in mind until this was achieved, echoing the vigilance tasks of the self-regulation literature (e.g. Muraven & Baumeister, 2000).

Initially, remembering to bring bags to the supermarket with me, turn off appliances when not in use and compost organic matter took quite a bit of attention. I would frequently remember to compost only after I had dropped the banana skin in the rubbish bin, and remember my supermarket bags as I was entering the supermarket. However, explicitly writing down my intentions in the behaviour change diary each week helped to remind me of my intended behaviour changes, and with time and thought my behaviour became more consistent... [...] Eventually I reached the point where I rarely had to make a conscious effort to remember my environmentally sustainable actions. (P120)

Participants linked attention aspects of self-regulation and affective aspects such as mood in a general frame of mind theme.

All in all i've learnt that in order to change my behaviour my attitude towards GW has to be at the top of my mind. I have to be passionate about it to be thinking about it and want to make a change. Today it was beautiful so i wasn't thinking about how we're destroying our world and i made a really poor effort at doing my part to mitigate that. (P167)

### *Effort*

Participants frequently assigned importance to effort as an influence on their behaviour, meaning the expenditure of energy, willpower and time needed to achieve the task. Their description of effort was similar to the model of self-control as a muscle argued by Muraven and Baumeister (2000), in which effort is a resource that takes time to recover after use and is difficult to keep spending over time.

...it takes alot of energy to remmember to do all these things. I guess it'll become automatic eventually, but at the moment it takes effort... I'm

trying to do the specific things we agreed to do, but not really generalising my energy saving. (P108)

Having said this I do feel myself losing motivation even after just these few short weeks of effort, especially in the electricity department where I find my self not caring whether I have left lights and appliances on more and more, so I will have to shape up a bit! (P111)

Effort demands were lessened by convenience and habit.

I have discovered that once you practise a behaviour for a certain period of time, its starts to become part of a rutine and becomes less and less hard to perform even if it takes abit of effort to do. (P071)

We did note that getting into the habit of doing the small actions took a little time but the habit soon became automatic and really did not take much more time or effort to maintain. (P129)

Many participants explained their failures of effort by reference to the personal trait of laziness, although being effortful was never portrayed as a stable personality characteristic in the same way.

Im not sure if this behaviour will stick. Im prone to developing bad habits or not developing any at all (aka being lazy) so time will tell (P031)

i will try my hardest, but i have little willpower and am lazy (P052)

In line with the muscular model of Muraven and Baumeister (2000), the unpleasantness or exhaustion resulting from effort were seen as transient costs and were not treated as part of the more abstract cost/benefit calculation. Instead they followed on from it, so at the moment of action the overall worth was weighed against effort requirements.

In terms of behaviour change, it takes a whole lot of effort and motivation to keep it up, and changing habits can be a pain in the ass! One can be socially responsible and have quick showers one morning, but when it's cold and icky outside, my motivation to conserve water completely disappears! (P007)

For example, if there's an unnecesary light on in the room I'm in I might get up and turn it off, but if there's a radio on downstairs that noone's listening to I will think about it but usually decide I can't be bothered going down and turning it off (P098)

### *The role of social influence*

Although social influence was clearly important to participant experiences, it was not represented in the data as a separate category of influence or a separate theme. It was the type of influence that mattered rather than the source, so social influences were scattered among the various categories.

### *Task Difficulty*

Members of the household were frequently referenced in this category. Helpful and supportive flatmates made tasks significantly easier, but opposition at home could make tasks significantly more difficult:

The other day my flat mate yelled at me! I was trying to be good and keep up my energy saving by turning off the heater! The room had already heated up very nicely and there was no point in keeping it on so i turned the heater off, instae of agreeing on what a fantastic idea it was he screamed at me that he was still cold and that if he wanted to keep the heater on he should be allowed.....this is what im up against.... (P041)

The effect was magnified by numbers, in accordance with social impact theory (Latané, 1981). Difficulty eased when participants were able to recruit allies in the household.

Yay! we have finally moved house and i have discovered that it is far easier to get 2 other people to do things to help save the planet than 9! (P044)

Also seen it is now just me and my boyfriend and not our flat mate it is easier to convince [name] to have shorter showers and turn off things when he is not using them as there is not someone around constantly turning everything back on! (P041)

### *Personal Capacity*

Social aspects of the personal capacity element were not strongly evident, but there was some discussion of personal ability to influence others. This participant discovered an ability to change others through a persistent interaction style:

I have discovered that a little pestering to make people think about their actions can actually help this situation of over consumption that we face, and by making things regular they easily become a habit that needs no thought. (P151)

### *Resource Availability*

Social aspects of the resource availability theme were not prominent, but included situations where resource needs were met by their social network:

We have a sort of barn/house thing in Otaki Forks which I thought was nothing special, but upon discussing it with my parents I found out that the electricity for the entire house is supplied by a hydropower generator that they installed in a nearby river, which also supplies all the water as well. This means everything the house effectively does – heating water, lighting, cooking – is carbon neutral... (P148)

### *Cost/Benefit*

There was no role for social influence in this category, which involved an abstracted accounting of non-social costs and benefits.

### *Self-Presentation*

Self-presentation was proactive and internalised, existing entirely within the participant's perception of the social environment (Leary & Kowalski, 1990). This meant social influence in this category was inferred and anticipatory rather than actively experienced. However, this could still be powerful. The desire to be seen as a good category member is a key prediction of the social identity perspective (Turner et al., 1999), and in line with this, several participants explicitly noted that they were strongly influenced by their desire not to present as a bad group member.

Being in a group has been useful for this as I've found it harder to cut down shower time than to cut down electricity use. I guess this is due to feeling alone 'I'm the only one doing this what's the point' where as if I didn't save power I'd be letting the group down. (P157)



### *Personal Interest*

Degree of personal interest was also subject to social influence. Formal or informal competition increased the interest of many participants, as did evidence of interest from high-status others:

My bags nowhere near full. The keeping rubbish thing has helped a lot. Its bought out the competitive side in me which means that I'm gonna beat all of you.. I'm that awesome at this no rubbish thing. Scared? You proably should be. LOL. (P147)

I work for a youth agency tied in with the catholic church. Each year they have a social justice week - this year it is on the environment. It was really cool to have the environment be an issue in both fields - so often my uni and work life and so far apart. (P161)

### *Frame of Mind*

Social influences could have a significant impact on frame of mind. Mockery and insults had a predictably negative effect, while supportive environments were positive. Participants frequently mentioned their enthusiasm immediately following action group get-togethers and how the commitment of others motivated them.

It's hard to remain passionate about saving our environment when people take the piss out of you. (P167)

Feeling enthusiastic about saving energy after our Social Psychology Lab, the first thing I did when I arrived home was to turn off all appliances that weren't being used off at the wall. (P180)

it's amazing what can be achieved through a group as opposed to an individual's effort. I can honestly say I would have never bothered to go to all this trouble if I was doing the project myself - and this isn't just because it would seem too much effort or that I would have been too lazy - I think it's more that I would've doubted myself or not have had the motivation to keep going. (P148)

### *Effort*

Practical assistance on a task would reduce effort requirements, but apart from this effort was not associated with social influence; rather it was seen as a highly personal burden.

### *A narrative of agency*

In reviewing how participants responded to and used the eight categories of influences, it was possible to construct a higher-level structure. Influences that were talked about in similar ways were grouped together into higher-level groups, and the relationships between these groups were reviewed to construct a model of behavioural production reflecting the participant's own views. In the constructive realism framework described by Hwang (2003), this generated a depiction of the participant's lifeworld. It can perhaps best be understood as a narrative of agency in the sustainability domain.

#### *Is it possible to do anything? (control)*

Three categories of influence related to how participants determined whether they could actually engage in an environmental behaviour: task difficulty, personal capability, and resource availability. These influences tended to be the first considered by participants in relation to any given action, and could stall even an actor with energy and enthusiasm. When participants said they had not taken action due to these issues, there were no attributions of guilt or responsibility attached, and often no elaboration at all was offered, the issue itself serving as a self-sufficient argument (Augostinos, Lecouteur & Soyland, 2002).

#### *Is it worthwhile to do anything? (judgement)*

Three influence categories related to participant judgements about the value of the action: cost/benefit, self-presentation and personal interest. The participant narrative requires judgements about each of these concerns before a decision to act is made. Judgement is presented as a process of reflection and evaluation. Participants often described this as an internal balancing act, or an internal conversation. Participants expected themselves to be rational and dispassionate in these evaluations, and judged

themselves harshly when they caught themselves failing to live up to these standards:

Then went for a drive, had a long as shower even longer than usual and had the heater on just to feel comfortable and happy and wasn't bothering about the assignment for the moment, telling myself stupid excuses like it would be a good comparison, plus haven't done the first meter reading. as well as it being my birthday was an excuse to not worry about it for the moment, it's a time to relax and do what I want, and thinking everyone does it. (P029)

The outcome of this process is a decision to either act or not act. If a decision to act is reached, then the participant also assumes responsibility to carry out the action. Decisions not to act usually appeared in participant diaries with detailed rationales explaining the basis of the decision.

#### *Carrying out the action (execution)*

The frame of mind and effort categories related to difficulties involved in actually carrying out a decision to act, what Baumeister, Bratslavsky, Muraven and Tice (1998) describe as "executive function". Even when a person was interested in acting and believed it worthwhile, they could encounter problems in following through.

Despite my ideals of wanting to do something about the environment and help to ease global warming I've found it rather difficult to actually take action. To actually go around turning things off every night. (P157)

When discussing difficulties in actually carrying out an action, participants emphasised transient personal factors. These were not seen as valid excuses and were often taken as evidence of personal weakness. Guilt was strongly associated with failure due to these influences.

I've kinda been focussing on other papers and stuff and so I've sort of just forgot to be green. which is a shocking excuse really. (P014)

This participant succinctly links the various aspects of this stage:

Today is a beautiful sunny day... and so I'm thinking I should really make an effort to hang the washing I did outside... but soooooo can't be bothered! Will try to though because otherwise I'll feel guilty! (P023)

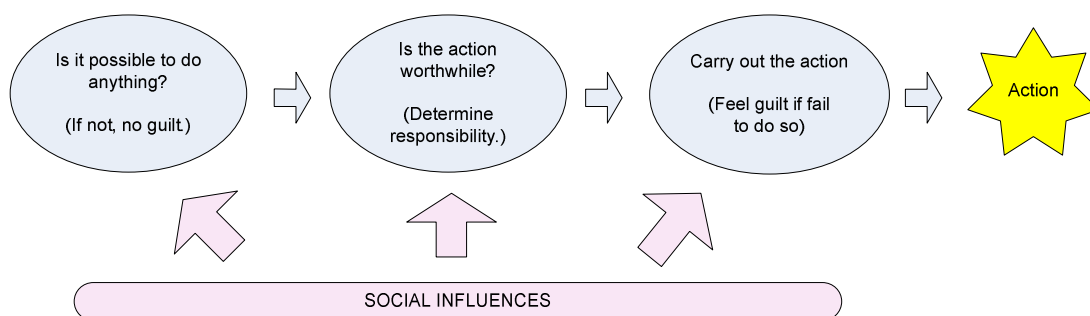
Interestingly, while failures of execution were often associated with self-

recrimination and feelings of guilt, this association seemed to disappear when the failure was on a “second-order” task. For example, many participants who were working towards being more responsible consumers reported their failure to research the origins of food products, but in not one case was guilt or shame mentioned in this context. This indicates that the construction of tasks was highly self-serving – participants appeared to treat “second-order” tasks as obstacles (control issues) rather than subsidiary commitments, such that failure to perform these was treated like encountering an obstacle rather than failing to carry out a decision to act.

### *Overview*

Overall, this amounts to a staged narrative of sustainable behaviour in which each individual carefully weighs up their thoughts and feelings on an action before deciding to pursue it, the decision creates a responsibility to follow through, and failure to carry out a decision is reason to feel guilty and disappointed with oneself. However, no guilt is needed if failure was due to an inability to act or if the action wasn’t seen as worthwhile. A diagram of this participant narrative is shown in Figure 7.

*Figure 7. Participant-perspective narrative of behaviour process*



### *The participant narrative as attributional device*

Hwang (2003) notes that the lifeworld is not a passive structure, but is used by the individual to orient them towards meaning. In the present case, the narrative can be understood as a tool for determining responsibility and guilt; that is, to determine when one has a responsibility to act on sustainability matters, and when one should feel guilty about inaction. As such, this narrative was essentially an attributional device. Attributions theory (Weiner, 1985) is concerned with how causes of behaviour are interpreted or assigned, and there has been a strong line of research linking attribution types to particular emotional consequences. Guilt has been a particular subject of interest (Weiner, 1985). Peterson and Schreiber (2006) recently found in a vignette study that internal attributions of low effort were associated with feelings of guilt, while Tracy and Robins (2006) found guilt was associated with internal and unstable attributions in a study eliciting the participants' emotions and attributions about themselves. It would be expected that a participant narrative that is an attributional device should show the same associations.

As each of the eight identified categories is, potentially, a reason for success or failure at behavioural performance, each category should relate to one or more types of attribution. A synthesis model of attributions advanced by Martinko and Thomson (1998) provided the best match to the present data. This model combined Weiner's (1985) achievement motivation model and Kelley's (1973) attributional cube into one explanatory structure. The key dimensions in this synthesis model are consistency/stability (whether the person behaves the same way at various times); distinctiveness/globality (whether the behaviour is distinct to this situation or occurs in other situations); and consensus/locus of causality (whether other people in the same situation would behave the same). Note that Martinko and Thomson (1998) omit

Weiner's (1985) controllability dimension, arguing that it is not independent of the locus of causality dimension and thus is also equivalent to the consensus dimension.

The majority of influences related to the "control" stage of the narrative equate to attributions that are stable and external. Task difficulty stable across time, external to the person and specific to the task. Personal capacity is stable across time, internal to the person, and will usually be specific to the task in question. Resource availability is unstable across time, external to the person, and will usually be a global situation – if the person has no money to buy expensive organic food, they also have no money to fix the hot water cylinder.

Influences related to the exercise of personal judgement equate to attributions that are external to the person and related more to general environmental concerns than to specific tasks. A claim that an action was not performed due to net costs is an attribution that is external to the person and highly specific to the task in question. It is also unstable across time because the particular array of costs attendant on an action can shift due to broader contextual factors, most obviously in the price of fuel which goes up and down and changes the cost/benefit calculation of choosing public transport over driving. A claim that an action was not performed because of the self-presentation consequences is an attribution that is stable across time because publicly-held views on a particular behaviour are very slow to change (and, indeed, this slow change is part of the impetus of the present series of studies). This attribution is also external to the person as the same social judgment would fall on anyone who acted in this way, and it is not distinctive to the specific task in question because social judgements that guide self-presentation apply to whole classes of behaviour and do not necessarily take heed of the specifics of a situation. Personal interest relates to attributions that are internal to the person, and stable across time because personal views on a particular behaviour tend to be slow to change, but not distinctive to the

specific task in question because personal interest is generally applied to a class of behaviour rather than a specific task.

Influences relating to carrying out a behaviour emphasised internal attributions and transient personal factors and limitations. “I’ll do better from now on” was a frequent comment in relation to these factors. Frame of mind was linked to attributions that were global rather than specific, as they applied to all tasks the participant could have undertaken at the time in question, while effort was linked to attributions that were specific to the task in question as each task had its own particular effort requirement.

Each of the eight identified categories of influence is related to a different cell in the Martinko and Thomson (1998) synthesis model (see Table 35). This precise and comprehensive fit was a considerable surprise, especially considering attributions theory was not consulted until after the eight elements had been identified. This suggests that the Martinko and Thomson synthesis model provides a good account of the behavioural influences of the participant narrative. Furthermore, it can be noted that the categories associated with guilt in participant narratives are related to internal and unstable attributions, in agreement with the findings of Tracy and Robins (2006).

Table 35. Elements of behavioural influence mapped on to synthesis model of attributions, Martinko & Thomson (1998)

		Consistency			
		High (stable)		Low (unstable)	
		Distinctiveness High (specific)      Low (global)		Distinctiveness High (specific)      Low (global)	
Consensus	High (external)	Task difficulty	Self- presentation	Cost/ benefit	Resource availability
	Low (internal)	Personal Capacity	Personal interest	Effort	Frame of mind



## Discussion

Analysis of participant discussion about the influences on their behaviour identified eight separate categories of influence, which in turn were used to construct a narrative of agency as perceived by participants themselves. The narrative appeared to be an attributional device, deployed by participants to determine whether or not they had a responsibility to act and whether they should feel guilt for not doing so.

This study was intended to resolve key questions that arose out of studies one and two, concerning the sufficiency of the picture of motivation given by the theory of planned behaviour model, and the role of groups in participant behaviour. These questions are addressed in turn.

### *Participant narrative and the theory of planned behaviour*

These results provide significant insight into the theory of planned behaviour and its application in the sustainability domain. Hwang (2003)'s constructive realism framework advocated relating the scientific microworld (in this case, the TPB model of behavioural production) to the lifeworld (in this case, the participant's representation of their own behaviour process). This comparison is particularly appropriate as the TPB model of behaviour is based on participants' rationales for their behaviour as recorded by survey questions. The participant narrative constructed here is an alternative account that is unconstrained by the survey questions of the TPB. Similarities between the TPB and the narrative lend support to the validity of the TPB, and discrepancies indicate areas where the TPB model may be lacking. Eight categories of behavioural influence were identified in analysis. By relating each of these to the TPB model, the sufficiency of the model could be tested. Relationships between categories in this analysis and the TPB were evaluated with particular reference to examinations of the TPB variables (Ajzen, 2001; Ajzen, 2002b; Armitage

& Conner, 2001) and the ideal form of the survey questions for each variable (Ajzen, 2002a). Table 36 shows how the categories were matched to TPB variables, along with an example of the kind of concern addressed by each in reference to the sustainability action of “switch to buying organic groceries”. Also included, for reference, is the attribution type linked to each category.

*Table 36.* Categories of behavioural influence mapped on to TPB variables and attributions

Influence	TPB Variable	Example concern	Attribution
Task difficulty	PBC (capacity)	Can I find organics on sale?	Stable, specific, external
Personal capacity	PBC (self-efficacy)	Do I know what to buy?	Stable, specific, internal
Resource availability	PBC (controllability)	Can I afford it?	Unstable, global, external
Cost/benefit	Attitude (instrumental)	Is it worth paying that much?	Unstable, specific, external
Self-presentation	Norms	Will people call me a hippy?	Stable, global, external
Personal interest	Attitude (experiential)	Do I actually care about the environment?	Stable, global, internal
Frame of mind	Intent	Will I remember?	Unstable, global, internal
Effort	Intent	Can I be bothered?	Unstable, specific, internal

Influences related in the ‘control’ stage of the narrative were close matches to the TPB variable of perceived behavioural control. Task difficulty was particularly linked to capability aspects of PBC as captured in questions such as “If I wanted to I could...” and “For me to do [action] would be (impossible – possible)”. Personal capacity relates to the capability aspects of PBC and also self-efficacy (Armitage & Conner, 2001). Resource availability relates to the controllability aspects of PBC as elicited by such questions as “How much control do you believe you have over...” (Ajzen, 2002a).

‘Judgement’ stage influences were related to the attitudes and social norms predictors. The cost/benefit calculation relates to the particularly the instrumental aspects of attitude, as captured by questions using adjective pairs such as *valuable* — *worthless* and *harmful* — *beneficial*, while personal interest relates to the experiential aspects of attitude captured by adjective pairs such as *pleasant* — *unpleasant* and *enjoyable* — *unenjoyable*. The evaluation of self-presentation consequences relates to the perceived social norms predictor, as captured in question forms such as “Most people who are important to me think that...”.

Relationships between the above influences and the TPB are relatively straightforward, suggesting that the TPB variables can do a good job of capturing influences on intent in this domain, provided questions are designed appropriately. However, influences relating to carrying out the behaviour do not have such a clear relationship with the TPB. The intent construct and the executive factors theme both describe the crucial step of linking the deliberative mode of evaluation to the performance mode of the action in progress, but the intent measure questions in the TPB, as formulated by Ajzen (2002a), are distinctly lacking in their ability to account for frame of mind and effort (“I intend to...”, “I will try to...”, “I plan to...”).

Aspects of frame of mind to do with remembering to act have been examined

through implementation intention experiments (Gollwitzer & Brandstatter, 1997; Sheeran & Orbell, 2000; Sheeran, Conner & Norman, 2001), where participants make a specific time-and-place plan for carrying out their intention, improving the relationship between intent and behaviour. Other frame of mind factors, such as mood, have not been investigated in this way. Ajzen and Fishbein (2005) treat mood as one of many background factors that feed into beliefs, on which the three main predictors are based, but if mood and remembering to act are part of the same category as was argued here, then mood should also moderate the intent/behaviour relationship, suggesting that Ajzen and Fishbein characterise mood incorrectly.

Effort is harder to relate to the TPB. It might be argued that effort should be included in the TPB attitude measure, as the experiential side of attitudes (Ajzen, 2002a) addresses whether the behaviour is enjoyable or not, and effort could be included as a factor that makes a behaviour more or less enjoyable. (Similarly *pleasant/unpleasant*.) However, this is insufficient for two reasons. Firstly, effort requirements as perceived in advance would not necessarily correlate closely with final effort requirements, because effort is heavily contextualized and subjective. Secondly, because it is possible to respond to attitude measures without considering effort at all, it cannot be presumed that survey respondents would adequately account for what is apparently an important influence on behaviour.

It has been argued by Schultz and Oskamp (1996) that effort should be considered part of PBC, because perceptions of a behaviour's ease or difficulty include effort. While this latter observation may be true and effort may form part of a behaviour's ease or difficulty, PBC measures do not usually tap into ease or difficulty as they relate to effort, asking instead about capability and controllability (Ajzen, 2002a). Evidence from study three in this research also suggests that effort is a distinct concept for its connection with issues of guilt and responsibility, which is not shared with other

aspects of PBC. Effort and control are, therefore, distinct dimensions. A high effort, high controllability task would be something that was hard to do, but ultimately under the performer's control, such as choosing each day whether to take the elevator or use the stairs. A low effort, high controllability task would be easy to do and under control, such as turning the light off upon leaving a room. A low effort, low controllability task would be easy to do but not under full control, such as putting recyclable waste into the right sort of bin (which requires having access to the proper facilities, or knowing where to find them). Finally, a high effort, low controllability task would be both demanding and not under control, such as trying to change to a more sustainable diet while residing in a hostel where meals are provided and there are no kitchen facilities in the rooms.

Effort should be considered most closely related to the TPB intent construct. When effort does appear in theory of planned behaviour studies, it is seen simply as evidence of strong intent (e.g. Ajzen, 2002b: "A high level of perceived control should strengthen a person's intention to perform the behavior, and increase effort and perseverance"). This may be correct as far as it goes, in that greater intent (or more properly, greater motivation) should result in greater expenditure of effort, but it obscures the fact that intent/motivation is not the same thing as effort; that effort, in fact, indicates the process of moving from intent to performance. Furthermore, there is evidence that effort demands can determine the importance of intent in the model: Bagozzi, Yi and Baumgartner (1990) found that relationships between attitudes and behaviours were moderated by intent when the behaviours required effort, but were direct when no effort was required. This finding could even suggest that some degree of effort is a prerequisite for the applicability of the reasoned behaviour models.

The poor comparability between the effort and frame of mind categories of influence and the TPB intent measure suggests that intent in the TPB may be missing

some crucial aspects. The nature of this construct is reviewed in the discussion following.

### *Social influence and the group effect*

A core prediction of attributions theory (Heider, 1958) is that success is attributed to internal positive factors rather than external support, while failure is attributed to external influence rather than internal weaknesses. This suggests that the social influence reported by participants should focus largely on negative influences, and so it proved. Social influence as reported by participants was overwhelmingly about negative experiences and obstructions. In particular, the household loomed large in participant accounts as a source of frustration and complication. As students often live in shared spaces in which power and status must constantly be asserted and negotiated, they are particularly vulnerable to opposition at home. Many households were unreceptive to changes suggested by the participant, and some households actively worked against the participant. This could result in the participant questioning the worth of the action (revisiting their judgement), or losing enthusiasm for persisting (a failure of effort or frame of mind).

Compared to the household, the action group was discussed not nearly as frequently. It is likely this was partly because the diary entries were also communications among group members, so comments about the group would be made knowing other members would be reading. Furthermore, groups were supportive institutions, and thus tended to be overlooked by participants attributing the causes of their success (Heider, 1958). Nevertheless, many participants did comment on how the group had positively influenced their behavioural outcomes. For some participants, group membership was seen as substantially responsible for success in pursuing desired behaviour change. Some participants noted that their group encouraged them

to greater efforts:

I feel that being a part of this group motivated me to keep up what I was doing. After all, I didn't want to let the group down, I wanted to contribute. (P122)

...the main reason I've been making an effort is because you guys are and I don't want to be the slack one. Obviously that's why they put us in groups. But the problem is that once the group is gone my main motivation will be gone too. (P108)

Other participants emphasised how working as a group made the task interesting and built up enthusiasm and motivation:

I found that since we were doing everything as a group, feeding off each other's enthusiasm and interest in the project, we all grew more motivated and more interested in participating as time went on. (P179)

I don't think that this is something that I would do by myself and that being in a group and having an assignment on it (or 2) really helped with motivation. (P157)

Participants also reported benefit from simply knowing they were not acting alone:

Doing this in a group situation helped me the most when I heard of my other teammate's improvements and successes. I think I would have given a half-assed effort if I had attempted this myself. Although our group did not really meet regularly, and we only talked about our actions around lab time, or just read each others' diary entries, I think that it was an important factor to have just felt like being in a group, rather than being on your own. (012)

Of course, not all groups were seen as supportive in this way. Some participants found the requirements of group participation to be irrelevant or even irritating.

I think the discussion forum was good by allowing us to log in and talk to each other directly (especially for our data) and get ideas, but to be honest I don't think it's made much of a difference to power consumption.. It was more of a chore than anything. (P152)

Still, overall there was a clear trend for participants to report that the group helped them achieve success. This suggests that there was some kind of group effect that worked to improve the relationship between intent and behaviour. As has been noted, studies one and two did not provide evidence of such an effect for the group identification measure. By linking the qualitative data to the quantitative data it is



possible to establish that group identification is a poor measure for the group effect. There is evidence that group support was felt even when group identification was low. For example, P122, quoted above claiming extra motivation from the desire to not let the group down, recorded a group identification score of only 4.22 in the first study, barely above neutral on the 7-point scale and nearly 1.5 standard deviations below the mean (which was 5.22; see Table 2). Similarly, P157 is quoted above saying that the group was a great help with motivation, but this participant's group identification score of 5.11 was also below the mean and fairly close to neutral. Of the other participants quoted for noting positive group influence, P108 was slightly above the mean at 5.67, P012 recorded a group identification score of 6.22 and P179 a score of 6.56, indicating that positive diary reports of a group effect were associated with a range of group identification scores. These are anecdotal examples, of course, but they support the conclusion advanced in discussion of study two that there was a group effect at work in the data but it was not related to group identification. The nature of the group effect, if it is not group identification, is considered in discussion following.

This study has used simple qualitative analysis techniques to categorize the kinds of behavioural influence reported by participants, and to derive a participant narrative of behavioural production from these accounts. This suggested that participants used their understanding of behavioural influences to determine guilt and responsibility. The narrative appeared to fit well with the theory of planned behaviour except for the intent construct which was poorly matched to the effort and frame of mind influences in participant accounts. Finally, there was evidence of that a group effect on behaviour did exist but had not been appropriately operationalized in studies one and two.



## Conclusion

In this series of three studies, an intervention programme for the performance of sustainability behaviours was examined. Participants divided into small groups and chose a focus domain in which to improve their behaviour, either energy use or consumer responsibility. It had been expected that this programme would support participants to significantly improve their behaviour, that the relationship between participant attitudes, intent and behaviour would be as predicted in the theory of planned behaviour (Ajzen, 1985), and that greater identification with the small group would be associated with greater performance on the task.

Study one was hampered by the lack of effective behavioural measures. Single-item measures were used for the two domains, reducing the validity of analyses involving the performance variables. Nevertheless, there was clear support for the efficacy of the programme in improving behaviour, and for the theory of planned behaviour model, although there was no support for an effect of group identification. Unexpectedly, the results showed differences between participants who selected an energy focus and participants who selected a consume focus.

Study two examined a refined version of the intervention programme that was delivered a year after study one. Importantly, the behaviour measures used in study two were very effective and appropriately captured performance in the two domains, energy use and consumer responsibility. The programme was once again found to be effective, with participants achieving greater improvements in behaviour than the previous year (perhaps due to better measures, perhaps to a more successful programme). The applicability of the theory of planned behaviour was supported, but again there was no effect of group identification. There were also differences once again between the participants based on their choice of domain focus.

Study three was a qualitative study reviewing participant diary records collected during study one. Analysis of participant accounts identified eight categories of behavioural influence and produced a participant narrative of sustainability behaviour with an orientation towards assigning guilt and responsibility appropriately. Categories of influence closely matched Martinko and Thomson's (1998) synthesis model for attributions and the narrative aligned well with the TPB but raised questions about the TPB's intent component. The qualitative data also provided evidence that group membership was effective in improving performance but that group identification was not an important variable in quantitative measures of this effect.

Overall, these three studies have provided strong evidence of the efficacy of the intervention programme and reasonable support for the applicability of the TPB to the sustainability domain. After reviewing the programme's success, two key issues raised by these studies are considered here in more detail: the intent component of the TPB in light of its relationship with the effort and frame of mind influences in study three; and the nature of the group effect if it is not based on group identification.

### *The success of the intervention programme*

This series of studies aimed to determine the effectiveness of a classroom intervention programme across two iterations. This was comprehensively achieved, with clear evidence that participant attitudes, intentions and behaviour all improved over the course of the programme. The programme itself was revised in a number of ways for the second iteration. These revisions were a product of feedback from and consultation with study one participants and a review of the successes of the programme. A descriptive overview of the behaviour change programme as it was used in study two is included as Appendix Three for reference.

The intervention programme introduced participants to media presentations and

background information presenting the case for change, arranged for them to work in small groups towards mutually-agreed behavioural goals, supported them with such resources as a schedule of meetings and an online communication facility, and added a structural incentive in the form of compulsory academic assignments that required participation. While there were no evaluations of the extent to which each aspect of the intervention programme contributed to its success, there was evidence of the positive effect of group membership in the qualitative data (although this was not echoed in the quantitative data). The other aspects were also cited by some participants as contributing to their success. No firm conclusions can be reached about which specific aspects of the programme were effective, nor is there any evidence in these studies about whether behaviour changes from the programme would last, but it is encouraging to see real change in participant behaviour emerging from a structured intervention in this domain.

Analysis of the success of the programme was complicated by the difficulty of finding good ways to measure behaviour. Weak performance measures made analysis problematic in study one, and improving the behavioural measurements was one objective of the extensive review of behaviour diaries begun for study three. Based on the behaviour actually recorded by participants, and informed by the measurement difficulties that had rendered many study one questions useless, an alternative question set for two domains was developed for study two. These measures were vastly more successful, with acceptable alphas (.690 and .764), high construct validity from large question sets grounded in actual every-day behaviours, and question structures that were not dependent on remembering too-specific details. With these improved behavioural measures study two was able to fully undertake the testing that had been piloted in study one. The new measures showed a greater degree of behavioural change than the study one pilot measures, perhaps due to their greater sensitivity and

perhaps due to improvements in the programme.

In both runs of the programme, differences were observed between the domains of energy use and consumer responsibility. There were signs that performance requirements differed between the two domains - that the domains placed different kinds of demands on participants and admitted different kinds of influences on behaviour. There were also signs that those who chose one domain focus were different to those who chose the other. To an extent these differences were confounded in the data, and it was difficult to distinguish them in many cases, but some signs of difference were clearly related to performance aspects or to participant characteristics. One negative consequence of these differences was their impact on the statistical power of the studies. The non-equivalence of focus groups and performance domains meant that categories could not be aggregated, and instead of one study with a large N, the participants were fragmented into multiple smaller-N groupings each requiring their own analysis and displaying their own patterns of results.

While differences between performance domains were in keeping with theoretical expectations and were not particularly surprising, it had not been expected that differences would be found between participants based on their choice of focus domain. It had been expected that choice of focus domain would deliver two groups who were equivalent in terms of the variables of interest in this study, but that proved not to be the case. Self-selection into energy-focus or consume-focus produced groups with different characteristics; in fact, group differences were clear even based on data that had been gathered before the focus selection had been made. Differences included:

- Participants in energy-focus groups performed well in their focus domain but not so well in the other domain, but participants in consume-focus groups performed well in both their focus domain and the other domain. This was true

in studies one and two.

- Consume-focus participants tended to have stronger starting associations between intent and performance than energy-focus participants, who improved over the course of the intervention. (This was true in study two, with the stronger behavioural performance measures.)
- In study two, consume-focus groups were felt to be more approving of the environmental behaviour change than energy-focus groups, indicated by a higher injunctive norm.
- Consume-focus participants scored higher on peer norms in study two, suggesting that they operated in peer groups that were positive towards sustainability issues.

From the different pattern of performance, it appeared that consume-focus participants were more engaged with environmental issues generally and more motivated to respond to them in a holistic way, as compared to energy-focus participants who engaged with environmental issues in a more task-specific way. The closer relationship between intent and performance suggests these participants began with a history of following through on environmentally-positive behaviour. Moreover, based on the peer norm and injunctive norm findings, they appeared to come from a social context that normalised and supported environmentally friendly behaviour, and to establish similarly supportive environments in their action groups. It is possible to speculate why people with these characteristics tended to choose the consumer responsibility focus more than energy conservation. Energy use is a fairly straightforward activity area with a high degree of personal control and good knowledge about what actions are appropriate to the goal, whereas consumer responsibility is more demanding and ambiguous with greater scope for personal learning and personal development. Participants with a holistic concern for the

environment and a track record of following through may have selected consumer responsibility as a focus because it promised to be much more interesting and worthwhile to their lives than the comparatively simple nature of the energy use focus.

### *Intention and the theory of planned behaviour*

These studies demonstrated that the theory of planned behaviour was a fairly effective model of behaviour in environmental domains. As expected, intent predicted behaviour and to an extent it mediated the effect on behaviour of attitudes, social norms and perceived behavioural control. In study two, intent alone accounted for around 9% of variance in energy use behaviour, and around 23% of variance in consumption behaviour, the second of which was in line with the average of 22% found by Armitage and Conner (2001) in their meta-analytic review of 161 reasoned behaviour studies. This application of the TPB therefore accounts for no more of the variation in behaviour than is usually achieved, leaving a significant portion of variance unaccounted for.

Qualitative analysis of participant diary entries in the third study revealed eight categories of influence on behaviour. Six of them were fairly well matched to TPB predictors attitudes, social norms and PBC. However, two categories of influence did not fit with the TPB model so cleanly and suggested that the TPB intent construct and intent-behaviour relationship could be missing some important influences on behaviour.

Remembering to act, being in the right frame of mind, and putting in the required effort were identified as important determinants of behaviour in participant accounts, but these are not a good fit with the TPB. These categories are united by a concern for the execution of an action, a concern represented in the TPB by intent and the relationship it has with behavioural performance. This relationship is a key concern of



the present studies and merits careful examination before considering the impact of present findings in this area.

Ajzen and Fishbein (2005) describe intent as “the closest cognitive antecedent of actual behaviour” (p.188). The TPB model expects that intent will mediate the relationship between behavioural performance and three key predictors (attitude to the behaviour, perceived social norms, and perceived behavioural control). The exact weight of influence from each of these predictors varies from behaviour to behaviour, but the combination of all three is expected to always predict behaviour, and intent is always expected to mediate the relationship (Ajzen & Fishbein, 2005). However, since the earliest reasoned behaviour model, Ajzen and Fishbein (1977) have been careful never to assign intent a causal role. What, then, is the precise role of intent in this relationship?

On examination, the intent construct appears to be a point of difficulty in the reasoned behaviour literature. Armitage & Conner (2001) note that a large number of TPB studies tap the intention construct inconsistently (Armitage & Conner, 2001), indicating that it is not defined with sufficient operational clarity for researchers to use it in a consistent way.

I suggest that a more precise conceptualization of intent should resolve some issues with the reasoned behaviour model and open up new ways of looking at behavioural production. Specifically, I argue that intent should be conceived not as a commitment measure, but as a forecasting measure. As it is measured in the TPB, intent questions are constructed to ask about future behaviour (Ajzen, 2002a), but it has been noted that some questions ask about expectation to perform the future behaviour, and some ask about commitment to do so (Warshaw & Davis, 1985). Needless to say, these ratings can be far apart for some individuals, for example those who make a commitment but perceive themselves as low in self-efficacy (Bandura,

1982). However, the majority of the population should correlate well on these measures; indeed, in the present study two, the intent measure used two questions and scored alphas above 0.9. When commitment and forecasting correlate highly the two measures will be of equal predictive use. Armitage and Conner 's (2001) meta-analysis found little difference between commitment and forecasting measures as predictors of behaviour in the TPB, suggesting that they will frequently correlate well. However, even if the predictive utility of the two kinds of intent is equivalent, their explanatory role is quite different, and they have different consequences when considering measurement and interpretation issues in the TPB, and particularly when trying to identify potential moderators of the intent/behaviour relationship as in the present study.

It is suggested that the two types of intent questions reflect distinct concepts. Intent measures that ask about commitment measure *present* disposition towards the action, the summed total of attitudes, social norms and PBC at the time of the measurement. Intent measures drawing on expectation are a prediction of *future* disposition, the summed total of attitudes, social norms and PBC that will hold at the time of behaviour performance. High correlation between these aspects indicates that the individual uses their present disposition as the basis of predictions for future disposition.

In the TPB model, future behaviour is the object of interest. The intent construct in the TPB is therefore deployed as a forecasting instrument, which prompts the individual to anticipate a future situation and forecast how they will act in that situation. In other words, the intent measure is really a proxy for future disposition. It can only be as reliable as the accuracy of the forecasting, or the extent to which current disposition is likely to remain in place at the time of the behaviour. (There is an obvious parallel to perceived behavioural control, which is a proxy for actual

behavioural control at the time of the behaviour.) It therefore follows that the expectation aspect of intent is of the greatest importance. Warshaw and Davis (1985) argued that behavioural expectations were the better predictor of behaviour for similar reasons.

Against this view, Armitage and Conner (1999) argued that the PBC construct should account for the extent to which commitment may not match final behaviour, and therefore that a forecasting measure would be redundant and less useful than the commitment measure. However, the results of study three provide evidence that there are many influences on behaviour that are not accounted for by the PBC measure, such as effort and frame of mind.

This perspective on the TPB's intention measure suggests that the high variance found in its predictions of behaviour (Armitage & Conner, 2001) is a function of the accuracy of the actor's anticipations. Two sources of inaccuracy suggest themselves. Firstly, there could be a change in the actor's attitudes, perceived norms or perceived behavioural control between the time of the intent measure and the time of the behaviour (Webb & Sheeran, 2006). An effective counter is to limit the time available between measuring intent and performing the behaviour, thereby limiting the opportunity for change. Another counter is to ensure that intentions are robust and resistant to change. Intention stability is seen as a good way to establish confidence in an intention; Ajzen (1991) identified stable intentions as a prerequisite for accurate behavioural prediction, and Sheeran and Abraham (2003) used intention stability as a measure of intention strength. Intention certainty has a similar role (Skår, Sniehotta, Araújo-Soares & Molloy, 2008).

Secondly, there could be unanticipated additional influences on behaviour. The TPB confines itself to those influences that can be anticipated and included in the intent measure. While variance in the intent/behaviour relationship undoubtedly

includes subject and situational factors that are rightly treated as noise, it is possible that it also contains other regularised components as yet unmeasured by the TPB. In fact, the TPB has been criticised for its apparent eagerness to treat as noise or interference anything that cannot be contained within its current structure (Deutscher, Pestello & Pestello, 1993). These influences could directly contribute to the prediction of behaviour, summing with the anticipatory intent measure to decrease the amount of variance in behaviour; or they could serve as moderators, interacting with the intent measure so it becomes more or less predictive. A good counter for this source of inaccuracy is to build understanding of the influences at work in a domain of behaviour, and ensure the participant is aware of them so their intention prediction bears closer relationship to later disposition.

Overall, this perspective on intention suggests a way to specifically explain how moderation of the intention effect on behaviour should operate. A positive moderating influence would be one that either makes anticipatory estimates more predictive of final disposition, or enhances the stability of disposition from the time of intent measurement through to the time of behaviour.

Frame of mind was identified by participants in study three as an influence on behaviour and a potential moderator of the intent-performance relationship. It incorporates effects related to self-regulation and vigilance, such as memory and mood. These effects cannot be easily controlled or predicted and can and therefore frame of mind is an obvious source of 'noise' in the intent/behaviour relationship. When a study participant indicates their intention to perform a behaviour, they cannot possibly account for whether they will remember to do so or not, or whether they will be in a positive mood or not, at the future time when the behaviour should be performed. As such, frame of mind is capable of moderating the intent-behaviour relationship. While it is unlikely that a participant can directly predict their future

frame of mind, if frame of mind elements are to some degree based on personal traits that are relatively stable (e.g. stability of mood over time: McConville & Cooper, 1999) then it is possible that self-assessments of such traits might be useful parts of a forecasting intent measure.

Effort was also identified as of importance in study three. The expenditure of effort can vary from task to task (perhaps based on frame of mind), effort requirements for future tasks can be underestimated, and effort itself is a limited resource that can be expended on other activities before the action of interest. For all of these reasons, effort too is capable of moderating the intent-behaviour relationship. Controlling for effort in the TPB could be accomplished by imposing a structure to regulate the amount of effort expended, by accounting for other effort demands, or by training actors to anticipate future effort expenditures more accurately.

The hypothesised group effect in the present studies would also have been a moderator. Group membership (with sufficient identification and appropriate group norms) is presumed to force actors to remain aware of and beholden to their attitudes and beliefs after the intent measure is taken, resulting in a greater resistance to attitude/belief change. Social comparison processes should have regulated effort expenditure by keeping the task salient with social consequences for failure. Group reminder processes should have assisted with vigilance. Together, these effects offer some possible explanations for the variance in performance that was not explained by intent.

The executive factors of effort and frame of mind clearly develop understanding about the relationship between intent and performance in the reasoned behaviour model, particularly in the sustainability domain. More generally, they demonstrate the value of reinterpreting the intent construct as a forecast rather than a commitment, and suggest how the reasoned behaviour model might fruitfully be adjusted to explain

more variance in performance.

### *Identity and the group effect*

This series of studies aimed to demonstrate the positive effect of group membership on efforts to increase sustainable behaviours. Unfortunately, the predicted group effect was absent from two successive quantitative studies. However, there was evidence in the third, qualitative, study that group membership was indeed a positive influence on behaviour change. Overall, it seems likely that there was some kind of positive group effect supporting behaviour change, but not one based on group identification as it was measured in studies one and two.

The action group was initially conceived as a source of motivation to follow through on environmental intentions and turn them into behaviours, and to assist members through information sharing and social support. In the two quantitative studies, it was expected that identification with the action group would vary significantly among participants and determine the strength of the intent-behaviour relationship accordingly. As expected, identification varied from relatively neutral to high and behavioural outcomes improved significantly, but the predicted moderation effect was not found in either study one or study two. Furthermore, Terry and Hogg (1996) and Terry et al. (1999) had found that group identification moderated the relationship between group-based injunctive norm and intent, but this was not found to be the case in either study. It is important to examine why identification failed to have either predicted effect.

The most obvious potential explanation is that the prediction of a group effect was simply unfounded. However, the qualitative data in study three did suggest that group membership enhanced the performance of the chosen behaviour, and discussion of the intent measure above identifies an exact process by which a group moderation effect

could operate. As such, this explanation is unlikely to be correct.

A second potential explanation is that the group effect may have existed but was too small to be detected in the present studies. It is impossible to rule out this explanation, as the power of the quantitative studies was not particularly high. However, the absence of even a tendency in the direction of an effect makes this explanation unlikely as well.

As previously stated, the prediction relied on variation in the group identification scores, so it could be that this variation was insufficient. There is some merit to this concern. In study one, the mean score for group identification was 5.49 on a seven-point scale, with a standard deviation of 0.92; in study two, mean group identification at the end of the study was 5.93 on a seven-point scale, with a standard deviation of 0.93. In both of these cases, but particularly in study two, it is possible that a ceiling effect was distorting the data. However, given that a group identification score of four was the neutral point, the 5.49 score sits almost exactly on the mid-point of the positive half of the scale, suggesting that (in this study at least) identification was not particularly affected by a ceiling effect. Identification did have strong correlations with some TPB predictors in that study that were not present in study two, where the mean score was also higher. The study two mean was just under one standard deviation below the top of the scale. It is possible that this scale range may have suppressed variability sufficiently that a ceiling effect was in place. Overall, the evidence for a ceiling effect is not particularly strong across the two studies, but it cannot be ruled out.

The most likely explanation for the failure of the identification measure is that it was not functionally important to groups in the way expected. It had been predicted that group identification would indicate the degree to which a participant was actually a member of a group, and would also indicate how committed they were to the group,

the salience of the group, the sense of collective responsibility within the group, and their adoption of group-appropriate norms (Turner et al., 1987). Identification with a group was expected to indicate the extent to which the group was cohesive, and it was expected that cohesive groups would have reduced effort requirements, improved behavioural control, more problem-solving resources, increased commitment to goals, and increased ability to resist outside forces and to influence others. To conclude that a group effect would be measured by group identification requires a three-step chain of logic. First, group identification must indicate the degree of cohesion within the group; secondly, cohesion must determine the extent to which the group effect would be felt; and thirdly, the group effect should operate on the performance of the subject behaviour and not something else. Each of these steps can be considered in turn.

The present study does not provide any clear evidence that group identification was not associated with group cohesion. Groups that co-operated effectively and produced high numbers of friendships also tended to have high group identification scores among their members, and the converse was true for groups with co-operation difficulties and no emergent friendships among members. On balance, this link in the causal chain is likely to hold true.

The second link reveals some problems with the present study design. On reflection, it is apparent that groups in this study were supported by the structure of the intervention, and this may have rendered group identification irrelevant. Groups in this study were provided with a regular meeting time and place, an online hub exclusive to them, and regular participation in both meetings and online activity; group members had significant externally-imposed motivation to participate in the form of academic assignments that would be based on their experiences in the group; furthermore, they were required to perform tasks together and were encouraged to share their efforts even when it was not specifically required, and there were obvious division-of-labour



benefits to doing so. All of these structural supports for the groups would not be expected to naturally emerge from a low-identification group where attendance was optional and a minimum degree of participation was not enforced by circumstance. It is therefore suggested that identification should predict group cohesion and the group effect only insofar as it is associated with supportive group structures. In this case, all groups benefited from structures that would usually only be present in high-functioning groups, and the presence of the artificially imposed group structures across all groups resulted in no effect of group identification. (It is possible to speculate that this is why many group members reported such high levels of identification for artificially-generated groups, particularly in study two where the structures were designed with greater care: a cognitive dissonance effect (Festinger & Carlsmith, 1959) may have been in operation, such that participants sensed that their groups operated as though they were highly cohesive, and adjusted their levels of identification to match the conclusion that they were in cohesive groups.) However, standing against this interpretation is the fact that different groups varied significantly in the extent to which they used the resources – some groups frequently used scheduled lectures to support additional meetings, others did nothing beyond the minimum required; some groups made extensive use of the discussion forums, others did not. While this explanation is considered to be likely, it is by no means definitive.

The third link in the chain is also problematic. The intervention programme was embedded within an academic course of study, and some of the group-related activities were oriented towards passing the course rather than performing better on the group-chosen behaviour task. It was expected that a group effect would operate on both the academic and behaviour change tasks equally, but it is possible that the effect of group cohesion was felt only on tasks related to academic coursework and did not show up in behavioural performance measures, which tended to be conducted by

individual members in their own households. However, there is no obvious reason why group effects should work for one aspect of group-related activity and not another. Even solitary behaviour change was embedded in group processes of initial task selection, regular reporting and evaluation of opportunities.

It is tentatively suggested then that the predicted group effect may have gone unmeasured because it resulted from the ubiquitous presence of group structures that are characteristic of cohesive groups, rather than from group cohesion or group identification. Testing this suggestion is an empirical question for further study.

An alternative explanation for the failure of the identification variable is suggested by Staats et al. (2004) who used a similar paradigm and found that the experience of social influence was a key variable for group-context behaviour change efforts. It is reasonable to suppose that the experience of influence within a group might vary more or less independently of the degree of cohesion within a group, although some relationship would be expected. It may be that the sustainability domain is one area in which this relationship is weak, and therefore that social influence experienced would be the better measure of the group effect than group identification.

Turning to the findings of Terry and colleagues (Terry & Hogg, 1996; Terry et al., 1999), the failure to find a moderating role in relation to injunctive norm is presumably due to the difference in the nature of the group. The reference group in the Terry studies was that of a large self-identification category, that of being a student in the appropriate university. The reference groups in the present study were small, artificially created groups in a semester long laboratory programme. Identification with these two groups may have had different meanings and different consequences to the participants, explaining the lack of support here. Certainly it is the case that the structural support for the small action groups in this study was not present in the large studies of Terry and colleagues. Exploring whether the group identification effect

found by Terry and colleagues can transfer to different types of reference group is an empirical question for future study.

Finally on the subject of group identification, it is important to note that it was not foreseen that our laboratory-contrived groups would in most cases come into direct conflict with vigorous real-world groups, namely the participant's household. The evidence from study three suggests that the group's influence on performance was not as strong as the influence from housemates. In the structure of this study, it is clear the degree to which the home environment dominated the participant's behaviour was underestimated, and the degree to which the environmental action group would provide support for the participant was overestimated. Social impact theory (Latané, 1981) suggests that performance in a social context is enhanced in accordance with the power, the immediacy and the number of observers, and the environmental action groups were specifically structured to take advantage of these principles. Of course, the participant's housemates universally exceeded our laboratory-contrived groups in both power and immediacy, regardless of whether they were flatmates or family; moreover, they were often unsupportive of the environmental action, if not outright hostile to it. Nevertheless, the small and focused environmental action groups, supported by the presence of a teaching programme with a clear conclusion, were often able to assert themselves in the face of this countervailing force. Dynamic social impact theory (Latané, 2000) offers a model that is perhaps applicable to the persistence of the environmental group subculture, positing that similar opinions and purpose within the environmental groups worked to bind them together and shield them from the influence of the majority across their living environments. However, dynamic social impact theory might equally explain why the household group should resist attempts to make it environmentally friendly; the relative merits of these explanations is an empirical question beyond the scope of the present study.

## *Ways Forward*

The three studies in the present research suggest some important questions about the theory of planned behaviour, particularly its relationship to attribution theory, and the exact nature of the intent construct. More importantly, however, they provide good evidence for the positive effect of a group-based intervention programme in order to achieve behaviour change in the sustainability domain. Programmes such as these are urgently needed, and while the programme used here takes advantage of distinctive opportunities that may not generalise to other populations, it is hoped that the success of this programme will inform subsequent efforts to achieve sustainability behaviour-change goals.

Aside from the group-based intervention programme, a number of points of intervention are suggested in the present studies in order to achieve sustainability behaviour change. Study two found that in this domain attitude was an important predictor of intention, and intention an important predictor of behaviour, suggesting that using resources to develop pro-environment attitudes is not worthless, despite the common gap between attitude and behaviour; Webb and Sheeran (2006) had reached a similar conclusion, finding that an increase in intention did lead to a (smaller) increase in behavioural performance. The kind of promotional material discussed in the introduction therefore has a place in the attempt to deliver substantial behaviour change.

Of more interest are the findings related to actually turning intention into behaviour. Of these, the group effect and the presence of a structured programme seemed to deliver immediate and significant benefit. Study three showed that effort and frame of mind were both important factors in turning thought into action, suggesting that interventions that lower the required amount of effort and provoke

appropriate frames of mind would be useful in enhancing action performance, as would activities that build awareness and understanding in actors of how effort and frame of mind interact with behaviour, that promote sustained effort among actors, or that build stability in mood and increase the vigilance of actors. It had been suggested that a group effect would have some of these effects, increasing the effort the participants would spend and decreasing the effort required of them for example. This effect was not found using a group identification measure. Whether a different operationalization of a group effect (such as the degree of influence experienced from the group) enhances effort and similar qualities, and whether the enhanced qualities in fact improve the intent-behaviour relationship, are empirical questions for future study.

It should also be noted that study three found that effort was subjectively understood as not part of the cost/benefit calculation undertaken by participants. This suggests that manipulation of effort, particularly to increase it, cannot be achieved by increasing the value of the target behaviour or the costs of alternative behaviour. Effort itself needs to be targeted, it appears, in order to improve task performance.

The studies described here, particularly the first two, were based on the principles of action research, which includes a focus on providing useful information back to the community that supported the hosted the research (Altrichter, Kemmis, McTaggart & Zuber-Skerrit, 2002). The *ad hoc* community of participants, particularly those who volunteered to advise on preparations for the second iteration of the study, will be advised of these outcomes and circulated this research. In particular, this group can be advised that this research provides a cautious endorsement of the use of groups to support performance improvement: while no quantitative proof of this claim was found, there was evidence for a group effect in the qualitative studies, and groups were an important part of the intervention programme that delivered a clear improvement in

performance scores.

Applying psychological knowledge to achieve urgent social change is not new, even within the domain of energy use reduction (e.g. Yates & Aronson, 1983). However, this series of studies has undertaken something unprecedented by attempting to demonstrate that group membership can work to improve how we carry out our good intentions. Although the group identification measure was found to be inappropriate for capturing the group effect, there was clear evidence of the efficacy of an intervention programme utilizing groups, and also for the utility of the theory of planned behaviour in explaining behavioural production. This opens the way for further studies that may wish to examine these questions in more detail, and also to practitioners and community agents who may wish to apply the findings here to develop new, more effective intervention programmes.

## **Appendix One**

### **Survey questions for study one**

#### *Study one, first survey (t1)*

Theory of planned behaviour questions: Questions about the energy use domain used the phrasing below. Questions about the consume domain replaced the phrase “the amount of energy used in my household” with the phrase “the environmental impact of the goods and services I purchase and use”. Equivalent questions were also asked about transport energy use and recycling/waste management. All responses were on 7-point scales.

#### *Attitude questions:*

I think that reducing the amount of energy used in my household would be  
(Very negative – Very positive)

I think that reducing the amount of energy used in my household would be  
(Completely useless – Extremely useful)

I think that reducing the amount of energy used in my household would be  
(Very unimportant – Very important)

#### *Social norm questions:*

Most people living with me want me to reduce the amount of energy used in my household. (Strongly agree-Strongly disagree)

Most people at Victoria University want me to reduce the amount of energy used in my household. (Strongly agree-Strongly disagree)

Most people in my peer group want me to reduce the amount of energy used in my household. (Strongly agree-Strongly disagree)

Most people in society at large want me to reduce the amount of energy used in my household. (Strongly agree-Strongly disagree)

*PBC question:*

How much control do you have over the amount of energy used in your household. (Total control – No control)

*Intent question:*

In the next two weeks I intend to reduce the amount of energy used in my household (Strongly agree – Strongly disagree)

Behavioural performance questions: A large number of questions were asked that were drawn from online carbon footprint questionnaires. The majority of these proved unhelpful and have not been reproduced here, with the exception of the two questions used as single-item indicators of performance:

*Energy use single-item question:*

Over the last week, how many showers did you take?

- Less than 5 minutes long
- 5-10 minutes long
- More than 10 minutes

*Consumer responsibility single-item question:*

Approximately what percentage of your food is locally produced and/or organic? (0-100%)

Other questions: Other questions in the survey, some for the purposes of other studies, asked about:

- Demographic information
- New Environmental Paradigm scale (Dunlap, Van Liere, Mertig, & Jones, 2000)
- Belief in anthropogenic global warming
- Belief in the real value of personal environmental actions
- Degree of identification with the environmental movement.



- Extent to which different factors (comfort, opinions, etc.) influence behaviour.

### *Study one, second survey (t2)*

This survey asked participants questions for the purposes of other studies, about:

- Their belief in the real value of personal environmental actions
- The environmental friendliness of their general lifestyle
- Their opinion of the value of the group action

### *Study one, third survey (t3)*

Group identification questions: These questions use the Hinkle et al. (1989) scale to measure identification with the action group. All responses were on 7-point scales anchored with strongly agree/strongly disagree.

I identify with this group.

I am glad to belong to this group.

I feel held back by this group.

I think this group works well together.

I see myself as an important part of this group.

I do not fit in well with the other members of this group.

I do not consider the group to be important.

I feel uneasy with the members of the group.

I feel strong ties to this group.

Group injunctive norm questions: All responses were on 7-point scales anchored with strongly agree/strongly disagree.

The rest of my group believes what it was doing helped make a difference.

The rest of my group believes our actions were a waste of time and effort.

The rest of my group believed in what it was doing.

The only reason the rest of my group cared about the action was because it's a course requirement.

Other questions: The survey also included questions for the purposes of other studies, asking about:

- The environmental friendliness of their general lifestyle
- The environmental friendliness of their groupmates' general lifestyles
- Their opinion of the value of the group action
- Self-reported performance on the group action
- Rest of group's performance on the group action
- Support received from group for action
- Belief in anthropogenic global warming

#### *Study one, fourth survey (t4)*

Theory of planned behaviour questions: As in the first survey.

Behavioural performance questions: As in the first survey.

Other questions: Other included questions asked about:

- The New Environmental Paradigm scale (Dunlap et al., 2000)
- Belief in the real value of personal environmental actions
- Degree of identification with the environmental movement.
- The extent to which different factors (comfort, opinions, etc.) influence behaviour.

## **Appendix Two**

### **Survey questions for study two**

#### *Study two, first survey (t0)*

Theory of planned behaviour questions: Questions about the energy use domain used the phrasing below and were introduced with these words: “These questions are about the environmental impact of your energy use, which includes electricity and gas at home, petrol for your car, water heating, etc.”. Questions about the consume domain replaced the phrase “the amount of energy I use” with the phrase “the environmental impact of my consumption behaviour” and were introduced with these words: “These questions are about the environmental impact of your consumption behaviour, which includes buying organic, buying local, recycling, etc.”. All responses were on 7-point scales anchored with strongly agree/strongly disagree.

#### *Attitude questions:*

Reducing the amount of energy I use would be a good thing.

Reducing the amount of energy I use would be satisfying.

Reducing the amount of energy I use would be pleasant.

Reducing the amount of energy I use would be worthwhile.

#### *Social norm questions:*

My family think it’s a good idea to reduce the amount of energy we use.

My peers think it’s a good idea to reduce the amount of energy we use.

#### *PBC questions:*

The amount of energy I use is mostly up to me.

If I wanted to, I could reduce the amount of energy I use.

*Intent questions:*

In the next two weeks I intend to reduce the amount of energy I use.

In the next two weeks I expect to reduce the amount of energy I use.

Other questions: The survey also asked about:

- Demographic information
- Moral norms
- Belief in the real value of personal environmental actions
- The New Environmental Paradigm scale (Dunlap et al., 2000)
- The Environmental Attitudes Inventory (Milfont & Duckitt, 2007)

*Study two, second survey (t1)*

Behavioural performance questions: The following questions are all scored on a 7-point scale with the anchors “never” (1) and “always” (7). Some questions also had the option of indicating “not applicable”. Where this is the case, a note beside the question will indicate how an NA was scored in terms of the 7-point scale.

*Energy questions:*

About your living area...

1. How often does your household leave the television on stand-by or just leave it going when no-one is specifically watching it? [score NA as 1]
2. When it gets cold in the living area, how often do people in your household put on more clothes rather than using the heater?
3. How often does your household take other steps to limit heater usage, like closing the curtains at dusk and turning the heater off when the room is warm?

In your bedroom or private space...

4. How often are electronic devices in your room turned off at the wall when not in use? [score NA as 7]

5. When it gets cold in your room, how often do you put on more clothes rather than using a heater?

6. How often do you take other steps to limit heater usage, like closing the curtains at dusk and turning the heater off when the room is warm?

About hot water usage...

7. Do you stay in the shower a while after you've finished getting clean?  
[score NA as 4]

8. How often do you take baths instead of showers?

9. Do you take a shower or bath more than once a day?

About your cooking habits...

10. When cooking on a stovetop, how often do you leave the lids on your pots? [score NA as 4]

11. When cooking, how often do you boil water in the kettle, not on the stovetop? [score NA as 4]

12. How often do you deliberately cook extra food so there are leftovers?  
[score NA as 4]

13. How often does your household cook together and share meals?  
[score NA as 4]

14. How often are dishes washed by hand in your household?

About lighting in your home...

15. Does your household use energy-saving bulbs rather than regular ones? [score NA as 1]

16. Do you turn off the lights when leaving a room empty?

17. Do others in your household turn off the lights when leaving a room empty?

About your laundry...

18. How often do your clothes get dried in a clothes dryer? [score NA as 4]

19. How often do your clothes get washed in cold water instead of hot?  
[score NA as 4]

20. How often do your clothes get washed when the machine isn't full?  
[score NA as 4]

21. How often do you wear clothes more than once before washing them?

*Consume questions:*

About your grocery shopping habits

1. How often do you buy fresh food (e.g. fruit and vegetables, meat, herbs, etc.) as opposed to canned, dried, frozen etc? [score NA as 1]

2. How often do you buy frozen food? [score NA as 7]

3. How often do you buy processed food? [score NA as 7]

4. How often do you choose to buy locally produced (i.e. New Zealand made) food stuffs over imported? [score NA as 1]

5. How often do you buy organic food? [score NA as 1]

6. How often do you buy eco-friendly brand cleaning and/or personal products? [score NA as 1]

About where you do your shopping

7. How often do you shop at organic stores rather than the supermarket?  
[score NA as 1]

8. How often do you buy fresh produce from local markets rather than the supermarket? [score NA as 1]

About your cooking habits

9. How often do you include meat in your daily main meal?

10. How often do you cook meals from scratch? [score NA as 4]

11. How often do you cook and eat meals with your housemates? [note that this question is shared with the energy questions as it relates to both]

12. How often do you prepare your lunches at home?

About how much packaging you use

13. How often do you buy food in bulk (e.g. dry food stuffs like flour, rice, pasta, sugar, etc.)? [score NA as 1]

14. How often do you buy takeaways, instant meals from the supermarket, and other pre-packaged meals?

15. How often do you choose items with less as opposed to more packaging when doing your regular grocery shop? [score NA as 1]

16. How often do you use your own bags to carry your shopping home? [score NA as 1]

17. How often do you have hot drinks in disposable cups rather than using reusable mugs? [score NA as 4]

18. How often do you recycle the majority of your recyclable glass and plastic waste?

19. How often do you recycle the majority of your recyclable paper and cardboard waste?

20. How often do you compost organic waste?

Intent questions:

In the next two weeks I intend to reduce the amount of energy I use.

In the next two weeks I expect to reduce the amount of energy I use.

Other questions: Questions in the survey for the purposes of other studies asked about:

- Descriptive norms for consumption behaviours

### *Study two, third survey (t2)*

Behavioural performance questions: As for the second survey.

Group identification questions: These questions are drawn from the Hinkle et al. (1989) scale to measure identification with the action group. All responses were on 7-point scales anchored with strongly agree/strongly disagree.

I identify with this group.

I am glad to be in this group.

I think this group works well together.

I do not fit in well with the other members of this group.

I feel uneasy with the members of the group.

Group injunctive norm questions: Responses were on 7-point scales anchored with strongly agree/strongly disagree.

The rest of my group thought our action was a waste of time and effort.

The rest of my group thought our action made a difference to the big picture.

Other questions: The survey also included questions asking about:

- Descriptive norms for consumption behaviours
- Support received from the group
- Identification with, support received from and injunctive norm related to the household

#### *Study two, fourth survey (t3)*

Behavioural performance questions: As for the second survey.

#### *Study two, fifth survey (t4)*

Theory of planned behaviour questions: As for the first survey.

Behavioural performance questions: As for the second survey.

Group identification questions: As for the third survey.

Group injunctive norm questions: As for the third survey.

Other questions: Other questions asked about:

- The Environmental Attitudes Inventory (Milfont & Duckitt, 2007)



## **Appendix Three**

### **Description of intervention programme**

The intervention programme used in these studies used small groups and a programme of activities to promote sustainable behaviours among participants. All components of the intervention programme were completely transparent and signalled in advance to participants, in accordance with the principles of action research (Lewin, 1946/1948). Aspects of the programme related to groups were informed by the social identity perspective (Turner, 1999), the reasoned behaviour approach (Ajzen & Fishbein, 2005), minority influence research (Maass & Clark, 1984), social impact theory (Latané, 1981) and dynamic social impact theory (Latané, 2000), as well as literature on groups including Lewin (1951), Sarri and Galinsky (1974) and Mills (1984) on the processes of change within groups, Dion (2000) and Craig and Kelly (1999) on group cohesion, Festinger and Aronson (1960b) on internal pressure within groups, Garvin (1974) on processes at work within groups, McGrath (1997) on how groups motivate behaviour, Napier and Gershenfeld (1993) on facilitating group success, Shaw (1981) on group size, and Sherif (1961) on group internal structure and intergroup conflict.

#### ***Key resources***

##### ***Online Group Space***

During the course of the intervention programme, each group was set up with an online environment. This consisted of a discussion forum where each member could create new messages and comment on the messages of others. E-mail communication directly between group members was also supported by this forum. Only group members and tutors could access their group environment, which was labelled with the name chosen by the group.

## *Session 1*

### *Setting Context*

The first step in the programme was to establish the rationale for a sustainability intervention. As noted in the introduction, there is an abundance of media available for this purpose. In study two, the format used was approximately an hour as a large group spent watching excerpts from film presentations such as *An Inconvenient Truth* (David, 2006) and discussing points of social psychological interest raised in those excerpts. The importance of personal action for sustainability should be a common thread in these presentations.

## *Session 2*

In the second study, the second session was held one week after session 1.

### *Form Action Groups*

The next step was to arrange participants in the programme into small action groups of between three and seven members, although four to six was preferable. The small size allowed the groups to organize themselves effectively and efficiently, but groups of four or more were still large enough to significantly improve the person resources available to each member and to allow effective social influence within the groups.

The facilitator asked participants to divide themselves according to their interest in the behaviour change activity to come – those interested in working on energy conservation were asked to move to one side of the room, while those interested in working on consumer responsibility were asked to move to the other side of the room. There was some discussion to ensure these categories were understood. Following this broad division, participants determined among themselves how they divided into

action groups. Friends were free to join friends and people could avoid others they did not wish to be in a group with. In both studies, participants primarily formed groups based on who was sitting near to them, despite efforts to encourage greater interaction.

### *Bonding Exercise*

In order to promote swift bonding within the groups, a short interaction exercise was performed immediately on their formation. In study two, the short exercise was for each group member to introduce themselves to their fellow members by telling the story of a breaching task (Garfinkle, 1967) they had performed as part of a just-completed assignment. This task was highly effective at icebreaking in the groups, as it required everyone to speak and ensured that everyone had a memorable, distinctive and often amusing story to tell.

### *First Group Task*

The newly-formed groups were immediately given a short-term specific task that would require them to work together and that supported the sustainability theme. In study two, the task was for the group to perform a second breaching exercise (Garfinkle, 1967) but this time to do so in a group and to choose an action that could be explained by reference to environmental concern. Participants were asked to write up these experiences individually with reference to minority influence research (Maass & Clark, 1984), social impact theory (Latané, 1981). Crucially, the academic aspect of this assignment was in no way group-dependent; the breaching itself needed to be with some or all fellow group members but the assignment was individual. This prevented early difficulties in working together from harming group cohesion. Participants were given two weeks to perform and write up this task.

### *Setting the agenda*

The newly formed groups were given a list of behaviours in their focus domain, which was based on the behaviour measures to be used. They were asked to choose, collectively, which of those behaviours would be their focus or if they would approach the domain as a whole without a specific focus. They were encouraged to choose something they were genuinely motivated to do, even if it was not for environmental reasons. Group members also decided on a group name and exchanged contact details at this point, and were invited to arrange to meet outside of the scheduled sessions if they saw fit.

### *Behaviour Diary*

The facilitator introduced through example the online forum environment and outlined the requirements of the behaviour diary. Each participant was required to complete three diary entries in the two weeks of the first action period (and would be required to do the same in the second action period later on). Each diary entry asked that the participant reflect on their experiences for a minimum of 25 words. Prompt questions asked what they had done since their last diary entry, the difficulties or barriers they had encountered, conversations they had had about the action, and any discoveries they had made.

### *First Action Period*

The first action period began at the end of the second session and lasted for two weeks. During this time, participants were expected to work toward the behaviour change goals they had set for themselves as a group. Diary entries were expected from all participants in this period. The group breaching assignment was also to be completed in this period.

### *Session 3*

This session occurred two weeks after session two, at the conclusion of the first action period.

#### *Debrief and Assignment Setting*

Groups were given time to debrief each other and report to the class about their group breaching project and their successes on the behaviour change task. Details of the group assignment and the individual assignment were introduced during this session, so participants could begin thinking about these tasks.

#### *Group Assignment*

This was one of two academic assignments that supported the programme. Each group was required to give a presentation to the rest of the class on their efforts as a team, covering their choice of focus and how they went about it in the first action period, and then describing how they used their status as a group in the second period. Finally, participants had to evaluate the success or otherwise of the group approach they used, and make recommendations to the audience as if the audience might be looking for a good behaviour change method to use in future. Importantly, assessment was not based on success or failure at behaviour change; it did not matter whether participants successfully behaved in an environmental way or not, only the analysis they brought to their success or failure.

#### *Individual Assignment*

This was the second of two academic assignments that supported the programme. Each participant was required to produce an individual report that related aspects of psychological theory to the experiences they had during the programme, using their behaviour change diary as primary source material. Participants were able to choose

from a selection of social psychological theories that had been studied in the course and could also select another one they wished to research themselves. They could apply these theories to their experiences in any way they saw fit. Again, assessment was not based in any way on success or failure at behaviour change, only on the analysis of success or failure.

### *Break*

In study two, there was a three-week break in the programme at this stage to accommodate university-wide tests and a holiday period.

### *Session 4*

This session occurred at the end of the break, three weeks after session three.

#### *Revisiting the agenda*

In light of their experiences in the first action period, groups were asked to revisit the decisions they had made for that period and determine their course of action for the second action period. Groups were also asked to decide on a way to make use of their group to support their behaviour-change efforts. Suggestions offered included using an internal competition or a group reminder system. Each group was free to devise any system they liked.

#### *Assignment Details*

More details were offered on the assignments, particularly the group presentation assignment. Participants knew that this assignment was based around the way they used their group in the second action period, providing extra motivation to be thoughtful about this decision.

### *Second Action Period*

The second action period began at the end of the fourth session and lasted for two weeks. During this time, participants were expected to work toward the behaviour change goals and to follow through on their plan to make use of their status as a group. More diary entries were expected from all participants in this period.

### *Session 5*

This session occurred two weeks after session four, at the conclusion of the second action period. Participants were given time to debrief and to work on their group assignments.

### *Session 6*

Group presentations were given in this final session. This was held two weeks after session 5.

### *Hand-in of individual assignments*

Individual assignments were handed in one weeks after session 6.





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