

# Using theory-based evaluation to assess communications approaches

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## ABSTRACT

This paper reports on the testing of measures for evaluating different approaches to engaging citizens in projects that encourage them to adopt more sustainable energy use behaviours. It is a central notion of stakeholder theory that '*bottom-up*' approaches, where individuals are actively involved rather than passive, are preferable to '*top-down*' authority-led projects. But this general agreement on the need for participation of stakeholders in order to progress towards sustainable development exists alongside a dearth of evidence from comparative evaluations.

A comparative study examined six distinct communication activities aimed at encouraging individuals to adopt more sustainable behaviours. Each used a variety of different approaches to communicate, some participative and others more top-down informational. Key theories from the fields of behavioural studies and communication were used to identify the variables to consider in this evaluation. Findings confirmed the added value of a bottom-up approach compared to other mechanisms and identified that the difference between the groups was in the extent to which they implemented their intentions to change behaviour, suggesting that participative methods offer a more supportive environment for this to take place. The measures used in this study may be useful to other evaluations comparing different communicative approaches.

## Introduction

Stakeholder theory argues that '*bottom-up*' approaches, where individuals are actively involved rather than passive, are preferable to those which are '*top-down*' or authority-led (Filmer-Wilson and Anderson, 2005) because they will be more likely to achieve their objectives. The advocacy for bottom-up approaches has been particularly insistent in the UK over the issue of climate change communication (Anable, Lane and Kelay, 2006), with the absence of this approach cited as the reason why greater numbers are not reducing polluting behaviours in greater numbers (Barr, 2003, Ereaut and Segnit, 2006). However, growing disillusionment is now reported among environmental managers who have failed to see enhancements that bottom-up approaches promise (Reed, 2008).

Supposition of greater effectiveness exists alongside a dearth of evidence from comparative evaluations. Literature reviews of communication, participation and evaluation fields have found very little evidence of comparative studies of participative methods or of studies which evaluated participative alongside non-participative methods. A key feature of participation is group deliberation, where individuals work together to carefully discuss and consider the arguments for and against a proposition before making a decision (Fearon, 1998). A review in the UK in 2003 failed to identify a single empirical study which rigorously compared the use of different approaches (e.g. top-down vs. bottom-up) or which compared different types of bottom-up deliberative methods (Abelson et al., 2003). Conducting such a comparative study is complex because a portfolio of different projects can have

different objectives and outcomes (Kim et al., 2007, Maruyama, 2004)<sup>1</sup>.

Much programme evaluation requires review of the whole system, specifically the social, ecological and economic sub-systems, using monetary and non-monetary terms. This can be at odds with the social science approach to evaluation which requires that there are a limited number of key issues of analysis (Hardi and Zdan, 1997). Indeed methods of evaluation born from social science could be considered inappropriate for assessing complex and multi-level interventions in community settings (Newburn, 2001). The testing of academic theories and searching for generalisable principles can be at odds with the primary goal of finding out what works in each local setting (Maruyama, 2004). However, the approach taken here is that by seeking an understanding of the core elements of communication, persuasion and social change that are at the root of all six activities to be studied, a useful comparative evaluation can take place. Plus, the intention was to create a study that helps identify ‘what works’ that would be quite straightforward to replicate in other studies of communication campaigns. In this sense it is designed in the spirit of advice from one of the founders of the discipline of social psychology Kurt Lewin, in that applied researchers should realise there is “nothing as practical as a good theory” (1951, p. 169).

It is acknowledged that this approach will be limited to assessing outcomes associated with behaviour change - and examine key (but not all) features which are theorized to predict such change. It will not, as other evaluation approaches might, examine the programme holistically, examining inputs and outputs. Nor will it examine other potentially desirable outcomes such as enhanced capacity or social learning among participants.

## **Background to study**

The activities which were the focus of this study were the work of two organizations operating in the same geographic area. One was a local public authority (whose ‘Switch It Off’ activities are identified as SIO in Table 1), and the other a voluntary action group descended from the Agenda 21 global action initiative adopted by the UN in 1992 (identified as A21). This shared-location approach avoided much of the potential for different cultures in which programmes might be operating to present a barrier to their comparison. Five of the projects encouraged people to reduce their home energy use. A sixth left participants to choose which sustainability behaviour to target from a range which included home energy use.

The six activities were selected for their different approaches to communication, some participative and others adopting a more traditional approach. An extensive review of participation typologies is beyond the scope of this paper but has been conducted by Oxley Green and Hunton-Clarke (2003) and also discussed by Bass, Dalal-Clayton & Pretty (1995). In summary, a literature review of these and other sources has characterized a top-down communication type as:

- Expert-led, paternalistic, authoritarian
- Asymmetrical or even one way
- Scientific persuasion, instructional, transmission of information

The characteristics of bottom-up communication types are:

- Two-way dialogue, negotiation and deliberation
- Participation, collaboration, partnership
- Explores issues from a user-needs perspective.

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<sup>1</sup> The participation referred to here is at the level of the activity. It is acknowledged that there is a parallel debate about participation of those running programmes in evaluations but that is not the focus here. For an overview of the parallel debate see (Weaver and Bradley Cousins, 2007)

**Table 1.** The six activities were selected for their different approaches. The activity representing the top-down characteristics of expert-led transmission of information is at the top of the table. The activity at the foot most fully represents bottom-up characteristics – using dialogue, collaborating and exploring issues for the perspective of participants’ own needs. The position of the activities listed in the middle of the table is suggested rather than as a result of scientific analysis.

Activity name	Description of activity and level of participation
SIO media	Participants read a two page article from their local newspaper which summarised the aims of the Switch It Off campaign and gave examples of how to save energy.
SIO bags	Participants were approached in town centres and given a ‘bag for life’ shopping carrier containing energy saving light bulbs and literature while being engaged in conversation about the Switch It Off campaign
SIO univ	Teams of secondary school children (age 12-13) competed in an inter-schools ‘Universally Challenged’ competition which included questions about energy saving and content of the Switch It Off campaign.
SIO vols	Local authority employees volunteered to act as champions within their organisation, supporting the Switch It Off campaign by reducing their own energy use and encouraging colleagues to do the same.
A21 peace	Participants approached volunteer advisers operating a stand at a peace festival in the locality. They chose the topic(s) of interest to discuss from home energy saving, locally grown food, recycling and/or transport.
A21 REC	These participants joined a renewable energy group set up to assist members adapt their homes to be more fuel-efficient/run on renewable energy. Typical projects included loft insulation, installing and running wood burning stoves and installing solar panels.

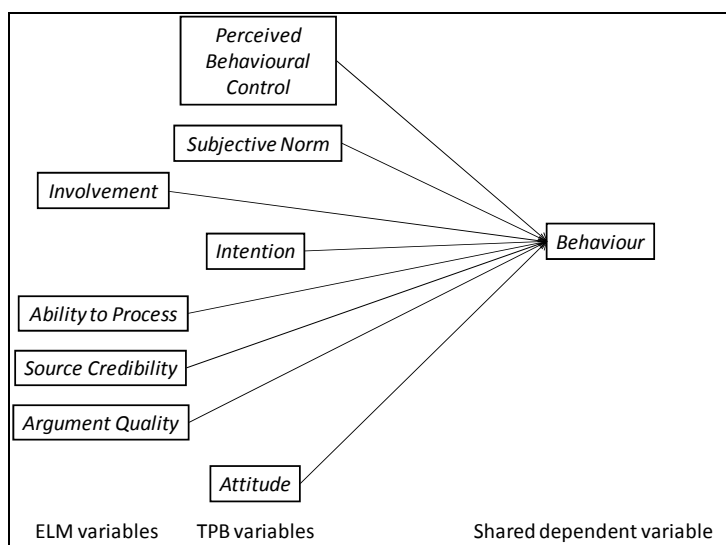
## Theories used to guide study

Key theories from the fields of behavioural studies and communication were used to identify the variables to consider in this evaluation. The Theory of Planned Behaviour describes influences on a person’s decision to engage in a particular behaviour (Ajzen, 1991). It is an extension of Ajzen and Fishbein’s Theory of Reasoned Action (1980), which suggests that a person's behaviour is determined by their attitude toward the behaviour, their perceptions of the extent to which those important to them will approve of the behaviour (subjective norm), and their intention to perform the behaviour. Intentions are described as a combination of the motivation required to perform a behaviour and how hard people are willing to try to perform it (Armitage and Christian, 2003). This splitting of intention into two distinct elements – making a decision and willingness to try to implement it – helps explain why intentions are not wholly accurate at predicting behaviour change. In meta-analyses of studies, intention accounted for only between 34 and 38% of the variance in behaviour (Conner and Armitage, 1998). Later Ajzen added a further variable, perceived behavioural control, for those situations where intention to act might be mitigated by a person feeling they had reduced volitional control. With this addition, the theory became known as the Theory of Planned Behaviour (TPB, 1991).

The Elaboration Likelihood Model (ELM) is a process model, offering a “framework for organizing, categorizing and understanding the basic processes underlying the effectiveness of persuasive communications” (Petty and Cacioppo, 1986, p. 125). The ELM addresses the recipient’s motivation and ability to process information, and also their evaluation of the source of and the quality of the message.

This makes the TPB and ELM, when brought together (see Figure 1), well suited to a study of communication intended to encourage people to cognitively engage with a topic. The ELM will be useful to investigate factors that may increase or decrease the likelihood of a message receiving thoughtful consideration, and the TPB used to assess relevant thoughts. The dependent variable for both is a measure of the thinking and activity that follows the communication. The evaluation undertaken for this

study aimed to assess not just which activity was most successful, but give insight into what led to this success.



**Figure 1** An path diagram showing simplified versions of the ELM and TPB with the columns distinguishing the two theories. It is here used to illustrate how variables from the two theories are used to explore influences on behaviour<sup>2</sup>.

## Methodology

### Participants

Participants were selected on the basis that they were convenient to act as respondents. The primary objective of collection was to target at least 30 people taking part in each of the six different activities. When choice of participant was possible, this choice was made on the basis of seeking to balance age and gender of participants to reflect the general population of the locality. From a total of 198 participants, 132 took part in one of four Switch it Off (SIO) activities organised by a local public authority, and 66 took part in one of two activities organised by a voluntary action group (A21). There were 80 males and 118 females, with 69 of the participants aged under 20, 41 aged 60 or over and 88 participants aged inbetween those upper and lower bands.

### Materials

Two questionnaires were used, with questions developed through a literature review. Both theories guiding this study have been used in a range of communication and persuasive situations previously, so questions were modelled as far as possible on those that have been found reliable. A measure of source credibility has been obtained in the past by asking people to rate on a scale the source of a communication by using keywords such as ‘expert’, ‘competent’ and ‘knowledgeable’ (Wood and Kallgren, 1988). Another variable, ‘ability to process’, aims to capture whether participants can attend to the message. In different circumstances this could include physical and practical difficulties such as whether language is overly technical, or whether participants have the time to read it. As the messages in this study were both accessible and non-technical it was more appropriate to model questions on those that have previously tested message clarity, such as asking participants to rate to what extent information

<sup>2</sup> This paper and this diagram focus on the direct relationships between the independent variables and behaviour. Interrelationships are discussed at the poster session of this conference (Wilson, Irvine and Mill, 2010).

was 'understandable' or 'clear' (Park, Lee and Han, 2007). Once a range of questions that seemed appropriate to this study had been found they needed adjusting to fit the specific communication situation at hand. The TPB works best when questions relate to specific, not general, behaviour (Ajzen, 1991), so asking a general question about attitudes to climate change would not for instance predict whether someone recycled. To be predictive, the question would need to be about attitudes to recycling. In order to ensure that questions aiming to test a range of different activities and contexts were appropriate in each case, they had to be altered slightly for each group (see Appendix).

The first surveys were completed face-to-face between researcher and participant with the exception of one group. In the case of this group (SIO vols), they received their persuasive communication electronically, and the survey was also conducted in the same way, using the online survey tool SurveyMonkey (<http://www.surveymonkey.com>). For this group the second survey was also conducted electronically. Of the remaining groups, three follow-up surveys were conducted by telephone. Two of the activities took place in schools (SIO univ and SIO media) and follow-up surveys were conducted by the same means as the first – face-to-face between researcher and participant.

Whereas five of the activities involved direct contact between the activity sponsor and the participant, the local authority had no means of tracking readers of the considerable media coverage it generated as part of the Switch It Off campaign. As generating media coverage was a significant input item for the authority, this was assessed by approaching a college within the locality of the Switch It Off campaign and requesting the participation of two classes of students (aged 16/17). The students were asked to read a sample of typical media coverage and complete the surveys without conferring. A month later the classes were revisited and the second survey conducted. All of the participants surveyed cooperated voluntarily and were free to withdraw from the survey at any point.

The first questionnaire contained all of the questions to capture data needed for the ELM independent variables and also asked about behavioural intentions. The second questionnaire captured the data required for the TPB independent variables and asked about behaviours since the communication activity. These final questions about behaviours since activity were to form the dependent variable for the study. The staging of the questions was chosen on a partly practical basis (to keep the questionnaire on each occasion to a reasonable length), and partly because of the need for time to elapse during which behaviour change could take place. Once a persuasive message had been received, people needed time to consider it and to turn their intentions (first survey) into actions (second survey). To do a follow-up survey too early might be to precede people's attempts to enact their intentions. Some intentions also need more time than others to enact. Arriving home from a persuasive communication activity with new resolve to install energy efficient lightbulbs may see immediate action.

Arriving home with resolve to investigate adding solar panels to your home may take more time to enact. It is also usually the case that the passing of time gives time for arguments to be forgotten, or for counter arguments to be considered instead (Ajzen, 2005). A single time period for all activities was felt to be an important element of a comparative study so the questions about behaviour post-activity were designed to accommodate potentially small step changes in behaviour (see behaviour questions in Appendix). There is no definitive guidance on optimum time to elapse between receiving information and forming intentions, and for those intentions to become behaviours. In a message-dense and rapidly moving situation such as a political election intentions were measured in a week (Fishbein and Coombs, 1974, in Ajzen, 2005), but more frequently studies tend to leave a gap of four to five weeks (Ajzen, 2002, Daigle, Hrubes and Ajzen, 2002, Sejwacz, Ajzen and Fishbein, 1980) and this was the time period used for this study.

## Analysis

Responses to groups of questions designed to measure the theoretical variables set out in Figure 1 were tested for whether they reliably measured the same concepts and were justified in being clustered into composite scores for analysis. This was done by using only question items which scored higher than .7 in Cronbach Alpha analysis<sup>3</sup>. Each cluster of question items was also tested for validity, or whether each was distinctly different from each other, using factor analysis (see Appendix). Ordinary Least Squares standard multiple regression was conducted to assess initial group differences. Hierarchical multiple regression was used to investigate group differences controlling for other influencing variables and to investigate interaction. All of these computations were performed using SPSS version 16.

## Results

The first aim of the analysis was to assess differences between the groups and whether, as asserted by the literature, the more engaging (bottom-up) the activity the more participants would have thought about or acted on the communication they had received, as measured by the dependent variable behaviour. To assess this hypothesis, standard multiple regression was used to examine behaviour as a function of group membership. As it was hypothesised that A21 REC would be the top performing group it was used as the reference group against which other groups were compared.

Normally when using multiple regression the beta values (B) provide the contribution of each independent variable in explaining the dependent variable, but when using group variables B represents the difference for each group compared to the reference group. As can be seen from Table 2, these show the negative impact of being in any group relative to the A21 REC reference group, i.e. all groups report less behaviour change than the A21 REC group. This difference is statistically significant ( $p < .001$ ) for the three groups at the foot of the table.

**Table 2.** Multiple regression table showing group performances relative to the A21 REC reference group (represented by 'constant'). The B values indicate that, compared with the reference group, all of the other groups report less behaviour change.<sup>4</sup>

	<i>Unstandardized Coefficients</i>		
	B	Std. Error	Sig.
(Constant)	1.699	.425	.000
A21 Peace	-1.090	.620	.080
SIO Vols	-.891	.610	.146
SIO Media	-4.094	.605	.000
SIO bags	-2.086	.601	.001
SIO univ	-2.033	.625	.001

*F (5,192) 10.697, p < .001, Adj. R<sup>2</sup> .198*

Given that the data were not gathered using random sampling, it could be argued that the differences between groups could be due to something other than activity type. When the groups were asked to rate source credibility for instance, some were being asked to rate the local authority and some the voluntary action group. Some of the groups were self-selecting, and could reasonably be expected

<sup>3</sup> Cronbach's test uses the mean score of question items to measure the strength of their relationship to others it is proposed to group with them.

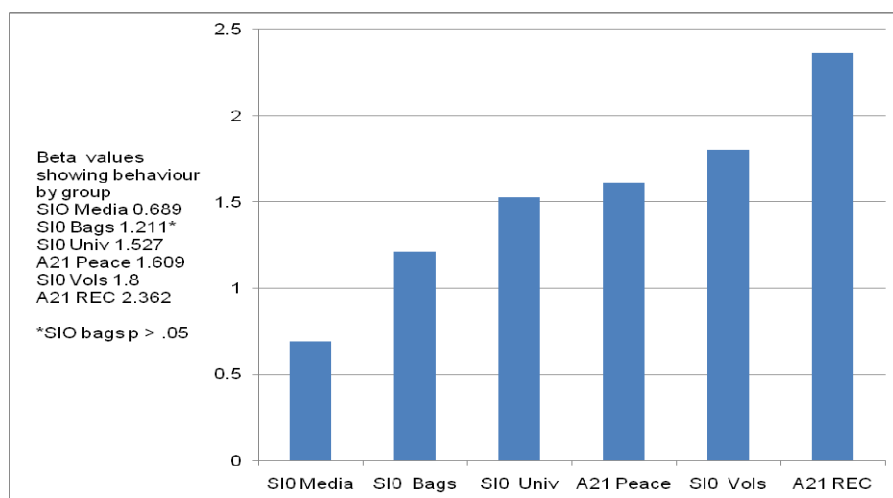
<sup>4</sup> Unstandardized rather than standardized beta values are reported throughout for consistency. They are required as interaction terms were part of the analysis strategy and these are not interpretable in standardized form.

to report higher levels of involvement or intention to act. The next step of the analysis was to investigate whether these differences remained, once those variables were taken into account.

In order to investigate this, hierarchical multiple regression was used for its capacity to analyse the differences in activity between the groups, while controlling for all of the theoretical variables for which data were collected (see Figure 1). In this way the difference between the groups could be assessed, controlling for any differences in what participants thought of the source. Levels of involvement could also be controlled for, which went some way to cancelling out the variability in types of people taking part in the various activities. Intention was also controlled for, so that varying levels of commitment to the topic could also be isolated. This analysis also included gender. This was done to further remove another potential confounding variable, that one of the groups, SIO media, was solely female. Even when all other variables were controlled for, the analysis revealed that again, as in Table 2, compared with the A21 REC reference group ( $B = 1.58, p = .014$ ) the SIO media group ( $B = -2.025, p = .002$ ) reported less behaviour change. So even when taking into account differing levels of involvement with the respective topics, different assessments of sources and different levels of intention, group membership was still explaining differing amounts of behaviour change for the two groups identified as being either the most top-down or bottom-up.

The final step was to use the data gathered to try to find the source of this difference. To do this involved investigating whether different levels of one or more of the independent variables accounted for significantly different scores on the dependent variable. Such interaction analysis seeks to explore whether one variable has a boosting effect (Hoyle and Robinson, 2004) for some groups more than for others. Preliminary analysis was undertaken concentrating on just the groups shown to be operating at either end of the top-down/bottom-up continuum (A21 REC and SIO media). This revealed that intention was a variable operating significantly differently for these two groups. Analysis was then conducted to examine all groups for a differential effect of intention and this revealed that, when compared to the reference group A21 REC four of the groups: SIO media group, SIO vols, SIO univ and A21 Peace reported reduced levels of intention.

This difference is illustrated in Figure 2. The beta values for the A21 REC group ( $B = 2.362, p < .001$ ), explain the contribution this group's intentions on the dependent variable behaviour. All of the other group performances have been calculated for comparison. Results for five of the groups were statistically significant ( $p < .001$ ). In summary, intention operates differently by group. Each unit change in intention produces a 2.362 unit change in behaviour for A21 REC group members. Each unit change in intention for SIO media group members produces a .689 change in behaviour. This indicates intention has more than three times as much impact for A21 REC members as for SIO Media group members.



**Figure 2** summarises the different levels of behaviour change attributable to intention, across groups.

## Conclusion

The analysis found support for the idea that bottom-up approaches have more impact on behaviour change outcome than top-down approaches. It also discovered that a potential difference between the groups was in the differential impact of intention across groups. It was noted earlier that intention has two distinct elements, a decision and willingness to try. One possible reason offered for the difference between the groups is that willingness to try might be supported more in an environment where participants can discuss their progress with like-minded individuals. It may well be that the opportunity for dialogue, collaboration and exploration of issues from the point of view of participants contributed to self-reports of increased behavioural change.

From an evaluator's or policy maker's point of view the finding that bottom-up approaches can work better at turning intentions into behaviours needs to be compared with the numbers of people that top-down methods reach. Top-down methods using the media are generally a cheaper way to reach more people and are a traditional way of raising awareness. Communicators in the UK are now being challenged to do more than raise awareness. They are being encouraged to contribute towards changing behaviour. This research supports the assertions set out in the introduction that if communicators are interested in moving their audiences beyond awareness to implementation then it does appear that engagement using participative methods has a useful role.

Random sampling offers the best possibility that differences between groups are due to the activity and not to differences in participants and the convenience nature of data collection, discussed in the methodology section, makes it more difficult to claim that the findings of this study would, for instance, be applicable in other cases. It is recommended that this study be replicated under different geographic and situational conditions. The ideal would be to track a larger scale suite of activities with the possibility of random rather than opportunistic sampling. One particular improvement to design would be to identify a better way of sampling the views of media readers rather than the quasi-experimental approach taken here of surveying a group of similar-age students. Another limitation is that all of the measures used self-reports, and it is well acknowledged that self-reports of behaviour can lead to socially desirable responding. Self-reporting was common for all groups, but it is possible that some groups might have felt greater internal pressure to respond in a socially desirable way than others.

Two of the variables did not accurately predict behaviour change in this study (argument quality and perceived behavioural control) but six performed as the theories' authors predicted. Again, further testing might reveal whether, for the two variables which did not predict behaviour, this was due to measurement error or contextual issues. A future study could also extend the nature of the intention questions to explore further whether it is in the supporting of willingness to try that leads to enhanced behaviour change for bottom-up approaches. It might also involve research over a longer time period to discover whether the differences between the groups found over the course of a month magnifies over time.

Despite these limitations, combining the ELM and TPB does appear to offer a template for comparative evaluations of behaviour change. The two surveys used are relatively easy to administer – the first took respondents about eight minutes to complete and the second approximately five minutes. The surveys do not require specialist knowledge and with instructions to ensure consistency could be administered by different members of an evaluation team. They can also be used online. As in this case, questions can be adjusted to suit the particular aim of the communication activity (see Appendix).

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## Appendix

### First survey questions<sup>5</sup>

#### Argument Quality

Do you find the **message** of the XXXXXX:

	Strongly disagree	Tend to Disagree	Neither agree nor disagree	Tend to Agree	Strongly agree
Believable					
Clear					
Credible					
Unconvincing					
Unmemorable					

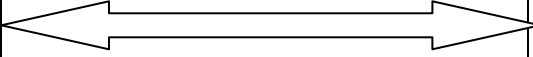
#### Source Credibility

Do you find XXXXXX, an *organisation* that is:

	Strongly disagree	Tend to Disagree	Neither agree nor disagree	Tend to Agree	Strongly agree
Credible					
Trustworthy					
Suited to an activity like this					
Expert					
Competent					
Knowledgeable					

#### Involvement

This section is about *you*. Please rate the adjectives below for how well they represent your feeling about XXXXXX. XXXXXX is:

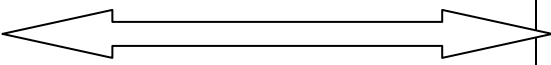
						
important to me						unimportant to me
relevant to me						irrelevant to me
involving to me						uninvolving to me
worthless to me						valuable to me* <sup>6</sup>
boring to me						interesting to me*
means nothing to me						means a lot to me*

<sup>5</sup> There are slightly fewer questions here than appeared on the questionnaires used to collect data. Before scaling questions from each set shown here into variables, questions were subject to factor analysis, a process which assesses the extent to which questions are measuring the same concepts. Some questions were omitted as part of this process.

<sup>6</sup> Starred questions indicate a question where wording was reversed to prevent response bias. These scales were reverse-coded before analysis.

**Ability to Process**

Now I want to talk about the *method* by which you learn about XXXXX and ask you to rate this:

						
inefficient						efficient*
helpful						unhelpful
useful						not useful
enjoyable						not enjoyable
engaging						not engaging
challenging						dull

**Intention**

As a result of XXXXXX how likely is it that you will:

	Very likely	Quite likely	Neutral	Unlikely	Very unlikely
change any activities in your personal or work life					
become more interested in this issue when you see or hear it discussed by others					

**Second survey questions**

**Dependent Variable (behaviour)**

Since the first survey and as a result of your contact with XXXXXX, to what extent have you -

	A great deal	To some extent	Not very much	Not at all
thought further about XXXXXX?				
changed any activities in your personal or work life?				
become more interested in XXXXXX when you have seen or heard it discussed by others				
sought out further information on XXXXXX				

## Subjective Norm

I want to think about people who are important to you – you can pick neighbours, friends, family, work colleagues as appropriate to you. To what extent would these people ...

	A great deal	To some extent	Not very much	Not at all
think XXXXXX was important?				
be interested in this topic themselves?				
be taking action with this topic?				
expect you to take action on this topic?				

## Perceived Behavioural Control

Please rate these statements for how well they describe your position, on the following scale...

	Strongly disagree	Tend to Disagree	Neither agree nor disagree	Tend to Agree	Strongly agree
I am fully able to control whether I introduce XXXXXX into my home (e.g. do you rely on others?)					
It would be easy to introduce XXXXXX into my home					
I have the right facilities to take this action					
I have enough information to take this action					

## Attitude

Please rate these statements for how well they describe your position, on the following scale...

	Strongly disagree	Tend to Disagree	Neither agree nor disagree	Tend to Agree	Strongly agree
Introducing XXXXXX into my home is convenient to me					
The advantages outweigh the disadvantages for me					
Introducing XXXXXX into my home is not effective					
Introducing XXXXXX into my home is not worth the effort					