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Social Networks and Environmental Psychology: Data Collection

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Abstract

Well used theories of behaviour (e.g. Ajzen's Theory of Planned Behaviour) often focus on the individual at the level of the individual. Typically, focal actors are asked for their perception of their referent others' expectations of them in relation to specific behaviours, but no data is collected from these referent others.

In this paper, we describe a method used to extend the above typical approach to understand not only the focal actor's psychological attributes, but also to gather similar data from the focal actor's important referent others, using techniques developed in social network analysis.

Value-belief-norm theory is used to measure the psychological attributes of both the focal actors and their referent others, using the 'ego' network approach. In the value-belief-norm theory, psychological constructs vary in their stability and therefore some are expected to be more susceptible to social influences than others; this project will empirically examine whether this is observed.

All survey subjects will be employees of De Montfort University. DMU aims to reduce its greenhouse gas emissions, and therefore subjects are also asked for their judgements towards proposals that the University could introduce to reduce its greenhouse gas emissions.

Keywords: Environmental Psychology, Social Networks, Value-belief-Norm Theory, Acceptability Judgements.

1.0 Background

The Intergovernmental Panel on Climate Change (IPCC), in their Fourth Assessment published in 2007, reported that “Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations” (IPCC, 2007: p39). In the same publication, the IPCC report that an increase in anthropogenic greenhouse gas concentrations will, amongst other effects, increase rainfall in tropical areas making flooding more likely, and decrease water availability in already dry regions. The struggle for existence for humans, plants and animals in these areas is therefore likely to become much changed, at a rate much faster than what it has been previously.

With the above observations in mind, action has been taken on many levels around the world to tackle the problem of anthropogenic greenhouse gas emissions. In the UK, the government passed the Climate Change Act in 2008, committing to action to reduce the UK’s greenhouse gas emissions to 80% below 1990 levels by 2050, with a 26-32% reduction to be achieved by 2020. By 2008, the UK’s greenhouse gas emissions were 624 million tonnes (CO₂ equivalent), 20% below 1990 levels (Defra, 2009).

There have been several options put forward to tackle the UK’s greenhouse gas emissions (DECC, 2009). One method to reduce greenhouse gas emissions is to change individuals’ behaviours (Defra, 2008), which account for over 40% of the UK’s CO₂ emissions. Defra believe that a degree of “environmental protection and improvement” can be achieved by “increasing the contribution from individual and community action” (Ibid p3)

It has been shown that individuals’ behaviours have a significant effect on the UK’s greenhouse gas emissions, and that changing these behaviours can result in the UK meeting it’s own emissions reductions targets. However, there is a sizeable gap that exists between identifying the problem and delivering the solution, behaviour change being notoriously difficult (Jackson, 2005). Many models exist that help understand an individual’s behaviour (Ajzen, 1991; Triandis, 1977; Schwartz, 1977) but often they focus solely on an individual as if the individual existed in isolation. Of the three models listed above, the most widely used, Ajzen’s Theory of Planned Behaviour (TPB), measures social influences by asking an individual to report on what they expect their close referent others to expect of them. In this paper, a method is presented whereby data is collected not only from the focal actor, but from the focal actors’ referent others too, using techniques developed in social network analysis.

2.0 Understanding behaviour

As described above, traditional models and theories of behaviour often focus on the individual, and pay little attention to social influences. For this project, the value-belief-norm (VBN) theory of environmental attitudes is to be used (Stern et al, 1999). Though the VBN theory also doesn’t measure social influences, the constructs in the theory, as they move from left to right (see Figure 1 below), become less stable and therefore more susceptible to social influences. The VBN model is an amalgamation of three existing theories of environmental attitudes, incorporating Schwartz’s values (1992, 1994), Dunlap et al’s New Ecological Paradigm (1978, 2000) and Schwartz’s Norm-Activation model (1977). Below is a schematic of the theory.

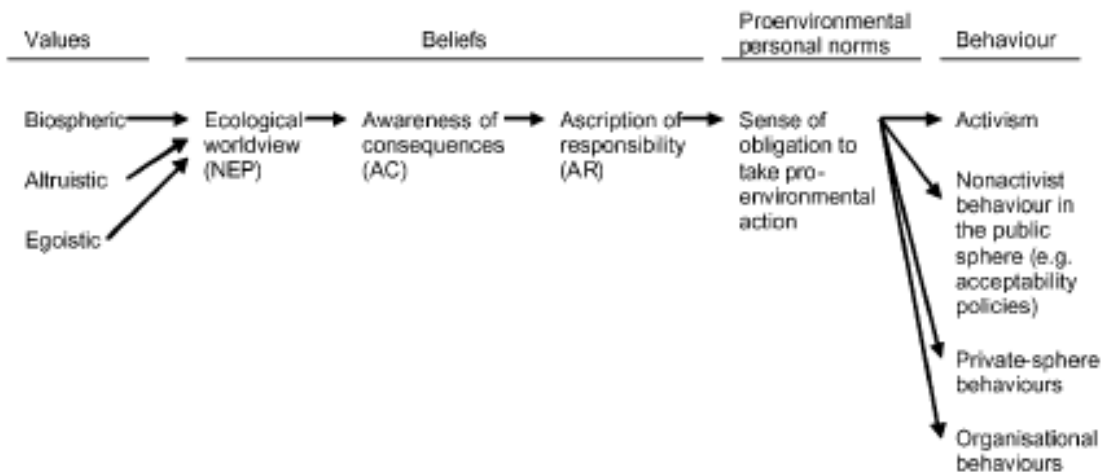


Figure 1: A schematic of the VBN theory, adapted from Stern et al (1999)

On the left hand side of the model are constructs representing an individual's values, adapted from Schwartz (1992, 1994). Schwartz developed a set of 56 values, and has used them extensively around the world (Ibid.). In the environmental literature, Schwartz's full set of values is often narrowed to a set that allows the researcher to distinguish people that care mostly for themselves (egoistic), mostly for others (altruistic), or mostly for the environment (biospheric) (De Groot and Steg, 2008). However, the link between values and behaviours is weak and is often mediated by other factors (Nordlund and Garvill, 2003; Poortinga, Steg and Vlek, 2004). For this study, it is proposed that a set of 13 values is used to differentiate egoistic, altruistic and biospheric value orientations, as used in De Groot and Steg (2008).

The next construct in the model uses the New Environmental (or Ecological) Paradigm (NEP) developed by Dunlap et al (1978, 2000). The NEP is a measure of worldview and of environmental concern, asking a set of 15 questions about the relationship between humans and the environment. Concern for the environment, or worldviews, are less stable than values, and again the link between concern for the environment or worldview and behaviour is weak. Again, it has been shown that other factors mediate this relationship (Nordlund and Garvill, 2003). Agreement with the odd numbered statements and disagreement with the even numbered statements gives an individual a high score indicating a high level of concern for the environment.

The final part of the VBN theory uses the Norm-Activation Model (NAM) developed by Schwartz (1977). The NAM proposes that those with a level of awareness of the consequences (AC) of their behaviour, for the environment, and/or those that ascribe responsibility (AR) to themselves for their behaviours, are more likely to develop pro-environmental personal norms, which in turn will have some effect on the individual's behaviours. Or, in reverse, pro-environmental behaviours are a result of pro-environmental personal norms which are developed by the individual taking a moral responsibility for their actions, and having an awareness of the (environmental) consequences of their behaviour.

The VBN theory proposes a causal chain between each of the three sections outlined above. Working from right to left, Stern et al (1999) proposed that, like NAM, personal norms are activated by AC and AR, which are themselves dependent to the individuals concern for the environment (NEP), and stable value orientations. Stern et al (1999) proposed four types of

behaviour that can be explained by the VBN theory – activism, non-activist behaviours in the public sphere, private sphere behaviours and organisational behaviours.

2.1 Context

In the 2009 grant letter from the secretary of state for Innovation, Universities, and Skills to the Higher Education Funding Council for England (HEFCE), the following criterion was added in respect of future capital funding;

“Last year, I set out our ambition that capital funding should be linked to performance in reducing emissions. Such links should be in place for 2011-12. In May 2008 I asked you to finalise a target for carbon reductions that would reduce carbon emissions by 60 per cent against 1990 levels by 2050 and at least 26 per cent by 2020. This target should now be upgraded to 80 per cent, in line with the Climate Change Act 2008.”

Though the exact detail of the criteria is far from fully developed, it is clear that universities will have to act in order to either maintain current funding, or gain additional funding.

With this in mind, De Montfort University (DMU) and its Sustainable Development Taskforce (SDTF) sought to engage with the staff of the University to understand current attitudes towards environmental problems and their acceptability judgements towards proposals that the University may introduce to reduce greenhouse gas emissions in the future.

2.2 Acceptability Judgements

The value-belief-norm theory, as noted above, seeks to understand the reasons behind an individual's behaviour. One of the four types of behaviour that the VBN helps researchers to understand is 'non-activist behaviour in the public sphere'. Non-activist behaviour in the public sphere indirectly benefits environmental conditions by influencing public policies, which may in turn influence the behaviour of many people.

As in Steg et al (2005), 'non-activist behaviour in the public sphere' is measured by asking respondents to what level they accept proposals that relate to reducing DMU's greenhouse gas emissions. Seven 'acceptability judgements' are the dependent variables for this study. Each of the seven acceptability judgements will relate to either the HEFCE proposals for all universities to reduce greenhouse gas emissions, or hypothetical proposals that DMU could adopt to reduce its greenhouse gas emissions, and therefore meet HEFCE targets.

Some of the acceptability judgements will challenge respondents by asking them to make difficult choices that will affect them every day.

2.3 Social Networks

Recent years have seen a marked increase in the use and usefulness of social network analysis to explain social phenomena across many disciplines (Borgatti et al, 2009). Social network analysis focuses on the relationships between individuals. Social network analysis uses discipline specific visual and statistical techniques to provide an alternative perspective on social groupings. Rather than treating individuals as acting in isolation, social network analysis recognises the importance of an individual's contacts, their position in their network and their ability to access various resources within their network. Social network analysis allows the researcher to recognise that all of these will play an important part in explaining what is currently happening and/or what might happen in the future, both for the individuals within the network, and for the network as a whole.

In this study, social network analysis is used to explain differences in individuals' attitudes and behaviours. We expect individuals that are connected together in a network to share similar characteristics, and that this social setting reinforces previously held commonalities. It is expected that variances between individual attitudes and behaviours will be dependent, to a certain extent, upon their network characteristics.

There are two main types of network data; 'ego' network data, and 'whole' network data. In this project, it is proposed that 'ego' networks are measured. Ego networks involve gathering data from one person, asking them about the other individuals in their network and the links between the individuals that they name. The alternative is to measure 'whole' networks. Whole networks require access to all the individuals in the network, so that network data can be gathered from all of them. Whole network data is more appropriate when the population under study is small and well defined, which isn't the case in this study - the population is over 2,000 people, and they are divided across a large organisation. Ego network data is more appropriate when the population is large, not well defined, or when access to all the individuals isn't possible.

3.0 Methodology

3.1 Respondents and Procedure

DMU staff were approached by email and invited to participate in the research. The DMU staff directory was copied into excel and sorted randomly. Email invitations were sent out on a Monday morning to the first 30 staff on the randomly sorted list in week one, the second 30 from the list in week two, and so on until the required response rate was achieved. Towards the end of the data collection, more than 30 invitations were sent out per week. Invitations were sent out on a Monday morning to allow respondents the remainder of the week to arrange and complete an appointment. 30 invitations a week were sent out to allow the researcher to survey all those that respond within a reasonable time period (approx. two weeks). Non-respondents were reminded with a further email invitation if a reply was not received within two weeks. Those that agreed to take part in the research were met in person, and went through two tasks, as detailed below in sections 3.2 and 3.3.

The DMU staff directory contains 3,448 records, of which 2,322 are individual records. 1,126 records were removed by the researcher. These were either duplicates (i.e. individuals with two part-time jobs in two departments), or were records that belonged to fax numbers or rooms, and not DMU employees.

Before commencement of the survey, respondents were read a script by the researcher, making them aware of the purpose of the research, formalities and the tasks that they will carry out. Respondents were offered the opportunity at this point to ask questions. The survey then commenced with task one, as detailed below.

3.2 Task 1: Social Networks

Ego network data was collected. With DMU employing over 2,000 staff, it would have been impossible to gain whole network data by gathering data from all staff or dividing the total population into well defined groups. Egos were asked to complete two linked social network tasks. The instructions for the two social network tasks were handed to ego on an A4 sheet of paper to ensure that all egos received the same instructions in the same way.

The first part of the task involves egos naming other members of DMU staff that they feel they are “very close” to (Burt, 1984). These individuals are known as ‘alters’. The instructions for the task included a definition of “very close” in bullet point prompts, as below (Hogan et al, 2007):

- discuss important matters with,
- regularly keep in touch with,
- are there for them when they need help.

Egos were free to name as many alters as they wished to name (free choice), were not given prompts as to who they might name (free recall) and were not required to rank or rate those that they name. Alternative techniques in social network analysis require ego to choose a fixed number of alters (fixed choice) from a list (roster method) and sometimes require ego to rank each alter sequentially or to rate them. By allowing ego to name as many alters as they wish without prompts, ego can decide where the boundaries of their work relationships lie, and do not allow them to include people simply because they have been prompted. It was hoped that by asking only for “very close” ties, ego should be able to accurately recall alters without the need for prompting.

Egos completed task one by writing the first name and surname of their alters onto small (37.5mm X 50mm) post-it notes, and then attaching the post-it notes onto an A3 sheet of paper. Egos were given post-it notes so that they can move them around the A3 sheet to make part two less complicated. There is no significance attached to where ego places the post it notes on the A3 sheet.

For the second part of the task, ego reported on the ties between their alters. To do this they drew lines between the post-it notes. Lines between post-it notes indicate those alters that ego believes are “very close” to each other. The criteria for the relationship between alter-alter ties is the same as between ego-alter ties. Ego is not required to make a specific number of alter-alter ties, or to differentiate between stronger and weaker alter-alter relationships.

The post-it notes that ego used were numbered from 1-25 in the bottom right hand corner of the post-it note. It was not expected that ego would name more than 25 alters, and only on one occasion did somebody exceed 25 (they named 26). This will allow the researcher to determine whether there should be any significance attached to the order in which ego named alters, at the data analysis stage.

3.3 Task 2: Environmental Psychology

After completing task one, egos filled out a questionnaire containing 60 questions. All questions were multiple choice closed questions. The questionnaire was separated into two distinct sections, with the first following the value-belief-norm theory.

To measure values, 13 questions were asked using Schwartz's -1 through 0 to 7 scale, where -1 represents values that the respondent is opposed to, 0 represents values that the respondent does not find important, 1 through to 5 represents marginally increasing value importance, 6 represents a very important value, with 7 representing a value that is of supreme importance. The 13 value questions aimed to differentiate between respondents that hold egoistic, altruistic or biospheric value orientations, using the 13 value statements identified in DeGroot and Steg (2008).

To measure beliefs, the full 15 question New Ecological Paradigm (Dunlap et al, 2000) was used, on a 5 point response scale from 'strongly disagree' to 'strongly agree' centred on 'unsure'. In accordance with the original scale, an 'opt out' option ('don't know') is not included.

The final section of the VBN theory used Schwartz's norm-activation model (NAM). A total of 18 questions were asked on a 6 point scale, of 'strongly disagree' to 'strongly agree' centred on 'neither agree nor disagree' with an option for respondents to opt out, 'don't know'. Of the 18 questions, 6 tapped awareness of consequences (AC), 6 tapped ascription of responsibility (AR) and 6 tapped personal norms (PN). All 18 statements were adapted from Steg et al (2005), specifically for the purposes of the study. This is in line with the recommendation by Steg et al (Ibid.), that 'tuning' statements to a specific behaviour or set of behaviours that is to be measured, provides greater explanatory power. All 18 statements that tapped AC, AR and PN were adapted so that they relate to global climate change and/or greenhouse gas emissions. In Steg et al (2005), the 'non-activist behaviour in the public sphere' was acceptability judgements relating to energy policies. An example of the statements measuring AC, AR, and PN, used by Steg et al (2005) is shown below, along with the corresponding statements that were used in this study:

Steg et al (2005)	This study
Energy savings help to reduce global warming (AC)	Reducing greenhouse gas emissions helps to reduce the effects of global climate change (AC)
I feel jointly responsible for the exhaustion of energy resources (AR)	I feel jointly responsible for worldwide greenhouse gas emissions (AR)
I feel morally obliged to save energy, regardless of what others do (PN)	I feel morally obliged to reduce my greenhouse gas emissions, regardless of what others do (PN)

A short statement was added before this section explaining what is meant by the terms global climate change and greenhouse gas emissions. Statements were worded both positively and negatively, and some statements were very similar to check for validity of respondents answers. The 18 statements were sorted randomly.

The second section of the survey contains seven acceptability judgements. These were asked on a 6 point scale of 'very unacceptable' to 'very acceptable' centred on 'neither acceptable nor unacceptable' also, with an opt out 'don't know' included.

The first two of the seven acceptability judgements asked how acceptable the respondent would find a proposal for DMU to reduce its own greenhouse gas emissions, and then how acceptable they would find it if DMU's funding was reduced if they didn't reduce their greenhouse gas emissions. These both relate to the HEFCE proposals, and allow the researcher an insight as to how likely the respondent is to accept further, and more specific proposals for DMU to reduce their greenhouse gas emissions i.e. if a respondent finds it very unacceptable for DMU to reduce its greenhouse gas emissions, they are unlikely to accept further, more specific proposals for the university to reduce their greenhouse gas emissions, especially those that effect them daily.

The final five proposals asked to what extent respondents accepted hypothetical proposals that DMU could adopt that would reduce their greenhouse gas emissions and therefore allow them to meet HEFCE targets. These five proposals focus on behaviours that many staff will be affected by on a daily basis, both positively and negatively. They were purposefully controversial in the hope that respondents will be challenged by them, and forced into thinking and weighing up what each one means both to themselves as employees of the university, and to the university as a whole. They included a proposal to reduce the number of international students that DMU recruits in the future, a proposal to allow staff to work from home, a proposal to double the price of a car parking permit, a proposal to reduce the temperature that DMU heats its building to in the winter, and a proposal to help staff pay for annual rail passes.

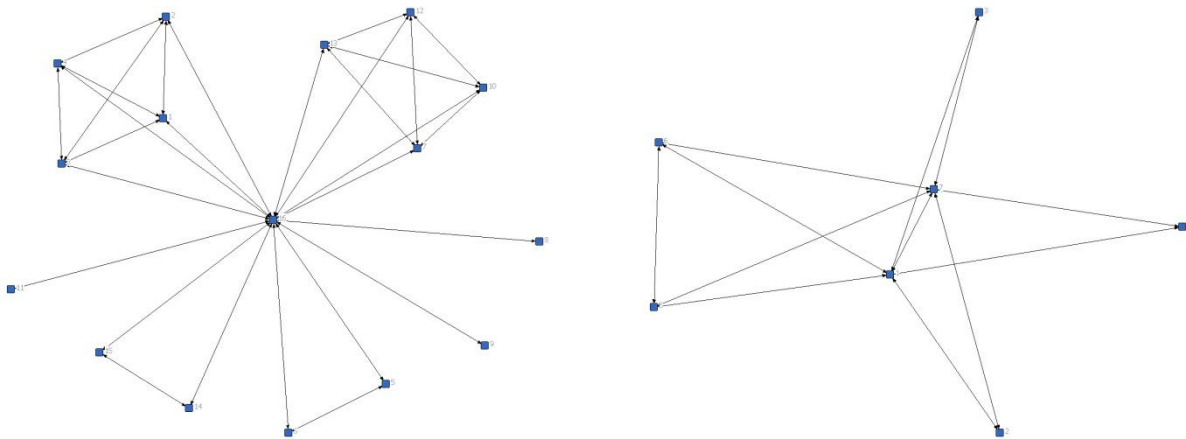
At the end of the questionnaire was a further seven questions gathering the socio-demographic characteristics of the respondent. These included; age in six ten year bands, gender, job type, employment status at DMU, length of time employed by DMU, educational attainment and income from DMU.

Once the respondent (ego) had completed tasks one and two, they were asked to carry out one final task. To gather data from their alters regarding their environmental psychology, it is necessary to survey them, asking them the same questions that are asked of ego (note: alters are not asked any questions regarding their social network). At this point, ego was given surveys by the researcher to pass on to their alters. Surveys were in hard copy and were passed to ego in addressed envelopes. Each survey was sequentially numbered to allow the researcher to identify which alter they had come back from, when returned. For example, if ego no. 1 named five alters, they will receive surveys 1-5, if ego no.2 named five alters, they will receive surveys 6-10, and so on. To allow ego to give each survey to the correct person, the researcher wrote the first name of their alter on the front of the envelope. The researcher kept a record of which person received which numbered survey, using the names from the post-it notes and looking at the number on the survey.

3.4 Post Survey

At this point, the face to face part of the survey is completed. The first task for the researcher is to upload the paper copy of the social network onto UCINET, software specifically developed for analysis of social networks. This ensured that data was not lost by post it notes falling off the A3 page. An example of two ego networks diagrams, produced using UCINET is shown below in Figure 2.

Three Mondays after the face to face survey, the researcher contacts the non-responding alters by email, obtaining email addresses from the DMU email address book. The purpose of this first 'reminder' email is to chase them for a response and to ensure that they have received the survey. This process is repeated again, five Mondays after the face to face survey. A further two weeks after that, non-responding alters were again contacted by email, this time with a link to a copy of the online version of the survey which uses survey monkey. Using this method, it was hoped would gather as many responses as possible from alters, and to complete as much as possible, the social networks of each of the egos that were met face to face.



4.0 Conclusion

Between 25th January 2010 and 31st March 2010, a total of 88 egos were met face to face. These 88 egos elicited the names of 606 alters (mean = 6.9 alters/ego), 414 of which were individuals that were named only once, and 86 that were named twice or more. No individual was named as an alter more than four times. On four occasions, an ego named no alters. The maximum number of alters named by an ego was 26. To get to meet 88 egos, a total of 286 DMU staff were invited. 60 of the 88 responded and completed the survey without the need for a reminder; the other 28 required a reminder before they made an appointment.

At the time of writing (29th April 2010), 399 of the 606 alters have returned their surveys, or completed the online version of the survey, a return rate of 66%. Alters named in the w/c 29 March 2010 are still due a second email reminder (4th May), and alters named after w/c 15th March 2010 are still due an email reminder with a link to the online survey.

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