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Influences on Attitudes to a Personal Carbon Trading System

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Abstract

There are mixed attitudes to the affect Personal Carbon Trading (PCT) can have on global warming and carbon emissions. The NICHE (Norfolk Island Carbon Health Evaluation) project has been developed to explore attitudes towards PCT. The researchers have designed the project to investigate links between health, obesity and an individual's carbon footprint. The first stages of the project undertaken in 2012 involve development of point-of-sale applications, personal carbon consumption web site and collection of data to establish a baseline measuring key health indicators and attitudes to climate change and PCT. This paper reports the findings from the correlation analysis of the key variables from the baseline survey. Correlation analysis was used to examine relationships among the variables. The significant relationships identified from the baseline survey will be re-examined in the latter stages of the project during 2014.

Keywords

Health, Obesity, Carbon Footprint, Personal Carbon Trading Scheme, NICHE.

INTRODUCTION

The NICHE (Norfolk Island Carbon Health Evaluation) project is a multi-disciplinary study that is exploring the link between health, obesity and an individual's carbon footprint. The primary objective is to assess whether personal carbon allowances are effective in reducing an individual's carbon footprint and what impact this has on health behaviours associated with obesity (see http://www.norfolkislandcarbonhealthevaluation.com).

An initial survey of households on Norfolk Island and health evaluations of a sample of residents were conducted in mid-2012. During 2013 selected residents carbon footprints will be monitored using a PCTS (Personal Carbon Trading System) that is being rolled-out on the Island.

Conceptual Foundations of the Research

Prior to the roll-out of the PCTS a baseline study was conducted to examine the attitudes of the residents of Norfolk Island to the introduction of a PCTS. The following four groups of variables are being examined for relationships:

- Self-health evaluation – Information on an individual's self-evaluation of their own health and weight

- Attitudes and behaviours towards health – Individuals who have positive attitudes and behaviours about health and weight management and who exercise regularly are more likely to have a positive attitude towards a PCTS

- Attitudes and behaviours towards the environment - Individuals who have positive attitudes and behaviours towards the environment are more likely to have a positive attitude towards a PCTS

- Attitudes and behaviours towards carbon emissions and climate change - Individuals who have positive attitudes and behaviours towards their carbon footprint, carbon emissions and climate change are more likely to have a positive attitude towards a PCTS

The link between health and obesity in the developed world has been widely researched by a variety of organizations such as the World Health Organization (World Health Organization 2000), the American Medical Association (Hedley et al. 2004) and the National Bureau of Economic Research (Bleich et al. 2007). A number

of organizations including the United States Environmental Protection Agency (United States Environmental Protection Agency 2010), the National Academy of Sciences (Solomon et al. 2009) and the Intergovernmental Panel on Climate Change (Field et al. 2012) have conducted research looking at the environment, carbon emissions and climate change. It has been proposed that obesity and climate change share a common cause and that there is a link between the two (Egger 2007) however it does not appear that this theory has been tested. The researchers believe that the NICHE project is the first study of its kind to explore this relationship. Norfolk Island is a relatively closed environment that makes it an ideal location to undertake the study. The Norfolk Island Government is supporting the study which makes it possible to track resource usage by residents and also to obtain comprehensive data related to the use of products on the island, both imported and locally produced.

Obesity and Climate Change

"*Compared with a normal population distribution of BMI, a population with 40% obesity requires 19% more food energy for its total energy expenditure. Greenhouse gas emissions from food production and car travel due to increases in adiposity in a population of 1 billion are estimated to be between 0.4 Giga tonnes (GT) and 1.0GT of carbon dioxide equivalents per year*" (Edwards & Roberts 2009, p. 1137)

In recent years a number of researchers have begun speculating that there is a link between an individual's carbon footprint, greenhouse gases, climate change and the rising obesity epidemic that started in the developed world and has now spread to developing countries as they increase in affluence.

Faergeman (2007) was one of the first researchers to propose this connection. Similar arguments were made McMichael, Friel, Nyong and Corvalan (2008), and Edwards and Roberts (2009). Garry Egger, one of the principal researchers in the NICHE project, proposed PCT as an option for dealing with both climate change and obesity (Egger 2007; Egger & Swinburn 2011). A similar approach has been presented by Francis Delpeuch et al. (2009) in the book "*Globesity: a planet out of control?*". Delpeuch et al. (2009) developed a model that outlines the link between obesity and greenhouse gases (Figure 1). The model has been included here as it provides a graphical description of the relationship between an individual, food production, the environment and greenhouse gas emissions and demonstrates how the relationship changes as the individuals body weight increases.
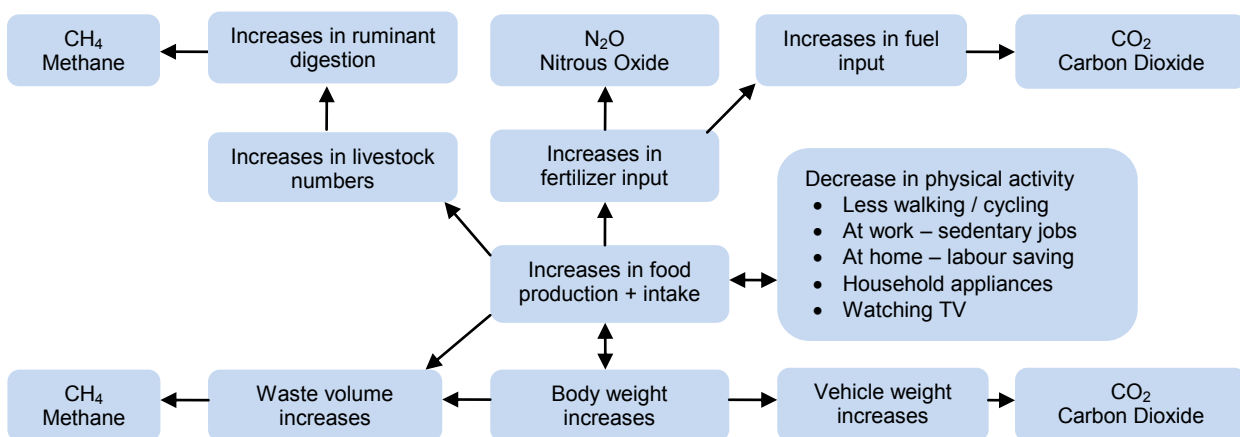

Figure 1: The link between obesity and greenhouse gases (Delpeuch et al. 2009)

METHODOLOGY

The outcomes being reported in this paper focus on the attitudes of residents of Norfolk Island to PCT and the relationships between PCT and attitudes to their own health and environmental concerns.

To assess attitudes towards a PCT system a section of the survey included questions specifically related to respondents' attitudes towards PCT (questions E1 – E10). The 10 questions in this section were all developed from scales used by researchers examining user information satisfaction models and technology acceptance models. The questions in this section are intended to measure the information needed for the dependent variable of the 'information systems' component of the study.

Respondent Selection

The survey was open to any permanent resident of Norfolk Island or any long term non-resident holding a GEP (general entry permit - visa renewal needed every 5 years) or a TEP (temporary entry permit - visa renewal needed every 12 months) over the age of 18. The aim was to gather data about households on Norfolk Island as well as characteristics and attitudes of individuals. It is recognized that the attitudinal data may not reflect the attitudes of all members of the household and that the health related data pertains only to the person completing the survey. However, over 400 responses were received which represents over 60% of the occupied households on Norfolk Island and over 20% of the total population or almost 30% of the population over 18 years of age.

Limitations of the Study

Norfolk Island is a relatively closed system which makes it ideal for this study. However the uniqueness of Norfolk Island also means that extrapolation of results to the general population needs to be undertaken cautiously. The population of the Island is reasonably representative of other developed locations yet it needs to be recognized that the geographic and demographic characteristics can be reasonably expected to affect attitudes to climate change and health. For example, a larger proportion of people on the Island have solar power and hot water systems than in other developed locations. As well, most produce needs to be shipped to the Island which means the carbon value of an item on the Island is much higher than that item in a store at a location in a capital city in Australia.

Additionally, this survey has been administered to gather data to develop a baseline on attitudes and household characteristics as a precursor to the roll-out of a PCT system on the Island. A second survey will be conducted 12 months after system roll-out that will aim to investigate if an understanding of personal carbon footprints influences personal behaviours in relation to health. The results being reported here are the baseline parameters that will be re-evaluated in a secondary study that will be conducted early 2014.

DATA ANALYSIS

The demographic data from the NICHE survey was compared with data from the 2011 census. Figure 2 below shows the age distribution and residential status of the NICHE survey respondents in comparison to the 2011 census and shows that the characteristics of respondents to the NICHE survey are consistent with the population characteristics evident from the census.
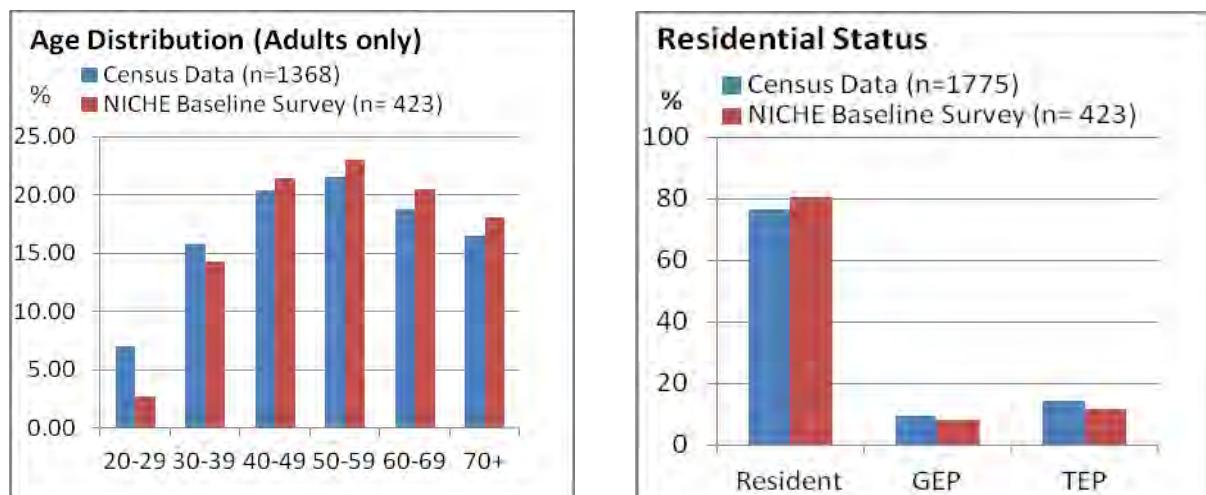

Figure 2: Age distribution and residential status NICHE survey vs. 2011 census

A total of 423 households responded to the NICHE survey out of a total 805 houses on the island. The characteristics of respondents were consistent with the characteristics of the Norfolk Island population as per the 2011 census. Comparisons of some key indicators, highlighting the consistencies between the survey and the census were:

- Responses to the survey indicated that the average household had 2.19 occupants and 2.22 vehicles. In the 2011 census the average Norfolk Island household had 2.23 occupants and 2.24 vehicles.

- In the survey 95.0% of survey respondents used gas for cooking and 97.64% have a water tank. In the 2011 census 95.9% of residents used gas for cooking and 97.02% had a water tank.

Examination of Relationships among the Variables

Correlation analysis was used to determine if significant relationships were present among the survey items. Correlations between items in the different blocks of variables have been examined to determine if intra-item correlations exist and also to determine if there could be the possibility of Type 1 errors if Structural Equation Modelling (SEM) was considered in future analysis. The results that are reported here will be used to determine the items that will be used to form the dependent variable in the latter stages of the study when the effect of the implementation of the PCT is evaluated in 2014.

The correlations are reported on a section-by-section basis that matches the general sections from the survey. Correlations among each of the items in each section as well as correlations between the items from each section are discussed.

Self-heath evaluation

The correlations shown in Table 1 are inter-item correlations among the variables for the survey questions about respondent's attitudes to their weight and health. The specific questions addressed in this section are as follows:

A9. Do you generally consider your health to be...
A10. How would you best describe yourself?
A12. Compared to others on the island of similar age and gender do you consider your body weight to be....
C1. How often do you engage in leisure time physical activity for the sole purpose of improving or maintaining your health?

Table 1. Self-health evaluation correlation analysis

	A10	A12	C1
A9	-.235**	-.123*	-.220**
A10		.437**	.139**
A12			.031

Significant relationships among these items were expected. The negative correlations reflect the scale descriptors and are also consistent with expectations. Essentially the statistical relationships evident from the correlations among these items reflect that people with a positive view of their bodyweight also consider themselves to be in sound health.

Attitudes to health, the environment, carbon emissions and climate change

The correlations shown in Table 2 are for the following questions that were included in the survey to measure respondent's attitudes towards health, the environment, carbon emissions and climate change:

B1. I buy environmentally friendly products as much as I can.
B2. Technology will solve future environmental problems
B3. Being overweight can have serious health effects
B4. Obesity will be solved in the future by medical advances
B5. It is important for me to have a low carbon footprint
B6. A financial incentive would encourage me to reduce my environmental impact
B7. Collectively, households can reduce the impacts of greenhouse gas emissions
B8. I always try to eat healthy food
B9. I am confident I could maintain a healthy body weight if I wanted to
B10. I would consider purchasing an electric car or bike if the price was right
B11. Walking or cycling instead of using the car can help reduce a person's weight
B12. I am unlikely to ever be obese
B13. I am worried about climate change

Table 2 – Attitude to health, the environment, carbon emissions and climate change correlation analysis

	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
B1	-.005	.184**	-.041	.484**	-.001	.415**	.402**	.340**	.132**	.148**	.169**	.342**
B2		.072	.317**	-.023	.166**	.120*	.022	.019	.056	-.031	-.004	.054
B3			.021	.237**	.092	.213**	.237**	.297**	.200**	.405**	.213**	.184**
B4				-.075	.192**	.021	-.047	-.047	.055	-.019	-.102*	.026
B5					.180**	.482**	.263**	.326**	.212**	.310**	.154**	.490**
B6						.288**	.050	.179**	.315**	.114*	.083	.211**

B7							.336**	.405**	.277**	.380**	.161**	.448**
B8								.574**	.168**	.343**	.332**	.270**
B9									.318**	.410**	.443**	.271**
B10										.229**	.224**	.253**
B11											.315**	.339**
B12												.230**

The significant relationships are highlighted in each cell. The first pint to note is that there are a large number of significant relationships ($p < 0.01$) among these survey items and secondly that all the significant relationships are positive. The questions were arranged in sections to reflect the structures the researchers believe would be evident in the data. The large number of correlations among these items supports the supposition that they are measures of one or more latent constructs. The researchers believe that there may be 3 constructs that reflect attitudes and behaviours towards health, attitudes and behaviours towards the environment and attitudes and behaviours towards carbon emissions and climate change underlying the data, but this will be examined in future analyses.

The researchers were hoping to identify positive, significant relationships among the items as it underpins a key precedent of the broader research project but were not certain that the relationships would exist in the baseline data. It is important at this stage of the study to have identified the relationships. It is believed that this is the first research project to examine the relations between obesity and carbon footprints. It is encouraging in this early stage of the research to identify that health consciousness and environmental consciousness are related. This should also be of interest to other researchers in this field and has the capacity to drive a research focus that has not yet been explored.

Attitudes and behaviours to consumption and the environment

The correlations shown in Table 3 shows the inter-item correlations among the questions included in the survey to assess respondent's behaviours in relation to consumption and the environment. The specific questions examined were:

B14. I turn the tap off when cleaning my teeth
B15. I turn lights off when not in use
B16. I sort my rubbish
B17. I look to buy second hand over brand new
B18. I consciously try to reduce waste and recycle
B19.I buy local produce, even if imported is cheaper

Table 3. Attitudes and behaviours to consumptions and the environment correlation analysis

	B15	B16	B17	B18	B19
B14	.557**	.412**	.233**	.413**	.270**
B15		.515**	.145**	.457**	.386**
B16			.203**	.580**	.291**
B17				.409**	.276**
B18					.451**

All of the items in this set of questions were significantly correlated ($p < 0.01$). These items were included in the survey as measures of a proposed conceptual construct called *Attitudes and behaviours to consumption and the environment*. The correlations evident in the matrix above show that individuals who consciously engage in environmentally friendly behaviours do so across a range of behaviours. From an environmental perspective it is pleasing to know that people are engaging in a range of behaviours to address climate change and carbon emissions. Given that the majority of people on Norfolk Island are concerned about climate change (see Figure 3 below) it is encouraging to know that most residents are engaging in environmentally conscious behaviours. Whether or not these behaviours are a direct response to environmental concerns or are a result of generational behaviours is not clear, but nonetheless is a set of behaviours that are consistent with environmental awareness.
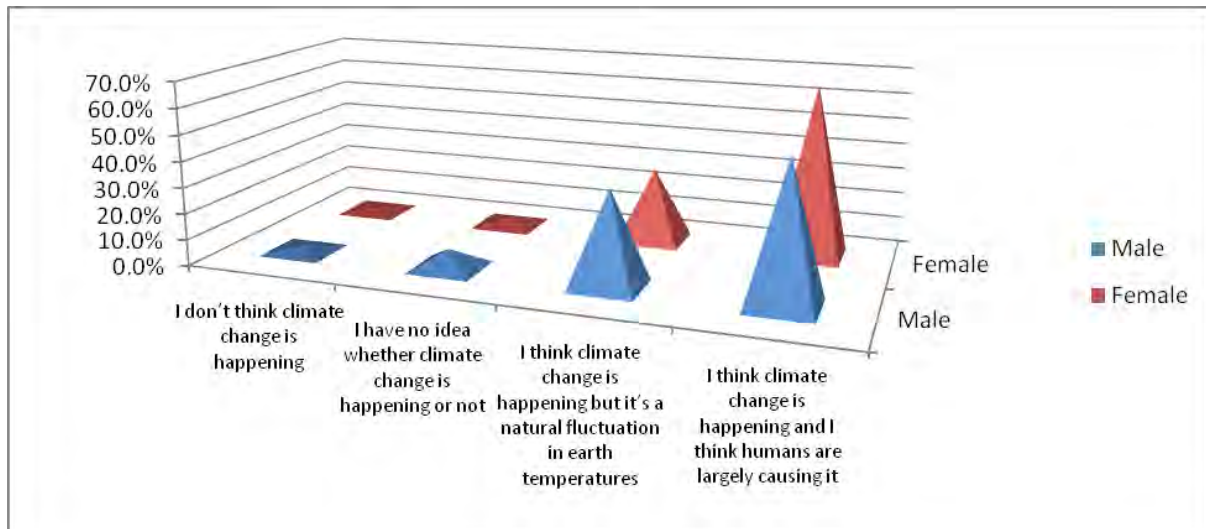
Figure 3: Attitudes to climate Change

Attitude to PCTS

The correlations shown in Table 4 are for the following questions that were included in the survey to assess respondent's attitudes towards a PCTS:

E1. Being able to measure my carbon footprint is important to me
E2. Most people would accept a PCT system as a tool for improving the environment
E3. A PCT system would encourage me to reduce my carbon footprint
E4. A PCT system would encourage me to walk or cycle more and drive less
E5. People who reduce their carbon footprint should be rewarded in some way
E6. People with a greater carbon footprint should have to pay for it in some way
E7. A PCT system would encourage me to eat more healthy, locally grown produce
E8. A PCT system would be useful for me to help monitor my environmental impact
E9. Comparing my carbon usage to the average would influence my consumption habits
E10. There is a strong link between a person's carbon footprint and their health

Table 4: Attitude to PCTS correlation analysis

	E2	E3	E4	E5	E6	E7	E8	E9	E10
E1	.420**	.665**	.566**	.298**	.336**	.526**	.669**	.605**	.468**
E2		.626**	.445**	.235**	.267**	.451**	.484**	.509**	.347**
E3			.705**	.383**	.417**	.614**	.719**	.675**	.512**
E4				.342**	.377**	.657**	.668**	.657**	.486**
E5					.379**	.320**	.385**	.376**	.274**
E6						.348**	.448**	.390**	.416**
E7							.677**	.706**	.544**
E8								.786**	.551**
E9									.569**

Once again all the items in this block of questions were positively and significantly correlated ($p < 0.01$). It is worth noting that some of the variance shared between the items is quite high although no correlation coefficient in the matrix was high enough for any of the items to be considered covariate. Researchers expected that all results would be positive with reasonable levels of variance as all the questions in this block had positive scale descriptors. The high level of variance explained by some of the relationships also confirms that the items are seen as measuring similar things and that they are all potentially related to a higher order latent construct.

The identification of the relationships among these items is key to the current project as these questions were included as measures to be used to form a dependent variable named *Attitudes to PCTS*. This variable will be used for comparative purposes when data from the second stage of the project has been collected and acceptance

of the PCTS is examined as a basis for measuring the success of its implementation. The attitudinal data collected after introduction of the PCTS will be compared to the pre-trial data.

Attitudes to PCTS vs. Self-Health Evaluation

Table 5: Attitude to PCTS vs. Self-health evaluation correlation analysis

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
A9	-.136**	-.035	-.081	-.115*	.028	-.039	.022	-.112*	-.083	-.081
A10	-.007	.043	.026	-.039	.046	.066	-.051	-.044	-.055	.043
A12	.004	-.059	-.031	-.070	.008	.026	-.061	-.062	-.079	.010
C1	.216**	.097	.178**	.153**	.010	.111*	.162**	.169**	.163**	.190**

The correlation analysis between the variables measuring *Attitudes to PCTS* (E1 – E10) and the variables measuring *Self-health evaluation* (A9, A10, A12, C1) is shown in Table 5 above. There were only a small number of significant relationships between these items.

In each case the level of variance explained by the significant relationship was quite low – the highest level between questions C1 and E2 was only 4.7% (r = 0.216, p < 0.01). The small number of correlations among these items is somewhat surprising to the researchers but as this is a baseline survey, correlations among these items will be re-examined in the second survey after users have engaged with the PCTS for 12 months. It would be expected that more relationships explaining higher levels of variance will be evident after users have had the opportunity to use a PCTS and see the impact of their carbon footprint and link this to their own health.

Attitude to PCTS vs. Attitudes to health, the environment, carbon emissions and climate change

Table 6 shows the correlations between the blocks of variables measuring *Attitudes to PCTS* and Attitudes *to health, the environment, carbon emissions and climate change* (B1 to B13). The large number of positive correlations evident shows that people who are concerned about the environment and carbon emissions do have a positive view of the role a PCT can have in addressing environmental concerns.

Table 7: Attitude to PCTs vs. Attitudes to health, the environment, carbon emissions and climate change correlation analysis

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
E1	.377**	.084	.128*	.047	.522**	.168**	.386**	.259**	.216**	.286**	.163**	.049	.487**
E2	.183**	.102*	.092	.067	.238**	.153**	.194**	.163**	.155**	.142**	.082	.036	.288**
E3	.332**	.014	.116*	.043	.416**	.209**	.348**	.148**	.205**	.339**	.144**	.096	.411**
E4	.240**	.035	.167**	.039	.369**	.187**	.291**	.114*	.116*	.300**	.215**	.069	.311**
E5	.089	-.016	.031	.087	.171**	.353**	.262**	.037	.110*	.241**	.117*	.109*	.235**
E6	.141**	-.043	.106*	.032	.249**	.199**	.219**	.121*	.097	.251**	.131**	.054	.298**
E7	.226**	.080	.096	.069	.315**	.234**	.215**	.081	.124*	.252**	.115*	.065	.334**
E8	.331**	.108*	.137**	.051	.426**	.218**	.362**	.193**	.177**	.331**	.183**	.112*	.397**
E9	.255**	.099	.104*	.080	.367**	.247**	.297**	.141**	.136**	.304**	.186**	.058	.412**
E10	.281**	.012	.210**	.030	.415**	.204**	.316**	.250**	.277**	.262**	.248**	.109*	.389**

Correlations between some of the items were to be expected and in fact would have been noticeable if they had not existed. For example the correlation between items B5 (*It is important for me to have a low carbon footprint*) and E1 (*Being able to measure my carbon footprint is important for me*) is no surprise although it would be expected that the variance explained by the relationship would have been higher (r^2 = 27.2%, p < 0.01) given the similarity of the items.

Attitudes to PCTS vs. Attitudes and behaviours to consumption and the environment

Table 7 shows the correlations the block of variables measuring *Attitudes to PCTS* (E1 – E10) and respondent's *Attitudes and behaviours to consumption and the environment* based on the questions about consumption and environmentally friendly behaviours (B14 – B19).

Table 7: Attitudes to PCTS vs. Attitudes and behaviours to consumption and environment correlation analysis

	B14	B15	B16	B17	B18	B19
E1	-.059	-.101*	-.079	-.152**	-.164**	-.154**
E2	.004	.002	-.023	-.039	-.031	-.058
E3	-.042	-.058	-.058	-.062	-.115*	-.101*
E4	-.065	-.061	-.056	-.087	-.051	-.076
E5	.035	.021	.024	-.090	-.033	.024
E6	.002	-.004	-.006	-.047	-.052	-.044
E7	-.042	-.021	-.011	-.044	-.004	-.032
E8	-.115*	-.091	-.084	-.121*	-.144**	-.102*
E9	-.044	-.038	.002	-.094	-.044	-.039
E10	-.060	-.059	-.052	-.128*	-.117*	-.078

There were only a very small number of correlations among the items and the variance explained by these relationships was quite small in each instance. The researchers expected that individuals that have positive environmental behaviours would be expected to have positive attitudes towards PCT. Therefore the small number of significant relationships was somewhat of a surprise, especially given the larger number or relationships evident between attitudes to PCT and attitudes towards the environment, carbon emissions and climate change. This seems to indicate that even though people are willing to undertake environmentally conscious actions they do not necessarily identify with the benefits of a PCT.

CONCLUSION

Norfolk Island is an ideal environment for the study being undertaken for this project. To some extent is atypical as it is isolated and a closed environment making it much easier to monitor consumption. That the current study has established that the majority of residents of the Island are concerned about climate change is encouraging. It indicates that more broadly the general population in developed countries could also be concerned about climate change and carbon emissions. However, extrapolation of the results from the current study to the broader population needs to be undertaken cautiously as the distinctive and relatively closed nature of the Island community could also be a key determinant in the majority of residents being concerned about climate change. Communications among a small group of people living and working in a relatively closed and isolated geographic location could lead to behaviours, norms and beliefs being influenced more extensively and in a direction commonly accepted in the whole community than in other developed countries.

The existence of the significant correlations among the items discussed above is in part justifying the study. That a link between obesity and environmental attitudes exists validates the exploration of this in the broader study. It also presents statistical evidence of a new direction in seeking change to address climate change by linking it directly to personal health benefits.

As the primary aim of the broader project is to assess whether attitudes to personal health can be influenced by an individual's understanding of their carbon footprint, the establishment of the baseline is crucial. It is expected that the relationships between variables and constructs measuring attitudes to the environment and health and attitudes to PCTS will be more evident and statistically that a higher level of variance will be explained after users have had the opportunity to monitor their personal carbon footprints and this is mapped to key health indicators.

REFERENCES

Ajzen, I. 1991. "The Theory of Planned Behaviour," *Organizational Behaviour and Human Decision Process*es (50:2), December, pp 179-211.

Bleich, S., Cutler, D., Murray, C., & Adams, A., 2007. "Why is the developed world obese?" *National Bureau of Economic Research Working Paper No. 12954*.

Davis, F. D., Bagozzi, R. P., and Warshaw, P. R., 1989. "User acceptance of computer technology: A comparison of two theoretical models," *Management Science*, (35:8), pp.982-1003.

DeLone, W. H., & McLean, E. R. 1992. "Information Systems Success: The Quest for the Dependent Variable," *Information systems research, (3:1)*, pp. 60-95.

DeLone, W. H. and McLean, E. R., 2002. "Information Systems Success Revisited," *35th Annual Hawaii International Conference on System Sciences (HICSS'02)*, (8:1), pp. 238-248.

DeLone, W. H. and McLean, E. R., 2003. "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update", *Journal of Management Information Systems*, (19:4), pp. 9–30.

Delpeuchet, F., Maire, B., Monnier, E., and Holdsworth, M., 2009. "*Globesity: A Planet out of control?*", Earthscan, Dunstan House, London.

Edwards, P., & Roberts, I., 2009. "Population adiposity and climate change," *International Journal of Epidemiology*, (38:4), pp. 1137-1140.

Egger, G., 2007. "Personal Carbon Trading: a potential 'stealth intervention' for obesity reduction?," *Medical Journal of Australia,* (187:3), pp. 185-187.

Egger, G., and Swinburn, B., 2011. *Planet Obesity: How we're eating ourselves and the planet to death,* Allen and Unwin, Crows Nest, Australia

Faergeman, O., 2007. "Climate change and preventive medicine." *European Journal of Cardiovascular Prevention & Rehabilitation*, (14:6), pp. 726-729

Field, C. B., Barros, V., Stocker, T. F., Qin, D., Dokken, D., Ebi, K., and Allen, S., 2012. "*Managing the risks of extreme events and disasters to advance climate change adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change*" Cambridge University Press, Cambridge, UK, and New York, NY, USA.

Fishbein, M. and Ajzen, I., 1967, "Attitude and the prediction of behavior", in Fishbein, M. (Ed.), *Readings in attitude theory and measurement* Wiley, New York, pp. 477-492.

Fishbein, M., and Ajzen, I., 1975, *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley, Reading, MA.

Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., and Flegal, K. M., 2004. "Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002," *JAMA: the journal of the American Medical Association,* (291,23), pp. 2847-2850.

McMichael, A., Friel, S., Nyong, A., and Corvalan, C., 2008. "Global environmental change and health: impacts, inequalities, and the health sector," *BMJ: British Medical Journal*, (336:7637), pp. 191-194.

Solomon, S., Plattner, G. K., Knutti, R., and Friedlingstein, P., 2009. "Irreversible climate change due to carbon dioxide emissions," *Proceedings of the national academy of sciences,* (106:6), pp. 1704-1709.

United States Environmental Protection Agency, 2010. "*Climate Change Indicators in the United States*" Retrieved 25 May, 2012 from http://www.epa.gov/climatechange/pdfs/CI-full-2010.pdf

Venkatesh, V. and Davis, F. D., 2000. "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science*, (46:2), pp. 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D., 2003. "User acceptance of information technology: Toward a unified view," *MIS Quarterly*, (27:3), pp. 425-478.

World Health Organization, 2000. "Obesity: preventing and managing the global epidemic," *World Health Organization technical report series 894*, Geneva.

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