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Measuring Community Values for Nature: Overview of a Research Project

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Abstract

The project involves the design of a survey scale to measure values for natural areas: intrinsic, use, non-use and recreation. Focus groups in regional and metropolitan areas were conducted to identify the terminology and concepts people use with respect to natural areas. Literature in psychology, environmental philosophy and economics provided the definitions and theoretical background for the project. A total of 6000 surveys were sent out, comprising 4000 to the general public, 1000 to environmentalists and 1000 to farmers. A 55% response rate was achieved. Factor analysis identified 20 items which comprise the Natural Area Value Scale (NAVS). The NAVS can be used for large population samples to comprehensively measure natural area values. Intrinsic value can now be measured in a way that is comparable with use and non-use values. We have also demonstrated that the NAVS produces valid results across different populations and different environments. This provides decision-makers with more reliable and comprehensive information about how people value natural areas.

People can be grouped according to scores for the values they held, and the relative importance they gave to each value. Cluster analysis identified five clusters with similar characteristics across the three population samples: Traditional, Pro-use, Moderate, Green Recreationist and Pro-intrinsic. These groups define the different combinations of intrinsic, non-use, use and recreation values which people hold. We also show that it is not just the scores for the individual values that is important to decision making, but the way in which people rate the importance of the four values relative to each other.

A Natural Area Preference Model (NAPM) was developed using structural equation modelling, and incorporating results from the factor analysis, cluster analysis and some information relating to environmental behaviour. The model also used results from two decision questions respondents had been asked to make with respect to the management of a natural area. The NAPM shows that all four value sub-scales and cluster membership, together with pro environment behavioural factors can be used to explain people's environmental preferences and willingness to make sacrifices for the sake of the environment.

1. Introduction

This report is a non-technical summary of a research project, undertaken to identify how people value natural areas, and whether or not these values impact upon their decisions about the conservation or use of those areas. One of the important reasons for preparation of this report is to communicate the findings to the many people who participated in the research project through focus groups, survey design testing and responding to the final survey.

The problem addressed in this research is that, at present, the range of values encompassed by instruments which measure values for nature, is incomplete. No instrument adequately deals with intrinsic value. This means that the full range of human values for nature, is not being measured, and therefore, is not available for consideration in decisions made about natural areas. Given that community participation in environmental decision making is now well accepted, it is important that people's values are identified and measured.

The research project is divided into four main sections:

- developing and validating a scale to measure individual's values for natural areas;
- exploring how individuals can be grouped according to their common values for natural areas;
- developing a model to explore how values relate to individuals' preferred environmental decisions; and
- testing whether individuals' values and preferred environmental decisions vary for different types of environment.

2. Background

Making decisions that affect natural environments, whether for their use, protection or conservation, is an important role for governments. It is desirable that such decisions are based on a sound understanding of how people value natural areas. The academic disciplines that deal with natural area values include philosophy, psychology and economics. While each of these disciplines deals with natural area values in a different way, none of them offer a comprehensive method for measuring them. Intrinsic value has proved particularly problematic.

Much has been written in the field of environmental philosophy to define and discuss an intrinsic value for nature. For those interested, Vilkka's (1997) *The Intrinsic Value of Nature* is a comprehensive reference on the topic. This research uses the definition of intrinsic value provided by O'Neill (1992):

> *Intrinsic value is used as a synonym for non-instrumental value. An object has instrumental value insofar as it is a means to some other end. An object has intrinsic value if it is an end in itself (O'Neill, 1992:119).*

O'Neill's definition avoids the distinction between the so called objective and subjective argument. This discussion revolves around whether the value of nature is held by a person (the subjective argument put forward by Callicott (1989)) or whether it is inherently in natural objects (the objective argument of Rolston (1989)). O'Neill argued the distinction is unnecessary because if a person acknowledges that an intrinsic value for a natural area exists, the *location* of that value, (whether as a human concept or as a feature of nature) is irrelevant.

While philosophers have debated the definition and meaning of intrinsic value, psychologists have attempted to explore the extent to which people hold such a value. Psychologists typically develop a series of questions that, in combination, give an indication of how a particular group of people think and/or feel about a topic. The questions are incorporated into a questionnaire (also called a survey instrument). Responses to the survey are analysed using various statistical techniques (in particular, factor analysis) to develop and validate a measurement scale (also called a psychometric scale). The scale can then be used to make measurements on the same topic with other groups of people. So far, efforts to develop a psychometric scale for natural area values have suffered from ambiguity and lack of philosophical coherence in their characterisation of intrinsic value.

All other (non-intrinsic) values are instrumental to human needs and wants. Many different classification systems have been devised for instrumental values. We have adopted a simple system used by environmental economists that has just two categories: use and non-use. Use values encompass the values humans extract from natural areas (timber, water grazing and so on) as well as on-site activities such as recreation and nature study. Non-use value has two aspects. First, people may gain satisfaction from simply knowing a natural area exists, regardless of whether they visit it or use it for some other purpose. Second, people may also value natural areas as a 'bequest' to future generations.

Intrinsic and instrumental values are not mutually exclusive. In fact, one of the problems in valuing nature is that the same object, such as a tree may hold multiple values. 'Intrinsically valuing biodiversity does not preclude appreciating the various ways in which it is instrumentally valuable' (Callicott 1994: 28).

Economic measures of use and non-use values can only incorporate those aspects of these values that are measurable in dollars. Such measures do not take account of the fact that some people are not willing to trade off natural area values for other goods and services. Furthermore, existing measurement instruments (surveys) are not based on an unambiguous, simple value classification that incorporates all value types. There is a need therefore to develop a survey instrument that:

- is applicable to the general public;
- incorporates a philosophically coherent notion of intrinsic value; and
- integrates intrinsic value with other components of natural area value.

The research described in this report addresses these needs. We have developed and validated a survey instrument that can identify and distinguish individual's intrinsic, use and non-use values. We have also developed a model that links environmental values with decisions. These developments are intended as a contribution to more informed decision making with respect to the use and conservation of natural areas.

3. Development of the survey

To achieve our purpose of developing an integrated natural area value scale, and exploring the relationships between values and decisions, we needed a survey instrument that contained the following elements:

- a series of statements (items) that addressed people's values for nature;
- a decision about the future of a natural area that would test the relationship between a person's values and their preferred management scenario;
- a decision about the level of personal sacrifice in jobs, home and income that a person would be willing to make to secure their preferred scenario about the future of the area; and
- questions seeking socio-demographic and behavioural information.

To help find the best way to word the questions and present information, a series of discussions (called focus groups) were held. The focus group discussions involved 45 people, including environmentalists and members of the general public in Albury-Wodonga and Sydney.

Following the focus groups a draft survey was developed and sent to a sample of 600 people, selected at random from the electoral rolls of Victoria and New South Wales. The main purpose of the draft was to help 'fine tune' the wording, to trial some different ways to elicit peoples' preferences, and to help us select the best questions for inclusion in the value scale. People who had attended the Albury focus group discussions also helped in this testing.

An initial list of over 120 items about natural areas was collected from the focus group discussions, a literature review and examination of similar research. The list was narrowed to 66 items for the draft survey. Analysis of answers to these items enabled us to further reduce the list to 34 items in the final survey. Respondents were asked to indicate the extent of their agreement or disagreement with each of these 34 items.

Responses to these questions form the basis for measuring intrinsic, use and non-use values. Unexpectedly, our analysis indicated that the recreation component of use value should be treated as a separate category.

The final survey comprised four versions. Each version included the 34 item scale, of which the following 20 items were ultimately used in the analyses. These 20 items (Table 1) constitute what we now call the Natural Area Value Scale (NAVS).

Note that the intrinsic sub-scale items identify people who agree with statements that *preclude* a belief in intrinsic value, hence they have been 'reverse coded'. It is logical to assume that those people who disagree with such statements hold intrinsic value. We found that this was a better way of measuring intrinsic value than to ask direct 'positive' questions. As one of the focus group participants commented, with respect to intrinsic value: *It is easier to explain what it is not, than what it is.*

To test the extent to which values influenced decision making, the surveys included a scenario section incorporating one page of background information as well as questions asking people to indicate their preferences for a management decision and the level of personal sacrifice they would be willing to make to secure their preference. Variations were built into this section to test the impact of different ecosystem types (forest and wetland) and the mention of endangered species on these decisions. A standard section seeking socio-demographic and some behavioural information was also included.

The final surveys were sent to three different population samples: general public, environmentalists and farmers. The general public sample comprised 4000 names selected randomly from the electoral rolls of Victoria and New South Wales (2000 from each). One thousand members each from an environmental group and a farmer organisation were also surveyed. The responses of environmentalists and farmers enabled us to check the validity of the NAVS.

A total response rate of 55% was achieved. Following adjustment of the data for missing responses, the final data set comprised 1872 general public responses, 797 environmentalist responses, and 385 farmer responses.

Table 1. The Natural Area Value Scale

Sub-scale	Item code	Item
Intrinsic	IN1	The value of nature exists only in the human mind. Without people nature has no value.*
	IN2	The only value that a natural place has, is what humans can make from it.*
	IN3	Places like swamps have no value and should be cleaned up.*
	IN4	Ugliness in nature indicates that an area has no value.*
	IN5	The value of an ecosystem only depends on what it does for humans.*
	IN6	Only humans have intrinsic value – that is, value for their own sake.*
Non-use	NU1	Natural areas are valuable to keep for future generations of humans.
	NU2	I need to know that untouched, natural places exist.
	NU3	I'm seeing natural areas the next generation of children may not see, and that concerns me.
	NU4	We have to protect the environment for humans in the future, even if it means reducing our standard of living today.
	NU5	Even if I don't go to natural areas, I can enjoy them by looking at books or seeing films.
	NU6	There are plenty of natural places that are not very nice to visit but I'm glad they exist.
Use (non-recreation)	US1	Forests are valuable because they produce wood products, jobs and income for people.
	US2	To say that natural areas have value just for themselves is a nice idea but we just cannot afford to think that way: the welfare of people has to come first.
	US3	All plant's and animal's lives are precious and worth preserving but human needs are more important than all other beings.
	US4	Our children will be better off if we spend money on industry rather than on the natural environment.
	US5	It is better to test new drugs on animals than on humans.
	US6	I don't like industries such as mining destroying parts of nature, but it is necessary for human survival.
Recreation	RC1	Natural areas are important to me because I use them for recreation.
	RC2	Natural areas must be protected because I might want to use them for recreation in the future.

* indicates a reverse coded item

4. The Natural Area Value Scale

Responses to the 20 item NAVS were analysed using factor analysis. The most important result is that the scale items measure and distinguish intrinsic, non-use and use and recreation values. Statistical analyses indicated that each of these four sub-scales has a good reliability.

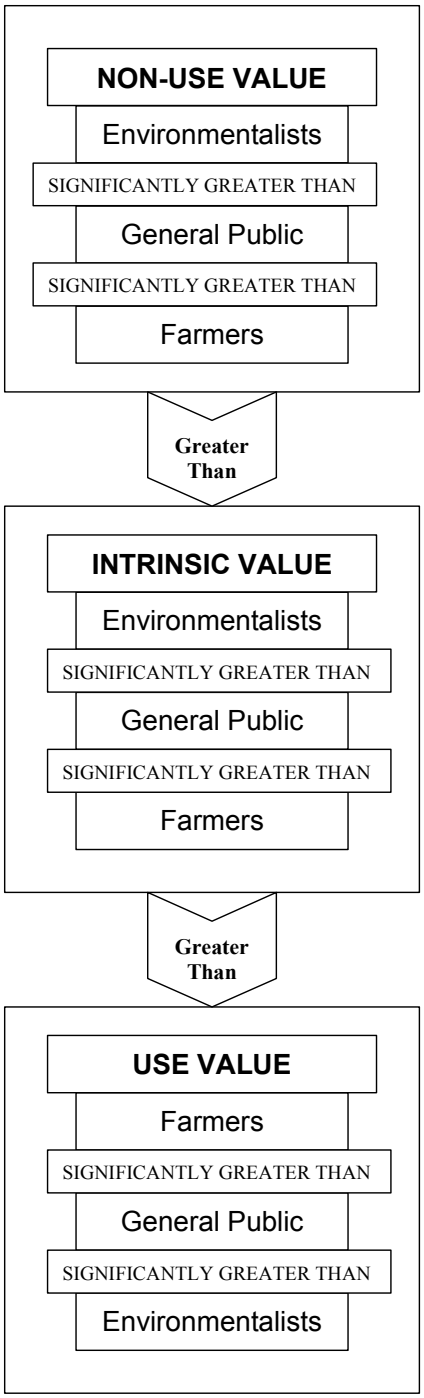
Results for the three populations provided evidence of scale validity (Figure 1). There was a significant difference in the strength of each value type for each population. For example, as expected, environmentalists hold stronger intrinsic values than farmers, whereas farmers have stronger use values than environmentalists. The highest scores for intrinsic value and the lowest scores for use value were measured for the environmentalists and the highest use values but lowest intrinsic values, were scored by the farmers. The general public sample has values that are intermediate between environmentalists and farmers.

For each population, non-use values are more important than intrinsic values, which in turn are more important than use values. It is interesting to note that even though farmers' intrinsic values are less strongly held than for the other two populations, they are still greater than their use values.

The identification of a fourth value for natural areas, (recreation) was not anticipated in the initial research design. Two items which had been included for recreation value, one a current use value and one a future use value, consistently appeared as an important factor in all of the analyses.

The value types themselves are related to each other in the ways that match theoretical expectations. That is, intrinsic value is positively related to non-use value and has a high negative relationship with use value. Non-use value has a negative relationship with use value. Recreation value is related to non-use value, but has a weak relationship with intrinsic and use values, and overall seems to be distinct from the other types.

Figure 1. Relative value strengths for the three sub-scales and population samples[1]



[1]Care should be taken in interpreting Figure 1 with respect to farmers' non-use and intrinsic values. A significant difference between the three populations is that analysis of the farmers' data did not produce a clear non-use category. Some of the non-use items tended to be linked with the intrinsic items, suggesting that the distinction between intrinsic and non-use values is not relevant for farmers.

5. Grouping people according to their common values

It is of interest to group people according to their common values, and to see how these groupings match with the three population samples – general public, environmentalists and farmers. We used a technique called cluster analysis to group the survey respondents according to their values. The analysis produced five distinct clusters (individuals with common values) as shown in Table 2. A brief description of each cluster follows. Note that the clusters were generated from within each population and not from the total sample. This means that, for example, although some environmentalists are more 'Traditional' than others, they are still more 'green' than Traditional people from the other two populations.

Table 2. Membership of clusters for the three population samples

Cluster	General public		Environmentalists		Farmers	
	No.	%	No.	%	No.	%
1. Traditional	80	6.2	179	23.6	77	21.9
2. Pro-use	349	27.2	3	0.4	73	20.8
3. Moderates	241	18.8	316	41.7	47	13.4
4. Green recreationists	292	22.8	160	21.1	103	29.3
5. Pro-intrinsic	320	25.0	100	13.2	51	14.5

Cluster 1 – Traditional

This cluster is small, representing only 6% of the general public sample. Traditionalists are characterised by a high negative response to intrinsic value and the high importance of use values and recreation. Non-use values are unimportant or negative. However it makes up a greater proportion of the two special interest groups. Traditionalists comprise 23% of the environmentalists and nearly 22% of the farmers. Environmentalists, unlike the general public and farmers, tend to view recreation values as unimportant and in this respect are similar to the Pro-use cluster. Traditionalists value nature only for its direct use to humans but not for its own sake. In the general public sample, Cluster 1 members tend to be older than those of the other clusters, with 48% being retired, and they are also more likely to live in country areas. Traditionalists have lower levels of income, education and representation of women than the other clusters. This was the only cluster in the environmentalist sample where representation of women was lower than the representation of men.

Cluster 2 – Pro-use

This is the largest cluster for the general public sample (27%) and of moderate size for farmers (21%). Pro-use people are characterised by negative responses to intrinsic, non-use and recreation values and high positive use values. This cluster values nature only for its direct use to humans, such as mining, logging and water use. In the environmentalist sample, this cluster is negligible and contains only three members.

Cluster 3 – Moderate

This cluster was generally labelled as moderate to indicate a set of values that was not particularly weighted towards any single component. This group represents 19% of the general public sample, and members have a moderately positive value for non-use, use

and recreation values, and a negligible score for intrinsic value. They are in the mid-range with respect to socio-demographic characteristics, and so with respect to age, income and so on they can also be grouped as moderate.

However, between the three population groups there are some differences. The Moderate cluster in the environmentalist population is large and comprises nearly 42% of the sample. They are characterised by low positive scores for every value, with recreation being a higher score. Moderate farmers comprise 14% of the population and could also be described as 'anti-recreationists'. This cluster has a low but positive score for intrinsic and use value, but a relatively high negative recreation value. The group has the lowest proportion of women, and all of this cluster's members have lived on a farm. They have a high membership of environmental groups and donate voluntary work equally to business and the environment.

Cluster 4 – Green Recreationists

This is a large cluster, with members having high positive intrinsic and recreation values and negative use values. It comprises 23% of the general public sample, 21% of environmentalists and 29% of farmers. This cluster is comprised of mainly city-based people in the general public sample. More people from this cluster are members of environment groups than for the other clusters, and 33% donate money towards the environment. They differ from Cluster 5 in the importance that they give to recreation values.

The environmentalists in this cluster are more likely to be younger and to have lived on farms or rural areas than the other environmentalist clusters. They are the most active of the environmentalists in volunteer work for the environment. Farmers in this cluster are younger and have experienced higher levels of city living than other farmer clusters. They are more likely to be members of business groups.

Cluster 5 – Pro-intrinsic

Cluster 5 is the inverse of Cluster 2, having a high positive intrinsic value and a high negative use value. This cluster also displays a high negative recreation value and negative non-use value. In other words, the Pro-intrinsics value nature primarily for its own sake and not for its value to humans. This cluster is represented by 25% of the general public sample and 14% for each of the environmentalists and farmers. The general public cluster has the highest representation of women, high levels of income and education, and high levels of donations to environmental causes.

The Pro-intrinsics from the environment group are a relatively small cluster. Many are older women with lower incomes compared to other environmentalists. This is one of the smallest clusters from the farmer sample. It is the youngest and is the only farmer cluster having equal representation of women (at 50%). Farmers from this cluster have by far the highest level of donations towards the environment.

As shown in Table 3, general public members from clusters featuring higher intrinsic value and lower use value (Green Recreationists and Pro-intrinsic) preferred parks over timber harvesting more than cluster members with low intrinsic values and high use

values (Pro-use and Moderates). While having a high incidence of support for the 'all park' option, they are significantly lower than the two greener clusters for the 'mostly park' option. A similar pattern occurred for the Traditionals in the environment group, but not the farm group.

Table 4 shows the degree of personal sacrifice that each cluster within the general public sample is willing to make to secure their preferred extent of park reservation. More people in the groups with higher intrinsic values are willing to make higher sacrifices than those in the groups with lower intrinsic values. Over half the Green Recreationists and Pro-intrinsics were willing to make at least a moderate sacrifice to secure their preferred degree of park reservation. Traditional, Pro-use and Moderate people had the least commitment to secure their park preferences, with over half willing to make only a small sacrifice or none at all. A similar structure of decision making was found for the clusters in the environmentalist and farm groups.

Table 3. Management preferences - general public by cluster

Management preference	Traditional (%)	Pro-use (%)	Moderate (%)	Green rec. (%)	Pro-intrinsic (%)
All park no timber harvesting	10	3	3	9	9
Mostly park, some harvesting	35	27	37	53	54
Some park, considerable harvesting	45	66	57	37	36
No park, all forest available for harvesting	10	4	3	1	1

Table 4. Personal sacrifices - general public by cluster

Personal sacrifice	Traditional (%)	Pro-use (%)	Moderate (%)	Green rec. (%)	Pro-intrinsic (%)
Preserve park at any cost	12	2	6	12	11
Willing to make significant sacrifice	18	16	23	39	36
Preserve with moderate sacrifice	10	8	10	11	14
Preserve only with small sacrifice	26	43	41	27	25
No willingness to sacrifice	34	31	20	11	14

6. The Natural Area Preference Model

It is important to understand how peoples' values are related to the way they would prefer to see natural areas managed, and the extent that they are willing to make sacrifices to secure their preferences. As noted above, the survey included questions that enabled us to explore the relationships between values, management preferences and willingness to make personal sacrifices. We have already explored some of these relationships in our consideration of clusters based on common values. However, further exploration is warranted. It is possible to incorporate values, clusters, preferences, willingness to sacrifice and behavioural indicators into a single 'model'.

Structural Equation Modelling (SEM) is a complex technique that combines the different analyses and is able to establish and quantify the relative strength of these relationships,

as shown in Figure 2. SEM combines the different analyses discussed in the previous sections of this paper and is able to compute the results of multiple variables simultaneously. In this way, it can perhaps be regarded as a more realistic approach to social analysis, than analysing variables individually, since the different variables all exert an influence on each other. Dealing with them collectively is also valuable, since it is known that people can hold conflicting values, beliefs and behaviours (Eagly & Chaiken 1993).

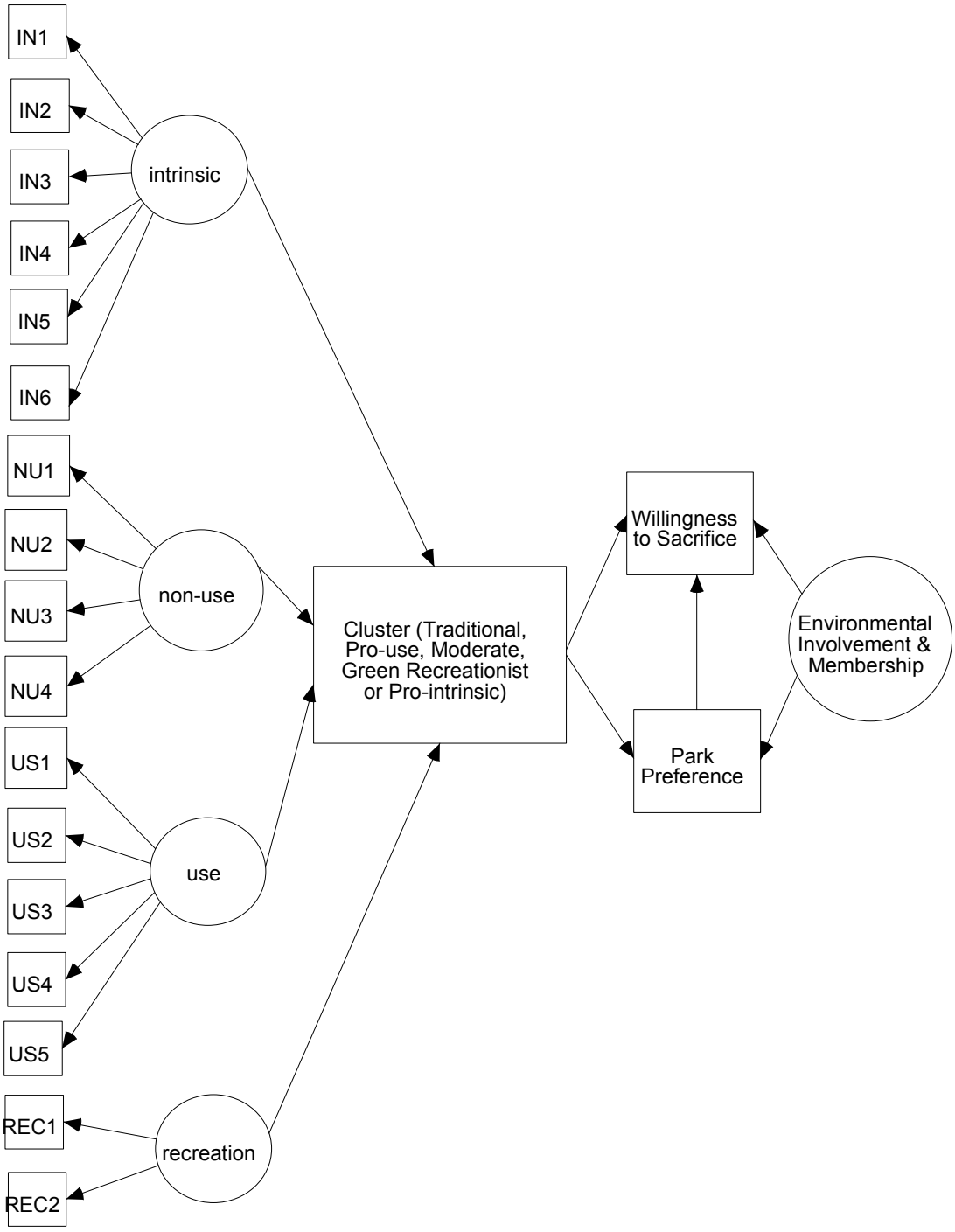
The left-hand side of Figure 2 shows the items that comprise the intrinsic, non-use, use and recreation sub-scales of the NAVS. There are also correlations between each of these sub-scales, but to keep the figure as simple as possible, the arrows showing these correlations have been suppressed. One use value item and two non-use value items from the NAVS have not been included, because they do not make a significant contribution to the SEM model.

Overall, Figure 2 shows that the strength of people's intrinsic, non-use, use and recreation values influences their preferences for park protection, as well as the extent that they are willing to make sacrifices for environmental protection. The relationship between values, preferences and willingness to make sacrifices are strongest if people are first divided into one of the five clusters described in Section 5. The extent that people have been involved in environmental issues or made donations to environmental groups is also a good predictor of their preferences.

The model shows that higher levels of intrinsic value, and to a lesser degree, higher levels of non-use value, ultimately leads to decisions that favour higher levels of conservation. Conversely, people who scored higher use and recreation values, tend to opt for lower levels of conservation. These measures are moderated through clusters which classify people according to five different combinations of values which they hold. This means that it is not just the scores for the individual values that is important to decision making, but the way in which people rate the importance of the four values relative to each other.

The model was a "good fit" for each of the three groups - general public, environmentalists and farmers. However, there are distinct differences in the preferences of the three groups.

Figure 2. Relationships between values, preferences and willingness to make sacrifices



As expected, given their high non-use and intrinsic values, environmentalists prefer higher levels of protection than other groups (Table 5). Environmentalists are also willing to make larger personal sacrifices to secure their preferred management scenarios than either the general public or farmers (Table 6). Eighty seven per cent of environmentalists preferred the park protection to the timber harvesting scenarios, compared with 48% of the general public and 16% of farmers. In the environmentalist group, 75% were willing to make a significant sacrifice to have the forests reserved as a park, compared with 35% of the general public and 16% of farmers. These choices reflect the relative differences in values between the three groups with environmentalists having strong intrinsic values and farmers having strong use values, with the general public in between.

Table 5. Frequency of responses to management decision – by population sample

Management preference	Environmentalists		General public		Farmers	
	No.	%	No.	%	No.	%
All park no timber harvesting	110	14.5	80	6.2	6	1.7
Mostly park, some harvesting	549	72.4	541	42.2	50	14.3
Some park, considerable harvesting	96	12.7	627	48.9	249	70.9
No park, all forest available for harvesting	3	0.4	34	2.65	46	13.1
TOTAL	758	100	1282	100	351	100

Table 6. Frequency of responses to personal sacrifice decision - by population sample

Personal sacrifice	Environmentalists		General public		Farmers	
	No.	%	No.	%	No.	%
Preserve park at any cost	126	16.6	102	8.0	8	2.3
Willing to make significant sacrifice	446	58.8	354	27.6	49	14.0
Preserve with moderate sacrifice	77	10.2	138	10.8	26	7.4
Preserve only with small sacrifice	65	8.6	428	33.4	144	41.0
No willingness to sacrifice	44	5.8	260	20.3	124	35.3
TOTAL	758	100	1282	100	351	100

7. Effects of context on values and preferences

The NAVS is intended as a general tool that can be used across different populations and environmental contexts. To test whether different environments are related to different values, three variations of the survey were used: forests, wetlands without endangered species and wetlands with endangered species. The following comparisons were made:

- the three environments and four value sub-scales for the general public sample:
    - as a whole;
    - for each cluster;
- the three environments and park preferences for the general public sample:
    - as a whole;

    - for each cluster;
- the three environments and willingness to sacrifice for the general public sample:
    - as a whole; and
    - for each cluster.

For the general public, with two exceptions, the comparisons did not expose any differences. Cluster 3 (the Moderates) valued forests for recreation more than they did wetlands, and they valued wetlands more than forests for use. Cluster 5 people (Pro-intrinsics) had significantly higher negative use values for the wetland in which the endangered species lived, than for the forest. One farmer cluster (Pro-use) valued wetlands over forests for recreation, and Cluster 1 (Traditionals) in the environmentalist sample preferred forests over wetlands in terms of park protection. However, it is important to note that the environments overall were prepared to make a significantly greater personal sacrifice for forests than wetlands. This may reflect the fact that an important part of the environment movement's campaign efforts have been concentrated in forest areas.

Similarly, different environments did not influence respondent's preferences and willingness to make sacrifices, except for the Pro-intrinsic cluster, who were prepared to make a significantly higher personal sacrifice for the forests than for wetlands. No other significant differences were found between respondents' preferences for conserving forests, wetlands without endangered species, or wetlands with endangered species. Despite their very different characteristics, respondents treated forests the same as wetlands when it came to protection and willingness to make sacrifices. Similarly, the presence of endangered species made no difference except for the Pro-intrinsics.

Overall then, people's values and preferences for park protection do not vary for different types of environment. People seem to be either concerned for all environments, or not much concerned at all. This conclusion matches with numerous comments made by people in the focus groups.

8. Conclusions

The NAVS is a useful new instrument for measuring individuals' values for natural areas. It can be used to identify the relative strengths of individuals' intrinsic, non-use, use and recreation values. The success of the intrinsic value sub-scale is particularly important, given that previous attempts to measure intrinsic value have either been flawed or unsuccessful. We have also demonstrated that the NAVS produces valid results across different populations and different environments.

The need for a distinct recreation value sub-scale was only identified during the work, and consequently it is measured by only two items. Further development of the scale is required to more fully characterise this sub-scale. While the NAVS has been developed and tested in Australia, we expect that it would also have validity and reliability in countries with similar characteristics in Europe and North America. It would be useful to confirm this expectation by conducting NAVS surveys in these countries. On the other

hand, it should also be noted that the NAVS has been designed within and for a specific cultural context - that is, for a general public sample in a developed economy. The NAVS should not, for example, be used to measure the values Indigenous peoples have for their environments.

Overall, higher intrinsic values were held by environmentalists, followed by the general public and farmers. The levels of intrinsic values were subsequently reflected in the clusters identified and the level of conservation or use and the personal sacrifice people were prepared to make.

Cluster analysis showed that within each of the main populations, five different groups can be identified, based on their common values: Traditional, Pro-use, Moderate, Green Recreationist and Pro-intrinsic. These groups define different combinations of the intrinsic, non-use, use and recreation values which people hold. The relative importance of each value, as reflected in their cluster membership, determines the decisions they are likely to make about the use or conservation of natural areas.

The preference model shows that the inclusion of a number of factors, in addition to values, helps to determine the decisions people make about the conservation or use of a natural area. The NAPM shows that each value sub-scale and cluster membership, together with pro environment behavioural factors can be used to explain people's environmental preferences and willingness to make sacrifices for the sake of the environment. All four sub-scales are important influences on park preferences and willingness to make sacrifices. The presence of the clusters in the model shows that it is not just the scores for the individual values that is important to decision making, but the way in which people rate the importance of the four values relative to each other.

It is widely acknowledged that no single approach is going to provide the 'magic answer' to conflicts over the use of nature (Wilks, 1990; Brown 1984). The NAVS is intended for use in conjunction with a range of other instruments, and it certainly does not replace or obviate the need for the processes of democratic decision making. 'Where environmental valuation studies have been undertaken they have tended to provide additional information for a decision-making process in which judgment by politicians and administrators still plays a crucial role' (Garrod & Willis, 1999: 12).

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