

CHAPTER 7 CONCLUSION

7.1 Comments on the results

The following comments relate to the results of this research project, with specific reference to the dimensionality and the correlates of environmental concern.

7.1.1 Comments regarding the factor analyses and the

The results of the factor analyses described in Section 6.5.1 indicate that the anthropocentric items in the measurement scale represent one factor, and the ecocentric items represent another factor. As these anthropocentric and ecocentric items were specifically developed and selected to reflect anthropocentric concern and ecocentric concern respectively, it would seem reasonable to conclude that these factors represent anthropocentric and ecocentric aspects of environmental concern.

However, the factor analyses also indicated that when the anthropocentric and ecocentric items are analyzed together, a single factor emerges. This suggests that anthropocentric concern and ecocentric concern are each separate aspects of a more comprehensive environmental concern construct. The anthropocentric and ecocentric factors can therefore be seen as subfactors of a general environmental concern factor.

Following from the above, it is reasonable to state that (i) environmental concern may be conceptualized and measured as a bi-dimensional construct, and (ii) when appropriately measured, these two dimensions are each a part of a single, more comprehensive construct. This implies that, once adequate recognition has been given to its differentiated basis, environmental concern may also be measured as a uni-dimensional construct.

The results of the factors analyses seem to suggest giving consideration to an inclusive rather than an exclusive approach to the debate regarding the uni- versus multi-dimensionality of environmental concern.

The uni-dimensional approach may initially seem to contradict current multi-dimensional ideas regarding environmental concern, but the existence of a single general factor does not necessarily negate the existence of sub-factors, provided that adequate attention has been paid to the definition of the latter as correlated sub-factors which together uniquely define the one general factor. It is therefore possible that the multi-dimensionality of environmental concern, that is, its differentiated basis, can be understood in terms of separately identifiable sub-factors which, when analyzed together, identify a single uni-dimensional construct.

7.1.2 Comments regarding the correlations

Firstly, of note is the significant positive correlation between involvement in the activities of an environmental organization and level of environmental concern. This agrees with the research findings of Dunlap and Van Liere (1978), and Weigel and Weigel (1978).

Secondly, the lack of significant correlations between any of the biographic variables age, gender, education and income and environmental concern provoked some thought, but was not wholly incompatible with other research studies which have found conflicting relationships between these variables, as may be deduced from the following summary of relevant points from Section 2.5.1.

- (i) Age: Differing results have been reported in the United States. While some (1978b; Arcury & Christianson, 1990). In
- (ii) Gender: Research by Blum (1987) found no difference between the level of while Arcury and Christianson (1990) found

- (iii) Education: One of the most consistent positive correlates of environmental concern have been reported in South African studies by Samdahl and Robertson (1989) in the United States.
- (iv) Income: Research by Scott and Willits (1994) indicated a positive correlation between income and environmental concern.

The above four points would seem to indicate that, while certain variables, for example, level of education and income, do seem to be more consistent correlates than others, it would be expedient not to draw any definitive conclusions regarding the exact and consistent correlation of these variables with environmental concern.

In addition, the following two points are offered for consideration regarding the correlation results as shown in Table 6.20:

- (i) As mentioned in Section 6.5.4 the filtering-out of certain responses, in the main study, that some correlations were found in the main study on the assumption that the filtering-out was based on the assumption that the responses were not relevant to the study.
- (ii) Some of the differing approaches used by researchers to investigate the biographic and/or demographic correlating factors, such as age, gender, and education, have been used in the main study.

As mentioned in Section 2.5.3, some researchers have hypothesized that environmental concern is influenced by egoistic/social-altruistic/biospheric factors.

Tarrant and Cordell (1997) state that some environmental concern scales are based on these factors.

In this research study, the general model of the formation and expression of environmental concern is based on the factors mentioned in the paragraphs above, to describe the process of environmental concern.

Differing constructs with respect to the model of environmental concern responses, giving rise to apparently different results.

7.2 Suggested modifications to the measurement scale

The results of the factor analyses suggest that, at this stage of the research, statement number 29 should be removed from the scale. An alternative option would be to reverse-score this item. However, the possibility that it can be construed as ambiguous, as well as its association with the emotional issue of hunting, support its removal.

This action would result in a 31-item measurement scale having 15 anthropocentric and 16 ecocentric items being available for further development.

7.3 Further development of the measurement scale

The results of this research can be verified, or investigated further, using a larger, nationally representative sample of participants. All independent variables, including Ethnic Group and Home Language, should be properly represented in this sample by sufficient numbers across all levels of each variable.

The following suggestions are proposed for further development of the scale and future research.

7.3.1 Verification of reliability

The reliability of the measurement scale developed during this research was noticeably higher than that of other environmental concern-type scales as indicated in Table 6.22. A similar statistic (Cronbach's alpha coefficient) can be obtained for the larger, nationally representative sample and compared with those in Table 6.22.

Two sets of data can be identified according to whether the participants were involved in the activities of an environmental organization or not. These would be the "involved" and the "non-involved" groups.

As a further confirmation of reliability, Cronbach's alpha for the "involved" and the "non-involved" groups can be obtained. Note that, while reliability might be expected

to be higher for the "involved" group, this might not necessarily be the case, as found by Dunlap & Van Liere (1978) when researching a measurement scale for the New Environmental Paradigm (NEP). In this instance, these researchers suggest that the lower reliability found for environmentally oriented participant item scores compared to those of the general public group may be explained by the lower item standard deviations within the former group.

7.3.2 Verification of construct validity

To confirm the construct validity of the measurement scale as indicated by the correlation described in Section 6.5.4, a difference-of-means test or an analysis of variance can be performed on the two samples as specified in Section 7.3.1 to provide a comparison between the means of the "involved" participants and the general population.

7.3.3 A stability test

A representative subset of participants can be selected according to their availability for a "retest" after a suitable interval, for example, four to eight weeks, in order that a test-retest comparison can be performed to quantify the stability of the measurement scale.

7.3.4 Consideration of items for exclusion from the measurement scale

In Section 7.2 the recommendation was made that statement number 29 be removed from the scale. In addition, the following should be noted for consideration during further research using this measurement scale.

Factor analysis of the 32-item scale described in Section 6.5.1 indicated that statement number 28 has a low loading on the first factor, and also loads, together with statement numbers 17, 19 and 24, on a second factor. Based on the loading of

statement number 28 shown in the factor analysis of the 16-item anthropocentric subscale (Table 6.2), it was decided that this statement should remain in the scale at this stage of the research. The loadings of statement numbers 17, 19 and 24 on the first factor are within acceptable limits, that is, 0.300 or higher, to permit the conclusion that they should remain in the measurement scale. However, factor analyses should be examined after further research using a larger sample, to determine whether the loading of any of these 4 items has changed to the extent that the item should become a candidate for removal from the measurement scale.

A further point regarding the exclusion of items from the questionnaire can be made with reference to one statement in this research project (statement number 22) which can be construed as including elements of both the "air, land and water" and the "non-human life" categories. This was noted at the time that the statements were being scrutinized to identify a possible method of classifying the "filtered-out" data. However, the presence of this item in the measurement scale had no effect on the research results as, irrespective of category, it belonged to the Ecocentric subscale. (While the results at the subscale level were unaffected, results at the lower, category level may have been affected had they been included in this investigation. Any future research which attempts to investigate environmental concern using the scale developed in this study at the "category within subscale" level as defined in this study, must therefore consider modifying statement number 22 or excluding it from the scale).

7.3.5 Consideration of a controlled environment for

The filtering-out of data resulted from the conclusion that some participants had interpreted various statements in the measurement scale incorrectly. This was determined by an analysis of the difference between the mean scores of the positively- and negatively-scored items, as stated in Section 6.5.1. Apart from the magnitude of the difference, there was no other obvious method for categorizing this data.

Nevertheless, the reduced number of valid responses available for use in this research project highlighted the fact that, in order to maximize the generalizability of the measurement scale, effort should be made to maximize the number of useable questionnaires across all levels of independent variables. The following suggestion is offered for consideration.

Ideally, a researcher should be present during the time that questionnaires are being completed to ensure that (i) the instructions to the participants, and especially (ii) the nature of the statements to be rated, (for example, positively-worded and negatively-worded), is clearly understood. Additionally, the researcher would be available immediately to clarify any further queries relating to the content of the questionnaire which may be raised by the participants.

Several additional observations would seem to support the above suggestion. The number of questionnaires which were discarded due to errors, and the length of time taken to receive an appropriate number of completed questionnaires can also be reduced by the provision of an environment in which the researcher/s can provide some form of instruction and support to the participants with regard to their responses.

It is reasonable to state that the ability of researcher/s to identify factors (and correlates) in the participants' data is at least influenced by (i) the questionnaire and/or item construction, and (ii) the ability of the participants to interpret and understand the items as the researcher intended. Without identifying the research hypotheses, the participants should therefore understand the items to the extent that their conceptualization of the construct being measured is compatible with that of the researcher/s.

This further supports the suggestion that participants should complete the questionnaires in a controlled environment, where occurrences such as the misunderstanding or misinterpretation of statements can be minimized. There are obviously practical limitations, should the number of participants be very large, for example, several thousand. The above is therefore offered as a suggestion for

consideration, and to emphasize the need to minimize the possibility of having to reduce the sample group size in order to obtain meaningful data.

7.4 Opportunities for additional research

The relationship between environmental concern as an attitude and corresponding environmentally concerned behaviour was discussed in Section 2.5.2. In Section 2.1.1 "additive" and "averaging" models of environmental concern were presented. In this study "Meanec" was expressed as the average of "Anthropocentric" and "Ecocentric" scores, as described in Section 6.5. The type of data available from this research provides a basis for investigating attitude-behaviour correspondence as well as exploring the "additive" or "averaging" nature of the contributing factors of environmental concern.

7.4.1 Attitude-behaviour correspondence

Fishbein and Ajzen (1975) propose that a high degree of correspondence should exist between attitude and behaviour. Several researchers have investigated this relationship using different approaches and various factors, for example, perceived control (Ajzen & Madden, 1986; Chaiken & Stangor, 1987), personal relevance (Newhouse, 1990). With regard to environmental concern and environmentally responsible behaviour, Tarrant and Cordell (1997) claim that variations in the measurement of environmental concern as an attitude may affect the degree of attitude-behaviour correspondence. Willers (1996) comments that, while a definitive relationship between attitude and behaviour may not exist, the relationship appears to be influenced by the interaction of several factors. As stated in Section 2.5.2, environmental concern may not always lead to environmentally responsible behaviour, but it is reasonable to suppose that behaviours which have already manifested have done so as a function of a concerned attitude. Environmentally responsible behaviour can therefore be seen as a reliable indicator of the attitude environmental concern.

By including items on the measurement scale in order to estimate the strength of appropriate environmental behaviours and/or behavioural intentions, it would be possible, in theory, to investigate the relationship between environmentally responsible behaviour and the three measures of environmental concern provided by this study.

To be noted, though, is that, in the case of South Africa, with widely different population biographics/demographics, variations in environmentally responsible behaviours may result from very different reasons.

7.4.2 Averaging and additive models

The theoretical model used in this research project was in accordance with the "averaging" model described in Section 2.1.1. An "additive" model was also discussed. Use of the "sum" parameter in SPSS (to supplement the "mean" parameter used in this project), would enable the "additive" data to be obtained. This would enable an investigation into the "averaging" versus "additive" nature of the model of environmental concern to be carried out.

An "additive" model used to investigate anthropocentric concern and ecocentric concern as two correlated subfactors of one general factor may be expressed in the form of a sum-of-two-products regression equation, which would be mathematically similar to the three-factor model developed by Stern, Dietz and Kalof (1993) to measure "motivation to act in an environmentally concerned manner".

The inclusion of items on the measurement scale which pertain to environmental behaviour would allow the strength of the relationship between environmental concern and environmentally responsible behaviour to be investigated not only in terms of a general environmental concern factor, but also in terms of two correlated subfactors, that is, in terms of its anthropocentric and ecocentric tendencies.

7.4.3 Opportunities for multi-lingual research

The questionnaire used in the main study of this research project was available in five of South Africa's eleven official languages. Section 6.7 presented some information regarding the language in which the participants chose to respond, related to their home language.

As the translation of this questionnaire from English into a further four languages was supervised by the Department of African Languages at the University of Cape Town, it can be considered to have been translated in a manner suitable for academic purposes. This makes it an ideal measurement scale with which to explore the psychometric importance of home language versus second (or third) language measurement scales.

7.4.4 Note on psychological testing in South Africa

There is currently an increasing requirement in South Africa for psychological tests which are applied in this country to be culture-fair, that is, not biased with respect to any particular group of people. While Foxcroft (1997) mentions the difficulty of developing culture-fair tests for use with a multi-cultural and multi-lingual population, the above requirement (which may have its origin in, and be oriented towards, employment equity issues) must be taken into account during any further research which aims to develop and use this measurement scale in South Africa.

7.5 Concluding remark

One of the aims of research in general is to identify new ideas and present these in relation to an existing body of information. In that sense this particular project has achieved this. It has extended existing ideas regarding the dimensionality of environmental concern and in so doing has provided new research opportunities. With specific reference to South Africa, it is hoped that this study may in some way contribute to an enhanced understanding of environmental concern in a country with many diversities, and so play a part in facilitating environmental conservation, the wise use of natural resources and sustainable development.