Comparison of Chinese-Australian and Anglo-Australian environmental attitudes and behavior

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COMPARISON OF CHINESE-AUSTRALIAN AND ANGLO-AUSTRALIAN ENVIRONMENTAL ATTITUDES AND BEHAVIOR

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This study examined the environmental behavior and attitudes of Chinese-Australians, in comparison with Anglo-Australians, using a survey methodology. Two hundred and three Anglo-Australians and 98 Chinese-Australians participated. The results indicated that Chinese-Australians and Anglo-Australians differed in their environmental concern and their endorsement of New Environmental Paradigm (NEP) values. The results also suggested that, overall, environmental behavior was related to environmental concern, which was in turn related to NEP values. Among the Chinese-Australians, length of residence in Australia was positively related to environmental behavior but negatively related to environmental concern. Chinese-Australians who identified themselves as Asians or Chinese were less likely to engage in environmental behavior, compared with those who did not identify themselves with any ethnic group. Results are interpreted from within an acculturation framework.

Understanding environmental attitudes and behavior is of increasing interest in environmental psychology. Particularly important and yet underresearched in this area are questions of the cross-cultural relevance of environmental attitudes and behaviors. The aim of this study was to examine environmental attitudes and behavior of the Chinese community in Australia, in comparison with the Anglo-Australian community. The Chinese community is deserving of attention because of the rapid increase in Chinese immigration to Australia since 1976 (Jones, 1992). In the 1996 census, Chinese-Australians are the second largest non-English speaking group in Australia (Australian Bureau of Statistics, 1997).

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However, to the authors' knowledge, there has been little research comparing the environmental attitudes and behavior of Chinese-Australians and Anglo-Australians.

Culture is regarded as the *"widely shared ideals, values, formation and uses of categories, assumptions about life, and goal-directed activities that become unconsciously or subconsciously accepted as 'right' and 'correct' by people who identify themselves as members of a society"* (Brislin, 1990, p.11). As such, culture is related to people's values, attitudes and behaviors, including environmental values, attitudes and behaviors. According to Triandis (1990), the dimension of individualism-collectivism has received most attention in terms of accounting for social behavior, including environmental behavior. Triandis pointed out that "people in every culture have both collectivist and individualist tendencies, but the relative emphasis is toward individualism in the West and toward collectivism in the East and South" (p.39). Individualist societies are societies where "people are supposed to take care of themselves and of their immediate families only" (Hofstede, 1979, p.398) whereas people in collectivist societies can expect their relatives, clans or other organisations to take care of them. Triandis also suggested that "collectivists pay much more attention to some identifiable ingroup and behave differently toward members of that group than they do toward out-groups" (p.40). Australians have been found to be higher on individualism than Chinese (Hofstede & Bond, 1984).

Recently, Stern, Dietz, Kalof, and Guagnano (1995) have proposed that proenvironmental action is a function of both beliefs and values, and they identify three values important to environmental attitudes and behavior: the social-altruistic value orientation (concern for the welfare of other human beings); the biospheric orientation (concern with nonhuman species); and self-interest or egoism.

In terms of social-altruistic values, people from collectivist cultures are likely to be more concerned about the welfare of their in-group members than other people outside their in-group (Triandis, 1990). People in collectivist cultures often show a lack of concern or care towards out-groups as most of their energy is directed towards their in-groups. People in individualist cultures have less strong relations with their ingroup members so they have some energy left for outgroups. In fact, Feather (1980, 1986) found that Chinese students valued general altruistic and affiliative values such as "a world at peace" or "helpful" less than did Australian students.

A codification of the biospheric orientation is given in the New Environmental Paradigm (NEP) (Dunlap & Van Liere, 1978). The NEP reflects a liberal way of thinking involving ecological awareness, which sees humanity as a part of nature, and values limits to growth in order to protect the equilibrium of the ecosystem, giving rise to environmental concern. According to Schwartz (1992), universalism is linked with environmental values including "unity with nature,

protecting the environment, and a world of beauty", and universalism is related to NEP values. Schwartz suggests that people from collectivist cultures such as the Chinese culture (Leung, 1996) tend to emphasise benevolence more than universalism, whereas those from individualist cultures value universalism and benevolence more or less equally. Feather (1994) found that universalism was valued by Australians. Chinese in Hong Kong, mainland China and Taiwan have also been found to be low in social integration, which is universalistic in its thrust (Bond, 1996).

With respect to the relationship between individualistic values and environmental concern, Stern et al. (1995) note that individualism may motivate people to criticise or to take action against environmentally harmful practices which have the potential to harm them or their immediate families. Individualism is relevant to self-interest. Australians have been found to be higher than Chinese on individualism (Hofstede, 1979; Hofstede & Bond, 1984).

From the above review, it seems reasonable to expect that Australians may differ from Chinese in their endorsement of environmental values and attitudes, as Australians have been found to emphasise universalistic and affiliative values more than do Chinese. However, among Chinese immigrants in Australia, those who have been in Australia for a longer period of time might have adopted Australian values and beliefs as a result of acculturation (Fan, 1999; Fan & Karnilowicz,1997).

Besides the cultural relativity of environmental attitudes and behavior, gender is another variable that must be considered in studies of environmental behavior and attitudes. Many studies have shown gender differences in environmental attitudes. Mohai (1992) and Stern (1992) found that women are more concerned about environmental issues than are men and that there are value and belief differences between men and women regarding the environment.

With regard to the possible interaction or overlap between cultural and gender difference, Kashima, Yamaguchi, Kim, Choi, Gelfand, & Yuki (1995) identified little overlap between cultural and gender differences. Cultural differences were found along the individualist-collectivist dimension (the degree to which people act and express opinions on their own) whereas gender differences were found along the relational dimension, the extent to which people perceive themselves as being related to others emotionally. Males tend to see themselves as separate from others whereas females tend to see themselves as related to others emotionally.

At this stage, it is useful to examine the relationship between environmental values such as NEP, environmental concern such as emotional response to environmental pollution and degradation (Maloney, Ward & Braucht, 1975) and environmental behavior. Hamid and Cheng (1995) found that environmental behavior was related to environmental concern. Dunlap and Van Liere (1978)

found that personal environmental behavior was related to endorsement of NEP ideas and NEP appears to be a set of generalised beliefs about human-environment relations which directly predict environmental behavior (Stern, Dietz & Guagnano, 1995).

In view of these documented relationships, the following hypotheses are generated:

1. Anglo-Australians will endorse NEP values and environmental concern more than will Chinese-Australians, and Anglo-Australians will engage in environmental behavior more frequently than will Chinese-Australians.
2. Among Chinese-Australians, the longer they have lived in Australia, and the less they identify with Chinese culture, the more similar their scores on environmental concern, NEP values and environmental behavior will be to those of Anglo-Australians.
3. Females will endorse environmental concern and NEP values more and will engage in environmental behavior more frequently than will males.
4. Environmental concern and NEP values will be related to environmental behaviors, among both Anglo-Australians and Chinese-Australians.

METHOD

PARTICIPANTS

There were 301 participants (134 males and 167 females), all of whom were Australian residents or citizens. Among the participants, 203 (74 males, 129 females) were born in Australia (n = 172) or other English-speaking countries, such as the United Kingdom (n = 23), the United States (n = 3) and New Zealand (n = 5) and spoke English at home (Anglo-Australians) and 98 (60 males, 38 females) used a Chinese dialect at home (Chinese-Australians). Language use was used as the defining aspect of culture because language is often regarded as an important aspect of culture (Berry, 1997). The majority of the Chinese-Australian participants (n = 73) were born in Hong Kong, with the rest being born in China (n = 4), Malaysia (n = 6), Vietnam (n = 6), Indonesia (n = 1), Cambodia (n = 1), Taiwan (n = 3), the United Kingdom (n = 2), and Australia (n = 2). The mean age of the participants was 34.0 years (SD = 14.2 years, n = 298) and the mean age for Anglo-Australians, and Chinese-Australian participants was 34.5 years (SD = 13.9 years, n = 202) and 32.9 years (SD = 14.9 years, n = 96) respectively. The mean age for male participants was 32.9 years (SD = 14.9 years, n = 133) and that for female participants was 34.8 years (SD = 13.7 years, n = 165). The mean length of residence in Australia for Anglo-Australians and Chinese-Australian participants was 31.7 years (SD = 13.8 years, n = 202) and 8.3 years (SD = 5.2 years, n = 95) respectively. Among the participants, 281 (89 Chinese-Australians and 192 Anglo-Australians) supplied

information on their level of education. Of these 281 participants, 61 had a tertiary or postgraduate qualification, including 38 Chinese-Australian (42.7% of all Chinese participants who supplied information on education level) and 33 Anglo-Australians (17.1% of all Anglo-Australians who supplied information on level of education).

MATERIALS

The materials consisted of a questionnaire with four sections.

Environmental concern - this was measured by the Affect Subscale of the Revised Scale for the Measurement of Ecological Attitudes and Knowledge (Maloney et al., 1975) which consists of 10 statements. An example is "when I think of the ways industries are polluting, I get frustrated and angry". The wording of some items was changed to conform to Australian idiomatic conventions. Participants rated their degree of agreement with the statements on a 7-point scale (1 - *very true of me*, 7 - *very untrue of me*). The proenvironment items were reverse scored and the scores of all statements were summed up to form a total score on environmental concern. A high score indicated a strong environmental concern.

Environmental behavior - this was based on the Actual Commitment Subscale of the Revised Scale for the Measurement of Ecological Attitudes and Knowledge (Maloney et al., 1975), comprising 10 statements measuring environmental behavior. The wording of some items was changed to suit an Australian culture. For example, the item "I have switched products for ecological reasons" was changed to "Switching products for environmental reasons". The format was changed so as to measure frequency of actions. Participants indicated frequency of engaging in each of the 10 behaviors over the last six months on a 7-point scale (0 - *never*, 6 - *more than five times*). The scores on all statements were summed up to form a total score for environmental behavior. A high score indicated frequent participation in environmental behavior.

NEP values - this part consisted of the 12-item NEP Scale (Dunlap & Van Liere, 1978), which measures NEP values. An example is "Humans must live in harmony with nature in order to survive". Participants rated their degree of agreement with the statements on a 7-point scale (1 - *strongly agree*, 7 - *strongly disagree*). The pro-NEP items were reverse scored, and a high score indicated endorsement of the NEP.

Demographic information - this part consisted of questions on demographic information including age, sex, country of origin, length of residence in Australia, language spoken at home, educational attainment, ethnic identification, and occupation.

PROCEDURES

The English version of the questionnaire was translated into Chinese by the first author. A bilingual research assistant back-translated this into English. The content was then checked by the first and second authors to ensure that the two versions were equivalent. Chinese-Australian participants could choose to answer either the English or the Chinese version of the questionnaire (44 of the 98 Chinese-Australian participants chose the Chinese version of the questionnaire).

The participants were recruited by third-year psychology students at Victoria University in the western region of Melbourne, Australia, as part of their course requirements. Chinese-Australian participants were also recruited through the first author's social contacts with Chinese community groups, including church groups, and by means of a snowball technique. Participants completed the questionnaires at a place of mutual convenience, usually at their own homes, and the questionnaires were returned via the psychology students and/or the community groups.

RESULTS

The mean and standard deviation scores of the participants are presented in Table 1. The reliability estimates and correlations among variables are presented in Table 2. Multivariate Analysis of Variance (MANOVA) results indicated that among the Chinese-Australians, there were no significant differences in scores on environmental concern, NEP values and environmental behavior between those who answered the Chinese version of the questionnaire and those who answered the English version. Box's M test (Tabachnick & Fidell, 1989) was insignificant, indicating homogeneity of variance. Thus, results of the responses to both versions of the questionnaire were not separately analysed.

TABLE 1
MEAN (STANDARD DEVIATION) SCORES OF THE PARTICIPANTS BY LNAGUAGE BACKGROUND AND SEX ON VARIABLES

	General environmental concern		Environmental behavior		NEP values	
Chinese-Australian participants	47.20	(7.77)	9.24	(8.77)	57.65	(6.92)
Males	47.20	(7.92)	7.87	(6.70)	58.03	(6.53)
Females	47.21	(7.63)	11.42	(11.04)	57.05	(7.53)
Anglo-Australian participants	46.01	(9.49)	9.70	(8.98)	61.54	(9.63)
Males	43.17	(11.22)	11.07	(11.07)	59.50	(10.81)
Females	47.64	(7.93)	8.91	(7.47)	62.71	(8.71)
All participants	46.40	(8.97)	9.55	(8.90)	60.28	(9.02)
Males	44.97	(10.05)	9.64	(9.47)	58.85	(9.16)
Females	47.54	(7.84)	9.48	(8.45)	61.42	(8.77)

TABLE 2
CORRELATION AMONG VARIABLES FOR ALL PARTICIPANTS (N = 301)

	Environmental concern	Environmental behavior	NEP values
Environmental concern	.74		
Environmental behavior	.21***	.77	
NEP values	.39***	.16**	.75

Note: Cronbach Alphas along the diagonals
* $p < .05$
** $p < .005$
*** $p < .001$

CULTURAL AND GENDER DIFFERENCES

To test for cultural and gender differences in environmental behaviors, environmental concern and NEP values, a two-way MANOVA was performed. The independent variables were culture and gender, each with two levels. The dependent variables were environmental behaviors, environmental concern and NEP values.[1] The results indicated that there was a significant multivariate effect of culture ($F_{3,295} = 6.72$, $p < .001$). Univariate analysis indicated that there was a significant cultural difference for NEP values ($p < .001$). Anglo-Australians endorsed NEP values more than did Chinese-Australians. Though there was no significant multivariate gender main effect, there was a significant multivariate culture by gender interaction ($F_{3,295} = 5.27$, $p = .001$). Univariate analysis indicated significant interaction effects for both environmental behavior ($p < .05$) and environmental concern ($p < .05$). Chinese-Australian females and Anglo-Australian males reported that they engaged in environmental behavior more frequently than did Chinese-Australian males and Anglo-Australian females. Anglo-Australian males reported the lowest scores on environmental concern. When males and females were analysed separately, MANOVA results indicated that there were still significant ethnic differences for males ($F_{3,125} = 6.22$, $p = .001$) and females ($F_{3,159} = 7.53$, $p < .001$). Univariate F tests indicated that Anglo-Australian males, endorsed environmental concern less than did Chinese-Australian males, whereas Anglo-Australian females endorsed NEP values more than did Chinese-Australian females.

RELATIONSHIP BETWEEN ENVIRONMENTAL CONCERN, NEP VALUES AND ENVIRONMENTAL BEHAVIORS

With respect to the relationship between environmental concern, NEP values and behaviors, correlational analysis indicated that environmental behavior was

[1] Two-way Multivariate Analysis of Covariance using culture and gender as independent variables and education level as the covariate indicated that the effect of the covariate was not significant.

related to environmental concern ($r = .21$, $p < .001$) and NEP values ($r = .16$, $p < .005$). Environmental concern was also related to NEP values ($r = .39$, $p < .001$).

WITHIN-GROUP ISSUES

To investigate the relationship among variables for the Anglo-Australian participants and Chinese-Australian participants separately, separate correlation analyses were conducted for each of the language groups. The results are presented in Tables 3 and 4.

TABLE 3
CORRELATION AMONG VARIABLES FOR ENGLISH-SPEAKING PARTICIPANTS ($N = 203$)

	Environmental concern	Environmental behavior	NEP values
Environmental concern	.76		
Environmental behavior	.28***	.77	
NEP values	.43***	.19*	.71

Note: Cronbach Alphas along the diagonals
* $p < .05$
** $p < .005$
*** $p < .001$

TABLE 4
CORRELATION AMONG VARIABLES FOR CHINESE-AUSTRALIAN PARTICIPANTS ($N = 98$)

	Environmental concern	Environmental behavior	NEP values
Environmental concern	.67		
Environmental behavior	.03	.79	
NEP values	.36***	.09	.59

Note: Cronbach Alphas along the diagonals
* $p < .05$
** $p < .005$
*** $p < .001$

Anglo-Australians

Among the Anglo-Australian participants, environmental behavior was positively related to age ($r = .15$, $p < .05$, $n = 202$), education ($r = .22$, $p < .005$, $n = 192$), NEP values ($r = .19$, $p < .05$, $n = 203$), and environmental concern ($r = .28$, $p < .001$, $n = 203$). Environmental concern was related to NEP values ($r = .43$, $p < .001$, $n = 203$).

When males and females were separately analysed, there were significant correlations between environmental concern and environmental behavior for both

sexes. However, the correlation between NEP values and environmental behavior was significant only for females.

Chinese-Australians

Among the Chinese-Australians, environmental behavior was negatively related to age ($r = -.27$, $p < .01$, $n = 94$) and positively related to length of residence in Australia ($r = .28$, $p = .005$, $n = 95$). Length of residence in Australia was negatively related to environmental concern ($r = -.25$, $p < .05$, $n = 95$). The correlations between NEP values, environmental concern and environmental behavior were not significant, though in the same direction as for the Anglo-Australians. There was no significant correlation between either environmental behavior, NEP values, or environmental concern when males and females were separately analysed.

Among the Chinese-Australian participants, 55 identified themselves as Chinese or Asian and 37 either declined to answer the question on ethnic identification or gave nonspecific answers such as "all human beings". To find out the influence of gender and ethnic identification on environmental attitudes and behavior, a MANOVA was performed. The independent variables were gender and ethnic identification (Chinese versus non-specific or no answer[2]) and the dependent variables were environmental concern, environmental behavior and NEP values. The results indicated a significant ethnic identification difference (multivariate $F_{3,86} = 4.40$, $p < .01$), and a significant interaction effect between gender and ethnic identification (multivariate $F_{3,86} = 9.97$, $p < .001$), but gender effect was not significant ($F_{3,86} = 1.05$, $p > .05$). Univariate F tests indicated ethnic identification difference in environmental behavior ($p = .001$). Chinese-Australians who identified themselves as Chinese or Asians (mean = 7.00, SD = 6.59, $n = 55$) engaged in environmental behavior less frequently than did those who did not identify with any ethnic group (mean = 11.19, SD = 9.28, $n = 37$). This effect is likely to be related to the behavior of Chinese-Australian females in particular. Univariate F tests indicated significant interaction effect for environmental behavior ($p < .005$) and NEP values ($p < .001$). Chinese-Australian females with nonspecific/no ethnic identification engaged in environmental behavior most frequently (mean = 15.69, SD = 10.32, $n = 16$) whereas Chinese-Australian females who identified themselves as Asians or Chinese engaged in environmental behavior least frequently (mean = 5.53, SD = 5.69, $n = 19$). Chinese-Australian females with nonspecific/no ethnic identification endorsed NEP values most (mean = 60.63, SD = 5.20, $n = 16$) whereas Chinese-Australian females who identified themselves as Chinese or Asian endorsed NEP values least (mean = 53.84, SD = 7.58, $n = 19$).

[2] One Chinese participant who identified herself as Australian was excluded from this analysis.

DISCUSSION

The results indicate that there are more cultural differences than gender differences in environmental attitudes and behavior, but there are also complex interactions between gender and culture. As expected, there was a significant cultural difference between the Anglo-Australians and Chinese-Australians, with the former endorsing NEP values more. Expectations of lower environmental concern scores among Chinese Australians were not fulfilled, with Chinese-Australian males and Anglo-Australian females showing almost identical means on this variable, and Anglo-Australian males scoring significantly lower. Furthermore, female Chinese-Australians and male Anglo-Australians reported higher frequencies of environmental behavior than did male Chinese-Australians and female Anglo-Australians. One possible explanation for the apparent inconsistency in the scores of Anglo-Australian males, who showed the highest frequency of environmental behavior, while expressing the lowest concern for environmental matters, is the possibility that they might be more reluctant to endorse emotional-affective items strongly on the general environmental concern scale. Another possible explanation may be that the environmental behavior of male Anglo-Australians is less emotionally driven than that of the other groups. It is also possible that male Anglo-Australians might want to behave in specific ways to gain status or peer approval, regardless of their personal attitudes.

Consistent with the literature, relationships were found between general environmental concern, NEP values and environmental behavior. However, for the Chinese group considered separately, environmental behavior was not related to either environmental concern or to NEP values. The lack of significant correlation between environmental concern, NEP values and environmental behavior for Chinese-Australian participants seems puzzling on the surface. Bond and Hwang (1986) suggest that since maintaining outward harmony is important for collectivist cultures such as the Chinese culture, it is possible that the discrepancy between public presentation and private belief may be greater for Chinese people than for those from individualistic societies. Similarly, King and Bond (1985) argue that Chinese conformity is often surface conformity with little internalisation, and in Chinese culture there is no great pressure to achieve consistency between internal beliefs and outward behavior.

Another explanation for the lack of correlation between environmental attitudes and behaviors among Chinese is related to acculturation. According to Berry (1997), cultural changes can range from the superficial (e.g., food or clothing) to more profound changes (e.g., value systems). Rosenthal and Feldman (1996) also suggest that cultural values are more resistant to change than are peripheral and visible behaviors. As such, changes in various values and behaviors probably take place at different rates, and consequently certain value and

attitudinal changes may not necessarily accompany early behavior changes. In fact, among Chinese-Australians, environmental behavior was positively related to length of residence in Australia but environmental concern was negatively related to length of residence in Australia.

The present study also throws some light on acculturation among different groups of Chinese-Australians. Environmental behavior was found to be positively related to length of residence in Australia and negatively related to age and Chinese identification. The results suggest that Chinese-Australians – especially young females – who have remained in Australia for a longer period of time, as they become less attached to their Chinese identification, engage more in environmental behavior, and are more likely to endorse NEP values. The results suggest that females and younger people might acculturate more rapidly than do older people and males, but this would need to be further explored.

This study, however, is limited in several ways. First, both the Anglo-Australian and Chinese-Australian samples were samples of convenience. Second, the Anglo-Australian sample was recruited through social contacts of psychology students whereas the Chinese-Australian sample was recruited through community groups and social contacts of the first author. Thus, the method of recruitment was different for the two samples. Third, the reliability estimates of some scales for the Chinese-Australians were below .7.

Overall, the results suggest that there are cultural differences in environmental attitudes and behaviors, but the results also show that Chinese migrants in Australia are not a homogeneous group and future research on environmental concern among Chinese migrants should explore differences due to length of residence in host society, identification with host culture and interactions with gender. Some of these influences are likely to be related to cultural assimilation, as detected here. It is also likely that other values such as individualism-collectivism, and universalism, which were not directly measured in the present study, may also be involved. Investigation of these associations warrants further research.

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