

A cross-national study of the ecological worldview of Senior consumers

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Lynn Sudbury-Riley,
Agnes Hofmeister-Toth
Florian Kohlbacher

Abstract

This paper presents the results of a cross-national study into the ecological worldview of senior consumers using the New Ecological Paradigm (NEP) scale. It was designed to examine the extent to which senior respondents in the UK, Germany, Japan and Hungary are endorsing the NEP scale and which factors determine NEP in the four countries under study. Our study is the first of its kind to measure the ecological worldview of older consumers across different nations. Examinations of the overall frequency and mean distributions of the NEP scale showed that the majority of seniors in each country support the NEP statements, but there is no general support for pro-NEP orientation. The relationship between values [using list of values (LOV) scale] and environmental attitudes was tested through a series of regression analyses calculated separately for each country. According to the results, a very weak relationship between some of the LOV values and the NEP scale was found in all the samples. Our study contributes to both cross-cultural environmental attitude research and to consumer studies in general.

Keywords

Cross-cultural, consumer behaviour, values, environmental concern, New Ecological Paradigm (NEP), measurement.

Introduction

One of today's global problems is our ever-growing raw material and energy consumption, driven by the expansion in household consumption. Raising awareness of the issue and increasing individual responsibility have been a point of focus for the last 30 years. In order to ensure that the new economic equilibrium following the economic crisis is based on conscious, responsible attitudes, knowledge pertaining to current consumption patterns and the requirements for implementation of sustainable practices is needed. However, implementing the principles of sustainability require different commitments from every nation. Each country has differing social, economic and environmental features, and there are fundamental differences in the degree of commitment to the main issues (Cordano et al., 2003; Sudbury-Riley et al., 2012).

Consumer behaviour is a key to the impact that society has on the environment. The actions that people take and choices they make – to consume certain products and services or to live in certain ways rather than others – all have direct and indirect impact on the environment, as well as on personal and collective wellbeing. This is why the topic of 'sustainable consumption' has become a central focus for national and international policy and research (Hofmeister-Toth et al., 2012; Sudbury-Riley et al., 2012; Paco et al., 2013).

In addition to issues of sustainability, a pressing global megatrend is the aging of the world's population. Yet, while there is a large body of the literature examining the ecological worldview of people and the consumer behaviour of older consumers or the so-called 'silver market', a review of the literature has revealed that no studies have examined the ecological worldview of older consumers. Our research was designed to fill that gap and present the results of a cross-national survey into the ecological worldview of older consumers in four countries. The four nations selected are Japan, Germany, UK and Hungary, all of which appear in the top 20 of every international league table that considers population aging, and all have experienced very different and important political and economic events during the lifetimes of these older adults (Sudbury-Riley et al., 2011).

The paper is structured as follows. The paper begins with a discussion of the growing importance of environmentally conscious consumer behaviour, before presenting an overview of the relevant literature on the New Ecological Paradigm (NEP) and its measurement. Details of the measurement instruments and methods used to collect the data in the four nations are then presented before moving onto the results. Next, the results of the statistical analyses are presented with commentary. Finally, conclusions, limitations and implications are discussed.

Literature review

Becoming a conscious consumer and adopting corresponding behaviour is a long and versatile process. Environmentally conscious behaviour, accordingly, is a complex phenomenon, one of the aspects of which is 'pro-environmental activities' (Stern et al., 1999; Straughan and Roberts, 1999; Paco and Raposo, 2009; Hofmeister-Toth et al., 2011; Sudbury-Riley et al., 2012; Paco et al., 2013). This behaviour might manifest itself in one's active participation in environmentalist political activities, participation in/support of environmental organizations, or the fostering of environmentally conscious decision-making in the marketplace and/or workplace.

There is an inconsistency in research regarding the relationship between environmental friendly attitudes and behaviour. Green consumers will try to protect the environment in different ways, but they do not always base their buying decisions on their positive attitudes towards environment protection (Vlosky et al., 1999; Laroche et al., 2001; Paco et al., 2013), while other studies investigating this relationship found that if consumers are more closely involved with the environment (i.e. they are environmentalists), they are more likely to buy green products (Rios et al., 2006; Paco et al., 2013).

As regards to demographic characteristics, studies usually find a significant relationship between gender, age and environmental consciousness. Women generally worry more about environmental issues and their attitude towards the environment is usually more positive (Anderson and Cunningham, 1972; Davidson and Freudenburg, 1996; Roberts and Bacon, 1997), yet other studies have found men to be more environmentally conscious (Balderjan, 1988). With regard to age, the young are frequently considered to be more environmentally conscious (Zeidner and Shechter, 1988; Diamantopoulos et al., 2003), although other studies found that older people display higher levels of green behaviour (Van Liere and Dunlap, 1980; Schahn and Holzer, 1990; Vining and Ebreo, 1990; Roberts, 1996). Clearly, the literature's findings on demographics and ethical or ecological consumption is inconclusive. This means two things: more empirical evidence is needed on one hand and the real drivers/impact factors are other variables rather than demographics. NEP is one of these possible variables, hence the focus of this paper.

The most often studied psychographic factors in this field are perceived consumer effectiveness (PCE), environmental concern and environmental attitude. PCE is the individual's assessment of the extent to which individual consumers can influence environmental problems (Antil, 1978 in Roberts, 1996), and studies have found this to be one of the strongest determining factors of environmentally conscious behaviour. The more attractive the environment, the more we are concerned for it, the more eager we are to be altruistic (Roberts, 1996). At the same time, concern for the environment seems to have a weaker ramification than PCE. If environmental concern is not accompanied by a feeling of effectiveness, there is a smaller possibility that it will incite consumers to action.

Some researchers consider environmental concern and environmental attitude to be identical (Van Liere and Dunlap, 1981) while others differentiate between them (Stern and Dietz, 1994; Schultz et al., 2005). The latter define environmental attitudes as an individual's beliefs, feelings and intent for action in regard to dealings and questions regarding the environment (Schultz et al., 2004). Attitude in itself is not sufficient to determine real actions (Diamantopoulos et al., 2003). A positive

attitude towards the environment and a change in attitude is more effective in the case of simple, repetitive, low-cost actions, while in the case of choices to be made in the frame of a long-term commitment or actions requiring higher costs, positive attitudes are often not reflected in action (Gatersleben et al., 2002). A recent study (Paco et al., 2013) using a sample of university students of four nations (UK, Germany, Portugal and Spain) found that although consumers want to satisfy their needs and desires, they feel nowadays that they should play a more active role in the protection, preservation and conservation of the environment. According to Zabkar and Hosta (2013), pro-social status perception of environmentally friendly consumer behaviour can help reduce the gap between willingness to act in an environmentally friendly way and environmentally friendly behaviour. The results of their study showed that actions for common good can be a source for increased reputation and lead to status gain.

Measuring environmental attitudes

Even though there is a wide choice of scales for measuring environmental attitudes, researchers usually turn to either the Ecology Scale, the Environmental Concern Scale or the NEP Scale (New Environmental Paradigm Scale and its revised version, the NEP Scale). Their popularity is primarily due to all three scales treating environmental concern as a complex phenomenon; consequently, they include statements concerned with convictions, attitudes, behavioural intentions and actual behaviour as well (Hawcroft and Milfont, 2010). What is more, they measure the extent of concern along more than one problem. Accordingly, these instruments belong to the group of multi-aspect assessment tools.

The NEP scale

Our study relied on the NEP scale in measuring environmental attitude. This choice was justified by the NEP scale having been found a reliable instrument in a number of previous international research projects (Corral-Verdugo and Armendáriz, 2000; Trobe and Acott, 2000; Clark et al., 2003; Cordano et al., 2003; Johnson et al., 2004; Berenguer et al., 2005; Bostrom et al., 2006; Casey and Scott, 2006; Davis et al., 2009; Erdogan, 2009; Hawcroft and Milfont, 2010). The NEP scale measures environmental attitude based on people's general convictions about humanity's relationship to nature. Its theoretical background originated in the recognition that the Dominant Social Paradigm (DSP) of Western societies did not provide adequate answers to a number of environmental questions. This approach considered humans to be independent from and reigning above all natural organisms. Along with environmental issues gaining more attention, however, a new, ecocentric system of beliefs began taking shape by the 1970s that treated mankind as an element of nature and endowed them with certain limits. This approach became known as the New Environmental Paradigm, which is based on the assumption that environmental problems pose a challenge to the basic way people think about the environment and their relationship with it (Dunlap and Van Liere, 1978).

The original scale (New Environmental Paradigm Scale) comprised eight forward-scored and four reverse-scored items, all on a 4-point Likert-type scale. The NEP scale also has a shortened version with only six statements. Because of the widespread use of the scale, it has received some criticism (Cordano et al., 2003), referring primarily to the validity and dimensionality of the scale.

Consequently, the scale was later revised for three major reasons: to make the scale more balanced, to correct the previous wording and to extend the three original factors (Hawcroft and Milfont, 2010). As a result, the previous three factors were modified to the following:

- 1 Recognition of the boundaries of growth (limits),
- 2 Anti-anthropocentrism,

- 3 The fragility of nature's balance (balance),
- 4 Rejection of the exceptional position of mankind (antiexemptionalism), and
- 5 The possibility of the occurrence of an ecocrisis (ecocrisis).

The modified 15 statements comprise eight corresponding (odddnumbered) and seven contradictory (even-numbered) statements. Responses are given on a 5-degree Likert-type scale. Although in the case of the NEP scale, all the items are analysed together, studies also have proven the validity of the shortened scales (Trobe and Acott, 2000; Cordano et al., 2003). Use of the different scales, however, makes the comparison of results difficult, as both the sample type and the length of the scale modify the value of the scale (Hawcroft and Milfont, 2010).

The NEP scale has been used by researchers on a number of occasions in the past 30 years to measure environmental attitude and environmental concern. The scale is suitable for the study of the connection between environmental attitude and other socioeconomic variables (Trobe and Acott, 2000), such as comparisons and deductions from individual values and environment friendly habits (e.g. Schultz and Oskamp, 1996; Schultz and Zelezny, 1999; Chung and Poon, 2000; Schuett and Ostergren, 2003; Milfont and Duckitt, 2004; Barr and Gilg, 2006). Casey and Scott (2006) and Olli et al. (2001) found that the NEP is a useful predictor of environmental behaviour. Based on a meta-analysis of more than 300 articles, Hawcroft and Milfont (2010) reported that environmental concerns throughout the world are measured with the help of the NEP scale. The authors analysed articles from Asia (China, India, Indonesia), North America (Canada, USA), Latin America (Argentina, Brasil, Mexico), Eastern and Western Europe (Germany, The Netherlands, Spain, Bulgaria, Russia) and Oceania.

Values

Values literature endorses the link between society and the individual (Beatty et al., 1988), where it is generally accepted that human value systems are a result of cultural socialization and heritage,

and personal experience resulting from economic conditions, historical and political events and specific deprivations suffered by differing age cohorts (Crosby et al., 1984). While values are similar to attitudes, insofar as they are both adaptation abstractions that help facilitate favourable interactions between an individual and his/her environment, values have hierarchical primacy over attitudes (Kahle, 1983; Homer and Kahle, 1988; Kahle et al., 1992), and they also transcend objects and situations, which attitudes do not (Crosby et al., 1984). Theoretically, then, values should be better than attitudes in predicting actual behaviour, and for this reason several previous studies have examined values from an ethical viewpoint. However, all these previous studies appear to tackle the issue from a psychological perspective, and have thus chosen Schwartz's value types (Karp, 1996; Stern et al., 1999; Milfont et al., 2006; Pepper et al., 2009). Indeed, Schwartz is widely used among psychologists (Pepper et al., 2009) while Kahle's list of values (LOV) is the preferred method for measuring values among consumer behaviourists (Christiansen and Hansen, 2001). LOV has been found to be related to numerous consumer behaviours, including product reactions, media preferences, positioning, advertising, packaging, personal selling and retailing (Kahle et al., 1988; Kohlbacher et al., 2011), yet no previous studies appear to have used LOV to examine ecological worldview of senior consumers using the NEP scale.

Methodology

Data collection and sample size

Using a survey, our study utilizes the NEP revised scale, in addition to a battery of variables to measure values and sociodemographic characteristics. This study examines Kahle's LOV as potential antecedents to ecological worldview (NEP) among seniors in four countries. Although many empirical studies have demonstrated LOV to be predicative of a wide range of consumer behaviours,

there is a research gap in that LOV and the NEP scale that have not been brought together. PCE was also included using the same measure as Ellen et al. (1991). Due to the sensitive nature of the questions, the short version (Strahan and Gerbasi, 1972) of the Crowne and Marlowe's (1960) Social Desirability scale was also included. The questionnaire was translated and back translated by teams in Japan, Germany and Hungary before being piloted across all four countries.

The data were collected from adults aged between 50 and 79 in Germany, Hungary, Japan and the UK. The lower age parameter of 50 was chosen for two reasons. First, researchers studying older adults appear to have finally reached consensus regarding the age at which the older consumer market begins, and 50 is now the starting point for most published studies into this market. Second, 50 is the eligibility age for many age-related services offered to older consumers in Germany and the UK. Three lists were purchased, one German (n = 6000), one British (n = 5000) and one Japanese (n = 1044) that contained randomly selected names and addresses of people aged 50 and above, and a questionnaire and prepaid envelope was posted to them all. The mailing list were representative regarding age and gender in all the three countries. The response rates were very low in Germany (3.8%) and in the UK (10%) but quite high in Japan (39.2%). The obtained UK and Japanese samples are quasi-representative regarding gender, but in the German sample males are overrepresented. Regarding age, the under 70s are somewhat overrepresented in all the three samples.

In Hungary, a representative sample (regarding gender, age, region, work status and income) was purchased from the Hungarian Central Statistical Office. Piloting in Hungary demonstrated difficulties of self-completion among many older Hungarian adults, thus the distribution strategy was adapted in that country, where a team of trained researchers administered the questionnaire face-to-face to 200 adults aged 50 and above. The data collection resulted in an overall sample size of 1338 people and Tables 1 and 2 give an overview of the sample characteristics by country. Data were analysed using the SPSS 20 IBM software package. Because the samples obtained are different, we analysed the data nation by nation and do not make direct comparisons between the countries

Table 1 Total sample by chronological age and country

Country	n	Mean age	Standard deviation
UK	502	66.68	8.683
Germany	227	63.30	8.421
Japan	409	64.47	8.572
Hungary	200	58.66	5.635
Total	1338	64.23	8.628

Table 2 Demographic characteristics of the samples

	UK	Germany	Japan	Hungary
Gender (%)				
Male	48.30	60.44	49.14	45.00
Female	51.70	39.56	50.86	55.00
Mean Age (years)	66.68	63.30	64.47	58.66
Work status (%)				
Working	27.9	36.16	43.52	39.39
Retired	68.86	54.91	37.05	53.03
Unemployed	0.42	3.57	6.22	2.53
Homemaker	2.75	5.36	13.21	5.05
Income Band				
Low	40.63	35.94	66.33	21.76
Medium	26.41	36.87	23.07	59.59
High	32.98	27.19	8.61	18.65

Measurement and analysis of the NEP scale

Respondents' ecological worldview was assessed using the 15 items revised NEP scale (Dunlap et al., 2000; Hawcroft and Milfont, 2010). According to its theoretical framework, as it was mentioned earlier, the scale measures individuals' environmental concern along five dimensions, namely the reality of limits to growth (limit, items: 1, 6, 11); anti-anthropocentrism (items: 2, 7, 12); the fragility of nature's balance (balance, items: 3, 8, 13); the rejection of exemptionism (anti-exemptionism, items: 4, 9, 14) and the possibility of an ecocrisis (ecocrisis, items: 5, 10, 15).

Besides calculating the percentage and mean distribution for every statement of the NEP scale, we also calculated summary indexes. An overall NEP orientation index was calculated by adding and averaging the mean scores of 15 items for each country. Frequency distribution indexes for the seven even numbered statements and the eight odd-numbered statements were calculated by averaging the scores to these statements for each country. The 15 items of the NEP scale can be seen in Table 3.

Table 3 Mean distribution of the New Ecological Paradigm (NEP) scale items by country

NEP items	UK			Germany			Japan			Hungary		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
NEP1	500	3.70	0.976	225	3.60	1.173	434	3.48	1.073	200	4.00	0.842
NEP2 ^a	499	3.25	1.066	226	3.80	1.220	429	3.74	1.150	200	2.84	1.206
NEP3	496	3.75	0.963	226	4.07	1.211	431	4.24	0.816	200	4.26	0.827
NEP4 ^a	491	2.94	0.941	226	2.96	1.062	432	2.23	1.027	200	2.55	1.031
NEP5	498	3.72	0.930	226	4.09	1.080	430	4.04	0.825	200	4.40	0.782
NEP6 ^a	495	2.42	0.986	225	1.76	0.946	432	2.41	1.015	200	2.03	0.838
NEP7	489	4.10	0.843	226	4.68	0.715	428	4.32	0.799	200	4.50	0.737
NEP8 ^a	496	3.46	0.922	223	4.02	0.984	433	3.31	1.073	200	3.40	1.089
NEP9	490	4.09	0.686	225	4.40	0.996	433	4.24	0.831	200	4.17	0.813
NEP10 ^a	497	3.14	1.077	222	3.56	1.182	430	3.09	1.202	200	3.24	1.229
NEP11	491	3.45	0.979	224	3.83	1.101	431	4.49	0.762	200	4.05	0.912
NEP12 ^a	489	3.51	1.087	225	4.20	1.088	426	3.62	1.273	200	3.59	1.179
NEP13	496	3.79	0.933	226	3.88	1.267	427	3.93	0.972	200	4.13	0.832
NEP14 ^a	496	3.16	0.969	226	3.57	1.086	431	3.24	1.192	200	3.27	1.069
NEP15	499	3.40	0.984	223	3.76	1.175	434	4.15	0.895	200	4.13	0.844
Overall Mean		3.46			3.75			3.64			3.63	
Overall 15 item scores ^b		51.88			56.17			54.52			54.51	

a Items are reverse coded.

b Scores are summed after adjustment for direction. Higher scores indicate pro-NEP worldview.

M, mean; SD, standard deviation.

Each item was measured on a scale ranging from 1 to 5; all pro-NEP responses were expected to be relatively high scores and all DSP responses were expected to be relatively low scores. Agreement with the eight odd-numbered items indicates pro-NEP orientation, therefore, responses were scored

as 5 strongly agree, 4 mildly agree, 3 uncertain, 2 mildly disagree, 1 strongly disagree. Agreement with the seven even-numbered items indicates pro- DSP orientation. Therefore, the scores were reversed for these seven items for the statistical analyses. The total score of the 15 items can range between 15 and 75, and one dimension scores can range between 3 and 15.

The reliability coefficient was also calculated for each country. The reliability coefficient for the 15 items in each country is acceptable ranging from 0.686 in Japan, 0.699 in Germany, 0.710 in Hungary to 0.787 in UK. This indicates that the NEP scale has good consistency in each sample. According to the most widely accepted evaluation of alpha, the value should be above 0.7, but not much higher than 0.9 (Nunnally, 1978). Others, however, claim that a value as low as 0.6 might be acceptable for an exploratory study (Garson, 2002).

Findings of the research

The ecological worldviews of senior respondents in each country were examined by calculating mean scores, percentage distributions, average scores and indexes of the respondents (see Tables 3 and 4). The overall score for the 15 items (Table 3), after correcting for the directionality of the items, was found to be the highest for Germany (56.18 out of the possible 75) and lowest for the UK (51.88 out of 75). The average mean scores for the eight pro-NEP items (Table 3) range from 3.75 (UK) to 4.68 (Germany), whereas the mean scores for the seven DSP items range from 3.10 (Japan) to 3.41 (Germany).

The overall orientation of senior respondents falls at the middle rank of pro-NEP scale: 54.7% of the UK, 63.1% of the German and 61.7% of the Japanese and Hungarian respondents have expressed pro-NEP views. The vast majority of the seniors in each country (ranging from 68.2% in Germany to 84.2% in Hungary) (Table 3) supported the eight odd-numbered pro-NEP statements, but one-third of the respondents in the UK, a little over 20% in the other three countries expressed agreements to

the seven even numbered DSP statements as well. A total of 51.1% of the German seniors disagreed to the seven DSP statements; in general, they seem to support more the environmental orientation of the NEP worldview. Examinations of the overall frequency and mean distributions shows that the majority of seniors in each country support the NEP statements, but there is no general support for pro-NEP orientation. The percentage distributions of agreements with the NEP items are shown in Table 4.

Table 4 Frequency distribution of the New Ecological Paradigm (NEP) scale items by country

NEP items	UK			Germany			Japan			Hungary		
	A %	U %	D %	A%	U%	D%	A%	U%	D%	A%	U%	D%
NEP1	59.8	28.0	12.2	54.7	28.4	16.9	53.8	25.4	20.7	83.5	8.5	8.0
NEP2 ^a	29.1	23.4	47.5	17.7	13.3	64.1	15.5	19.2	65.3	46.0	21.5	32.5
NEP3	69.6	17.3	13.1	72.4	8.8	13.7	87.1	10.2	2.7	86.0	9.5	4.5
NEP4 ^a	33.2	42.4	24.4	32.8	40.7	26.5	67.6	18.8	13.6	57.0	23.5	19.5
NEP5	69.1	17.7	13.2	81.4	7.5	11.1	81.1	14.9	4.0	88.5	8.0	3.5
NEP6 ^a	63.8	19.8	16.3	84.0	7.6	8.4	59.9	22.8	17.3	75.5	20.0	4.5
NEP7	87.6	6.3	7.4	95.6	1.3	3.1	84.5	13.3	2.3	89.5	8.5	2.0
NEP8 ^a	14.1	36.3	49.6	7.6	18.8	73.6	23.0	29.1	47.9	22.5	26.5	51.0
NEP9	87.6	9.8	2.6	85.3	6.7	8.0	85.2	10.9	4.0	85.2	14.0	3.5
NEP10 ^a	27.9	31.8	40.3	19.9	23.9	56.3	37.5	22.8	39.7	31.5	22.0	46.5
NEP11	53.7	25.5	20.8	67.4	17.0	15.6	92.0	5.5	2.5	78.0	15.0	7.0
NEP12 ^a	21.3	19.6	59.1	9.4	12.4	78.2	21.6	19.3	59.1	21.0	20.5	58.5
NEP13	71.6	15.9	12.5	69.5	14.6	15.9	72.1	20.7	7.2	80.5	15.5	4.0
NEP14 ^a	26.2	36.5	37.3	15.0	34.1	50.8	27.5	27.3	45.2	28.0	28.5	43.5
NEP15	46.5	36.5	17.0	62.3	21.5	16.1	81.3	13.8	4.9	79.0	16.5	4.5
% of answers to the eight NEP items	68.2	17.4	12.4	74.4	13.3	12.6	79.7	13.6	6.7	83.2	12.2	4.6
% of answers to the seven DSP items ^a	30.8	30.0	39.2	26.6	22.3	51.1	36.1	22.9	41.0	35.2	23.2	36.6
Mean total pro-NEP percent (%)	54.7			63.1			61.7			61.7		

a Items are reverse coded.

A, agree; D, disagree; U, uncertain.

Limits to growth (items 1, 6 and 11)

This dimension of the NEP is concerned with development and growth issues. An examination of this dimension reveals that over 83.5% of Hungarians embrace beliefs about population control (item 1) and only 59.8% of the UK, 53.8% of Japanese and 54.7% of German seniors have the same view. A total of 92.0% of Japanese and 78% of Hungarian respondents support the beliefs about conservation of resources (item 11) while this is true for only 53.8% of the UK and 67.4% of German respondents. It is interesting that all respondents in all four countries support, to various degrees, the DSP idea of unlimited resources and learning to use them (item 6). Eighty-four percent of German, 75.5% of Hungarian, 63.8% of UK and 59.9% of Japanese seniors are not accepting the NEP evaluation of nature and are more aligned with the DSP value on economic growth.

Anti-anthropocentrism (items 2, 7 and 12)

The NEP view does not support humans' domination over nature (item 12) and humans have the right to modify the natural environment to suit their needs (item 2). The majority of respondents in the four countries support the idea that plants and animals have as much right as humans to exist (item 7). A total of 78.2% of German, 59.1% of Japanese and UK respondents and 58.5% of Hungarian respondents do not accept the DSP idea that nature exists for human use (item 12). Over 60% of German and Japanese respondents have the view that humans do not have the right to modify the natural environment to suit their needs, but 29.1% of UK and 46.0% of Hungarians agreed to this statement representing the DSP orientation.

Balance of nature (items 3, 8 and 13)

According to the NEP idea, there is balance in nature and human interference endangers this balance. The items 3 and 13 reflect the negative consequences of human interference and the

delicate character of nature. The majority of respondents in the four countries agreed with these two NEP items. On the other hand, statement 8 provides a DSP orientation: 73.6% of the German sample and around half of respondents in the other three countries disagreed with the statement that the balance of nature is strong enough to cope with the impact of modern industries.

Anti-exemptionalism (items 4, 9 and 14)

The NEP assumes that people reject the domination of humans, economy and technology over nature. A total of 67.6% of the Japanese and 57% of Hungarian respondents have exemptionalist worldview believing that humans will not make the earth unlivable, and only one-third of the UK and German respondents share this idea (item 4). Nearly 50% of the German, Japanese and Hungarian respondents have an anti-exemptionalist worldview; whereas 36.5% of the UK respondents and 34.1% of the German seniors have ambivalent opinions about the statement that humans will learn enough how nature works to be able to control it (item 14). Over 80% of the respondents in the four countries believe that humans are still subject to laws of nature (item 9).

Eco-crisis (items 5, 10 and 15)

The NEP spotlights the importance of nature and express concern about the outcome of human interference to nature. The great majority (over 80%) of respondents in three countries (Germany, Japan, Hungary) agrees with the statements about human abuse (item 5), but in contrast this agreement is found among only 69.1% of UK respondents. The majority of Japanese, Hungarian and German (81.1%, 79% and 62.3%) respondents agree with the statement about probable ecological catastrophe (item 15), but only 46.5% of UK seniors support this opinion. Interestingly, more than one-third of the Japanese and Hungarian and 28% of the UK respondents agreed that the ecological

crisis has been greatly exaggerated (item 10). However, 56.3% of the German, 46.5% of the Hungarian, 40.2% of the UK and 39.7% of the Japanese respondents disagreed with that statement.

Relationship between values and the NEP scale

Values literature endorses the link between society and the individual (Beatty et al., 1988), where it is generally accepted that human value systems are a result of cultural socialization and heritage, and personal experience resulting from economic conditions, historical and political events and specific deprivations suffered by differing age cohorts (Crosby et al., 1984; Sudbury-Riley et al., 2011). The LOV instrument was chosen because it is widely used in consumer research and has previously been used in a number of cross-cultural studies (Sudbury-Riley et al., 2012). Different researchers treat the NEP scale as a measure of environmental concern, environmental values and environmental attitudes; however, it is increasingly treated as a measure of environmental beliefs and attitudes, which is, according to Dunlap (2008), the most accurate interpretation. The NEP measures a certain type of attitudes, namely environmental attitudes. These should be based on core personal values which can be measured by LOV. The LOV comprises eight values: sense of belonging, warm relationships with others, self-fulfillment, being well respected, fun and enjoyment of life, security, self-respect and a sense of accomplishment. Respondents were required to rate each value on a 9-point scale.

Linear hierarchical regression was used to assess the ability of the values to predict levels of the NEP scale, after controlling for social desirability, age, gender and social status. The regression analysis was performed in three steps. Social desirability and the other control variables was entered at step 1, while all the values were entered at step 2 and PCE was entered at step 3. Linear hierarchical regression was used to assess the ability of the values to predict levels of the NEP scale, after controlling for social desirability. The regression analysis was performed in three steps. Social desirability was entered at step 1, while all the values were entered at step 2 and PCE was entered at

step 3. Tables 5, 6, 7 and 8 present the significant results for each country. As can be seen from the tables, the final models (R²) explained 7.8% of the variance in the UK, 6.5% in the German sample, 10.2% in the Japanese and 10.9% in the Hungarian sample. Social desirability was significant in the UK and Japan but with negative direction. Social desirability was not significant in the final model in Germany and Hungary. In terms of values, in the UK sample 'self-respect' was the strongest positive predictor for NEP (Table 5).

Table 5 Multiple regression results: UK

UK	B	β	t
Step 1			
Social desirability	-0.009	-0.130	-2.703*
Step 2			
Social desirability	-0.008	-0.126	-2.577*
Self-respect	0.105	0.236	3.604**
Step 3			
Social desirability	-0.008	-0.118	-2.424*
Self-respect	0.103	0.233	3.575**

*P < 0.05. **P < 0.00.

R² = 0.018 for step 1 (F = 7.308), R² = 0.062 for step 2 (F = 2.865),

R² = 0.078 for step 3 (F = 3.019).

Table 6 Multiple regression results: Japan

Japan	B	β	t
Step 1			
Social desirability	-0.011	-0.147	-2.790*
Step 2			
Social desirability	-0.012	-0.149	-2.866*
Self-fulfilment	0.046	0.159	2.124*
Being well respected	0.035	-0.146	-2.188*
Step 3			
Social desirability	-0.016	-0.205	-2.959*
Self-fulfilment	0.047	0.161	2.151*
Being well respected	-0.034	-0.143	-2.153*

*P < 0.05. **P < 0.00.

R² = 0.022 for step 1 (F = 7.783), R² = 0.092 for step 2 (F = 3.839),

R² = 0.102 for step 3 (F = 3.510).

Table 7 Multiple regression results: Hungary

Hungary	B	β	t
Step 2 Security	0.123	0.173	1.9910*
Step 3 Security	0.118	0.166	1.924*
PCE	0.060	0.189	2.206*

*P < 0.05. **P < 0.00.

R2 = 0.001 for step 1 (F = 0.236), R2 = 0.086 for step 2 (F = 1.981),

R2 = 0.109 for step 3 (F = 1.981).

Table 8 Multiple regression results: Germany

Germany	B	β	t
Step 2 Accomplishment	-0.071	-0.219	-2.321*
Step 3 Accomplishment	-0.071	-0.218	-2.273*

*P < 0.05, **P < 0,001.

R2 = 0.001 for step 1 (F = 0.195), R2 = 0.050 for step 2 (F = 1.112),

R2 = 0.065 for step 3 (F = 1.182).

In the Japanese sample, the 'self-fulfillment' and 'being well respected' values have significant influence on NEP scores, but with different directions. 'Self-fulfillment' was a positive, while 'being well respected' was a negative predictor, but with the same strength (Table 6). In the Hungarian sample, 'security' was the only value which was a positive predictor for NEP scores. It is interesting that only in the case of Hungary was PCE a significant positive predictor (Table 7). In the German

sample, the value 'accomplishment' has significant influence on NEP scores; it was a negative predictor (Table 8).

Discussion and conclusion

This paper has presented the results of a study that assesses the ecological attitudes of senior consumers in the UK, Germany, Japan and Hungary. The ecological worldview of senior consumers has not been studied so far, thus the current study fills an important gap in knowledge. Previous studies examining the ecological worldview of people are usually limited to national samples, ethnic groups or younger consumers, particularly university students (Thapa, 2001; Rideout et al., 2005; Erdogan, 2009; Woodworth et al., 2011; Amburgy and Thoman, 2012) or even adolescents and children (Menzel and Bögeholz, 2010; Kopnina, 2011).

Examinations of the overall frequency and mean distributions shows that the majority of seniors in each country show some support for the NEP statements to various degrees, but there is no general support for a pro-NEP orientation. About one-third of the respondents in each country have a pro-DSP view, believing in human's ingenuity and modern technology. Moreover, a significant number of respondents in each country were uncertain about environmental problems. Although the total average NEP scores in each country do not show large differences, there are variations in means for responses to single items, which can provide support for possible differences of understanding human's relationships with nature. Of course, establishment of full measurement invariance of the NEP scale would be required before direct comparisons between nations are made, thus future research should address these issues.

Item 6 on the scale (the earth has plenty of natural resources) requires deeper understanding and discussion. Pro-NEP agreement levels (i.e. disagreement with item 6) were smallest at 8.4% in the German and 4.5% in the Hungarian samples. While these results are consistent with previous

research that has also found item 6 to generally have the lowest levels of pro-NEP agreement (Dunlap et al., 2000; Rideout, 2005; Vikan et al., 2007; Erdogan, 2009), these results provide an interesting contrast to the UK and Japanese results which show 16.3 and 17.3% levels of agreement respectively. Even lower is the level of agreement (13.6%) among Japanese seniors between pro-NEP and trusting human ingenuity (item 4), which taps the dimension of limits to growth. However, the answer is different from the reaction to the other two items of concerning the limit issue (items 1 and 11), in which pro-NEP responses of Japanese seniors is over 50% (item 1) and 92.0% (item 11).

Our percentage of the overall total NEP agreements ranged from 54.7% (UK) to 63.1% (Germany). These results are similar to Rideout et al.'s (2005) student data and not very different to the study conducted by Dunlap et al. (2000) who report percentage agreements of 66.5% overall.

Burn et al. (2012) investigated gender, ethnic identity and environmental concern in Asian American and European Americans found even higher NEP scores than those reported in the past studies. They claim that their findings reflect a greater awareness of human impacts on the environment because of increased media attention to environmental issues in the USA. Future studies should therefore attempt to consider the different media attention given to environmental issues in the nations under study in order to ascertain if this is indeed a contributing factor.

In their study using a representative sample of the Hungarian population, Hofmeister-Toth et al. (2012) identified four different consumer groups by their ecological worldviews as measured by the NEP scale. The members of these groups were sensitive to environmental issues to varying extents. The overall frequency distribution on the 15 NEP items of the Hungarian population is somewhat lower (57.6%) than our Hungarian senior sample (61.7%).

Many authors on the basis of their results suggest that consumers who express higher levels of environmental concern are more likely to engage in environmentally friendly consumer behaviours (Roberts, 1996; Laroche et al., 2001; Olli et al., 2001; Johnson et al., 2004; Paco et al., 2013; Zabkar

and Hosta, 2013). According to Laroche et al. (2001), attitudes, as opposed to knowledge, are the most significant predictors of consumers' willingness to pay more for environmentally friendly products. The German seniors in our study showed higher ratings on almost all items, indicating a relatively higher concern for nature. Germany was among the early adopters of environmental practices and this might be one of the reasons why the German seniors in our sample exhibit more concern about the human–nature relationship. A recent study conducted by Ipsos OTX (2013) (the global innovation centre for market research firm Ipsos) comprising a poll of 18 503 adults in 24 countries found national differences. Those countries most likely to agree that they cared about the efforts of brands to help the environment included Argentina (70%), Mexico (68%), Indonesia (66%), South Africa (62%), Germany (60%), India (60%), Turkey (60%) and Brazil (59%). Those most skeptical of brand efforts were Sweden (50%), Saudi Arabia (49%), France (46%), the UK (46%), Hungary (46%), Belgium (45%), Russia (44%), Poland (38%) and Japan (17%). The willingness of consumers to pay more for green products followed a similar pattern. Consumers most resistant to paying a green premium were from Hungary (30%), Italy (29%), Australia (29%), Spain (28%), France (27%), the UK (26%), Belgium (25%), Poland (22%) and Japan (13%). Kohlbacher (2013) investigating ethical consumption in Japan using an adult sample of Japanese people, found a higher NEP average score (3.84). He found no statistically significant differences between men and women, but negative correlation with age, which is in line with our findings of the Japanese seniors' lower NEP score which is 3.64 in the current study.

The research presented here has contributed to knowledge in a number of ways. First, it is the only cross-cultural study that examines the ecological worldview of older consumers using the NEP scale. Second, it portrays the diversity of environmental concern of older people in four culturally different samples. As populations age, organizations from a wide range of sectors, as well as policy makers will be increasingly called upon to understand the differences in values, attitudes, beliefs and behaviours of older citizens. Differences in concerns about the human–nature relationship across cultures will impact organizations at the strategic and operational level. In turn, this will then have

an impact on consumers and their well-being. The better organizations and policy makers understand consumer needs the better they will be able to address these needs, and subsequently consumers will benefit from the availability of new products and services that make their daily life easier, more convenient and more in line with consumer values and attitudes. The revised NEP scale could prove useful in tracking possible changes in endorsement of an ecological worldview, as well as in examining the effect of specific experiences and policies in generating some positive changes in this worldview across countries. This study, the first of its kind, investigated the ecological worldview of seniors in Japan, Germany, the UK and Hungary. Scholars who want to understand how citizens in different countries think about human–nature relations may find the revised NEP a useful measure, especially for comparative purposes.

Limitation and further research

Although the study yields insights into the interplay of individual pro-environmental value orientations, some limitations have to be taken into account. One of the limitations of the study is, due to its exploratory nature, direct cross-cultural comparisons are not made, as more confirmatory methods would be necessary to establish measurement equivalence. When non-comparable samples are used, possible problems in measurement invariance are confounded with differences in the characteristics of the samples (e.g. Steenkamp and Baumgartner, 1998) and it is suggested that future research should attempt to establish measurement invariance of the NEP scale.

Although the authors tried to adopt measures to ensure the samples as representative as possible, it is to be noted that they may not be a true representations of all the senior population in the four countries. We also must be careful not to over interpret the data given the limitations of the samples and their potential noncomparability, e.g. difference in the sampling method and

representativeness of the samples between Hungary and the other three countries, which means that the results should be viewed with caution.

Despite the limitation of the samples, this study provides fresh information on the ecological belief system of the senior population of the four countries. Of course, additional research is needed before definite conclusions can be made about the worldviews of the older population of these countries. Future research might also investigate how other cultural values at national and individual levels relate to individual pro-environmental value orientations and ecological worldview and how they interact and how they influence behaviour.

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