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Abstract

Destinations are increasingly concerned about the environmental sustainability of the local tourism industry. A number of authors have proposed a demand-driven approach to sustainable destination management as a complementary measure to traditional supply-sided interventions. However, there is little empirical evidence to support the feasibility of such a demand-driven approach. This study contributes to this gap by investigating whether individuals who feel morally obliged to behave in an environmentally friendly manner represent useful target segments for destination management aiming to improve the ecological sustainability of the local tourism industry. Results indicate that distinctly different moral obligation segments exist that differ in pro-environmental behavior and attitudes. These segments are associated with distinctly different vacation preferences and can consequently be used by destination management for target marketing. Gaps between people's pro-environmental behavior at home and at the destination differ systematically across segments, leading to the conclusion that different combinations of demand and supply-sided measures may be suitable to reduce the environmental footprint of different segments.

Keywords

market segmentation, sustainable tourism, environmentally friendly tourists, ecotourism

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An Investigation of Tourists' Patterns of Obligation to Protect the Environment

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An Investigation of Tourists' Patterns of Obligation to Protect the Environment

ABSTRACT

Destinations are increasingly concerned about the environmental sustainability of the local tourism industry. A number of authors have proposed a demand-driven approach to sustainable destination management as a complementary measure to traditional supply-sided interventions. However, there is little empirical evidence to support the feasibility of such a demand-driven approach. This study contributes to this gap by investigating whether individuals who feel morally obliged to behave in an environmentally friendly manner represent useful target segments for destination management aiming to improve the ecological sustainability of the local tourism industry. Results indicate that distinctly different moral obligation segments exist that differ in pro-environmental behavior and attitudes. These segments are associated with distinctly different vacation preferences and can consequently be used by destination management for target marketing. Gaps between people's pro-environmental behavior at home and at the destination differ systematically across segments, leading to the conclusion that different combinations of demand and supply-sided measures may be suitable to reduce the environmental footprint of different segments.

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INTRODUCTION

For many decades destinations and tourism researchers have investigated ways in which the environmental sustainability¹ of local tourism can be improved. Two main solutions have emerged which are referred to as *ecotourism* and *sustainable tourism*.

In the field of sustainable tourism a large number of supply-sided measures (Dolnicar 2006) have been researched and developed in the past that can help destination management to reduce the negative environmental side-effects of tourism industry. Typical directions of research reflect this orientation and can roughly be grouped in three streams: the quantification of negative impacts of tourism on the environment (e.g. Driml 1997; Gössling 1999; Vail and Hultkrantz 2000; Chan and Lam 2002), the investigation of reasons for (non-) environment-protective attitudes or behaviour within the tourism industry of host countries (e.g. Barron and Prideaux 1998; Wunder 2000; Carlsen, Getz and Ali-Knight 2001; Weiler and Ham 2002), and the study of environmental policy and management as tools to protect the natural environment in host countries (e.g. Hunt and Auster 1990; Davis and Gartside 2001; De Burgos-Jiménez, Cano-Guillén and Céspedes-Lorente 2002; Page and Thorn 2002; Font and Harris 2004; Jennings 2004). Sustainable tourism measures emerging from these streams of research all have in common that the interventions by destination management are implemented at the destination itself and can therefore be referred to as supply-sided measures. Examples include restricting the capacity for attractions, educating tourists after their arrival at the destination about issues of sustainability or inviting tourists to reuse their towels in hotels during their stay. Such supply-sided measures take the nature of the tourists visiting the destination as a given. Whichever tourists choose to visit the destination: they will

be exposed to locally implemented interventions aimed at reducing the ecological footprint of tourism.

Ecotourism, on the other hand, refers to a highly demand-sided or demand-driven concept (Dolnicar 2006). Tourists who are interested in a particular kind of vacation experience (typically nature oriented) are actively targeted. Such tourists are known to care about nature to a higher extent and are consequently assumed to leave a smaller ecological footprint than tourists who do not include nature as a central decision criterion into their vacation or destination choice. This concept is very promising as naturally existing demand (in this case for nature-based tourismⁱⁱ) can be taken advantage of by tourism suppliers with matching tourism offers. Yet, this demand-driven approach is currently only harvested in the context of ecotourism and very little reliable information about who “environmentally friendly tourists” are is currently available (Dolnicar, Crouch, and Long, forthcoming). Extending the concept of targeting tourists who are intrinsically motivated to leave the minimal ecological footprint can potentially be a valuable extension of (not a substitute for) the currently dominating supply-sided sustainable tourism destination management portfolio outlined above for destinations that are interested in minimizing the ecological footprint of tourism or destinations that face scarce natural resources. This view is supported by Bramwell and Lane (2005) who state – in their review of research in the field of sustainable tourism – that many papers still view natural areas as central to sustainable tourism research, “perhaps reinforcing misconceptions that ST [sustainable tourism] is only relevant for such areas” (p. 54).

Demand-driven approaches have implicitly or explicitly been proposed by numerous authors: Inskip (1991) recommended selective marketing as a way to increase environmental

sustainability at the destination. Ataljevic and Doorne (2000) postulate the emergence of a new segment of tourists that is environmentally friendly. New Zealand tourism business owners who have themselves experienced environmentally friendly tourism are actively developing products for such a segment. Dolnicar (2004) describes an empirical segment, the members of which express their interest in maintaining unspoiled nature at the tourist destination. While this is an empirical study, the derived segment is the result of splitting the respondents by one single variable into a priori segments. The same methodological limitation applies to the study conducted by Crouch, Devinney, Dolnicar, Huybers, Louviere and Oppewal (2005) in which respondents stating that maintaining unspoilt surroundings plays a major role for them during a vacation (so-called “environmentally caring tourists”) are empirically profiled. Fairweather, Maslin and Simmons (2005) describe a group of tourists to New Zealand who they refer to as the Biocentric segment. This group is characterized by high pro-environmental attitudes but is shown to also differ in socio-demographics, their interest in ecolabels, the intended use of ecolabels for accommodation choice and their expressed willingness to pay a price premium for green certified accommodation. The most explicit call for a demand-driven approach to sustainable tourism management was recently provided by Dolnicar (2006) who postulates, on the basis of a review of tourism literature as well as psychological and sociological literature related to environmentally friendly behaviour, that environmentally friendly tourists exist in all tourism contexts and could be actively targeted as market segments to reduce the ecological footprint of tourism. While the proposition is plausible, Dolnicar does not provide empirical evidence for the usefulness of this approach. As opposed to the empirical studies reviewed above, such evidence would have to be based on more than one single splitting criterion for segments, it should not be purely attitude based because past research does not indicate that pro-environmental attitudes are particularly

predictive of pro-environmental behaviour and it should contain descriptors of environmentally friendly tourists which are useful to and actionable by destination management. Past behaviour was first used as a splitting criterion by Dolnicar and Leisch (forthcoming). Respondents who stated that they behaved in an environmentally friendly way on vacation were found to be distinctly different from respondents who expressed lower levels of pro-environmental behaviour at the tourist destination. This study is, however, limited by the fact that only statements about past behaviour were used which may not necessarily be predictive of future behaviour. Furthermore, the specific kinds of behaviour were not accounted for in the study. Instead only a single summated measure of pro-environmental behaviour was used, making it difficult to assess which supply-sided measures could be useful to complement demand-driven strategies for certain segments of the tourist market.

Filling this gap is the aim of the current study. This aim will be achieved by investigating whether sub-groups of the population can be identified which feel morally significantly more obliged to behave in an environmentally friendly manner. Moral obligation was chosen as the core construct (and segmentation base) for this study because prior work has revealed that the feeling of moral obligation is a strong predictor of environmentally friendly behaviour (Kaiser and Shimoda 1999; Kals, Schumacher and Montada 1999; Berenguer, Corraliza and Martin 2005). In fact, moral obligation appears to be the only construct which has been consistently found to be predictive, as opposed to many attitudinal or socio-demographic measures which have led to contradictory findings. Furthermore, moral obligation will not be studied as a single measure. Instead the pattern of moral obligation across a whole range of behaviours is used to study heterogeneity among tourists.

If sub-groups of the population can be identified which have distinct patterns of moral obligation to behave in an environmentally friendly manner, such segments have to be validated to ensure that their past behaviour actually reflects their expressed feeling of moral obligation. Finally, resulting segments of high moral obligation have to be profiled and described in a way that is meaningful and actionable to tourism management.

Furthermore, and related to the main aim of the study, differences in environmentally friendly behaviour in the home and vacation context will be investigated. Two competing hypotheses seem plausible: that individuals who behave pro-environmentally will do so in all contexts or that individuals at all levels of pro-environmental behaviour will face significantly more obstacles at the destination than at home and pro-environmental vacation behaviour will consequently be systematically lower for all individuals. To the best of our knowledge, nobody has previously compared tourists' pro-environmental behaviour in the vacation context with their behaviour at home despite significant interest in their environmental footprint at the destination.

The paper consequently makes two contributions to the field of sustainable tourism research: (1) we use individual moral obligation items to construct market segments and investigate whether such segments could represent a suitable target for selective marketing. (2) we analyze the relationship between pro-environmental behaviours at home and on vacation for each segment separately. In doing so we identify which segments are particularly suitable for a demand-driven approach to sustainable tourism management (because their behaviour is relatively stable across contexts) and which segments' ecological footprint could be reduced more effectively by supply-sided measures.

DATA

The population under study was not restricted to one particular destination. It was consequently possible to collect data using a general Australian permission-based internet panel which contains 250,000 registered members: respondents were randomly selected from the panel which is maintained to contain respondents representative of the Australian population based on key census criteria provided by the Australian Bureau of Statistics. Randomly selected respondents were invited to complete a 30 minute online questionnaire. The survey was online until 1000 respondents had responded (nine days). No reminder emails were needed. The data collection took place in Australia in April 2006. The resulting sample consisted of 488 females and 512 males, the age ranged between 18 and 84, with mean 42.2 and standard deviation 14.5 years.

Specific questions about environmentally friendly behaviour included the following:

1. Pro-environmental behaviour at home: respondents were presented with 30 everyday behaviours and were asked to state how often they engage in each of those behaviours at home. Answer options included *Always*, *Often*, *Sometimes*, *Rarely*, *Never* and *Not applicable*.
2. Pro-environmental behaviour on vacation: respondents were presented with the same 30 behaviours and asked to state how often they engage in them on a vacation. The list of 30 behaviours presented both for the home and the vacation context was derived from compilations of environmentally relevant behaviours published and used in the empirical studies by Corraliza and Berenguer (2000), Johnson, Bowker and Cordell (2004) and Trumbo and O'Keefe (2001).

3. Moral obligation to behave environmentally friendly: respondents rated the above 30 items with respect to how morally obliged they personally felt to engage in them. Answer options were *Totally obliged*, *Mildly obliged*, *Unsure*, *Rather not obliged*, and *Not at all obliged*. The actual wording of the question was taken from Berenguer, Corraliza and Martin (2005).
4. Moral obligation context: respondents were asked whether they feel more morally obliged to carry out these pro-environmental behaviours at home or during their vacation.
5. Finally, 15 items from the New Ecological Paradigm (NEP, Dunlap and Van Liere 1978, 1984; Dunlap, Van Liere, Mertig and Jones 2000) were presented to respondents who were asked to indicate their agreement with each of the statements. The NEP has been extensively used in studies of environmental behaviour to assess different aspects of environmental concern. Although the NEP scale has been criticized by a number of authors (Edgell and Nowell 1989; Roberts and Bacon 1997) it remains – to the authors’ knowledge - the only validated scale available to measure environmental attitudes. The NEP was included in the present study to assess how strongly environmental attitudes are associated with moral obligation segment membership. Five answer options were provided, ranging from *Strongly Agree* to *Strongly Disagree*. As recommended by Dunlap et al. (2000) we use the NEP scale as unidimensional and sum the items (some reverse-coded) to form one measure of environmental attitude.

Specific tourism-related questions included the following:

1. Travel frequency: respondents were asked to state the number of domestic and overseas holidays and the number of domestic and overseas business trips they undertake in an average year.
2. Accommodation choice: respondents were presented with a list of seven accommodation options and were asked to state which accommodation they use most frequently.
3. Information sources: 15 alternative travel information sources were listed in the questionnaire. Respondents were asked to indicate which of those information sources they use during the decision making stage. There is no a priori hypothesis why individuals with different level of moral obligation to behave in an environmentally friendly way. If, however, any significant differences in information behavior can be detected this would be the best possible information for destination management about moral obligation segments because it would make the task of reaching them in their home environment significantly easier.
4. Vacation preferences: a list of 25 statements about vacations was presented to respondents. They were asked to indicate which of the statements apply to them. A few examples of such statements are “I want to rest and relax”, “I use my holiday for the health and beauty of my body” or “Cultural offers and sights are a crucial factor”. These items have been taken from the Austrian National Guest Survey where they have been used successfully in multiple survey waves.

Specific questions about personal characteristics included the size of the town in which they live, their ethnic background, religion, and media behaviour. Media behaviour plays a similar role as the items about information sources used in the vacation / destination choice

process: if significant differences between moral obligation segments can be detected these would help destination management in reaching attractive (high moral obligation) market segments.

RESULTS

3.1 Step 1: Data structure analysis

Before the data were clustered, the structure of the data set was analyzed. This was done by computing hierarchical clustering solutions simultaneously for individuals and variables. This analysis gives the researcher an indication about the extent and nature of structure in the data set. Typically, empirical data sets based on survey responses are not highly structured in the sense of containing strongly separated groups of individuals, instead reflecting the fact that each person is uniquely located in the space of the construct under study. Based on the extent of structure of respondents, the researchers either pursue the aim of *identifying market segments* (if the data are highly structured and homogeneous groups of individuals exist which are strongly separated from the other groups) or the aim of *constructing market segments* (if the clear groups do not exist). Please note that constructing segments of individuals who are not naturally grouped in segments is a perfectly legitimate approach because there are significant advantages in targeting individuals who are more similar to each other than to not segment at all and try to target the mass market in an undifferentiated manner. This point was first made by Mazanec et al. (1997). The value of gaining insight into the data structure lies in knowing what approach is taken rather than using a clustering algorithm as a black box and claiming the existence of natural segments where in fact there are none. For the moral obligation data, variables demonstrate a slight group structure which essentially reflects the amount of active effort required to undertake each of the listed behaviors. Individuals, on the other hand, are not well structured at all, indicating that well-separated segments do not naturally exist in the data and, consequently, a constructive clustering approach needs to be adopted.

3.2 Step 2: Clustering of respondents according to their moral obligation

Next, the individuals are clustered using the 30 moral obligation variables as a segmentation base. This is a classic data-driven (a posteriori) segmentation approach. Note that respondents were asked to state the extent to which they feel morally obliged to undertake each of the listed behaviors on a 5-point ordinal scale. Mean values are only appropriate for interval-scaled data, while medians can be computed for data on an ordinal scale. Hence, the data were clustered using the k-medians procedure, which is essentially the same as k-means, but uses absolute instead of Euclidean distance (e.g. Kaufman and Rousseeuw 1990). All computations and graphics were done using R version 2.3.1 (R Development Core Team 2006) using extension packages flexclust (Leisch 2006), both available as free software from <http://cran.R-project.org>.

Number of clusters between 4 and 10 were computed. Not surprisingly given the lack of data structure in the dimension of individuals, no particular number of clusters is recommended by both the within-cluster sums of distances and the cluster silhouettes (Rousseeuw 1987).

Consequently, all resulting segment solutions were fully interpreted and the most managerially valuable solution was chosen. The managerial value of a solution was judged by assessing whether the resulting segments are large enough to be actionable, are not too similar to each other in profile and represent distinct segments the central characteristics of which can be easily understood. The segmentation solution with six segments best complied with these criteria.

Figure 1 provides segment plots for all six segments which show how morally obliged each of the segments feels to engage in each of the listed behaviors (depicted by horizontal bars) and how frequently the entire respondent population feels in this way (depicted by horizontal lines with a dot at the end). Deviations from the total sample are used to interpret the segment characteristics. Please note that values for both segments and the total sample can only take one of the five values of the original answer options because k-medians analysis was undertaken.

---- Insert Figure 1 here ----

As can be seen Segments MO1 and MO6 represent the extremes of moral obligation. More specifically, Segment MO1 can be referred to as *low moral obligation segment* because the members of this group feel the least moral obligation to engage in pro-environmental behaviors. The only item with respect to which this segment demonstrates average moral obligation is not to litter. Segment MO6 (*high moral obligation segment*) is the opposite type: members of this segment generally feel most morally obliged to behave environmentally friendly. Segment MO2 is the *average moral obligation segment*. Members of this group almost perfectly fit the average profile of moral obligation in the population under study. Among the 30 listed behaviors members of this group only deviate in their moral obligation towards four behaviors: switching the heating off, reusing things, reducing car washing and voting for a pro-environmental political candidate less often. Segment MO3 (*pro-environmental consumers*) differ from the total sample very distinctly in that they feel morally

obliged to engage in environmentally friendly consumer behavior to a higher extent: to buy environmentally friendly, refillable, bio-degradable and energy-saving products and to take bags from home when they go shopping. Segment MO4 (*environmental activists*) shows a fairly average pattern of moral obligation to pro-environmental behavior in most respects. The distinctive feature of this segment, however, is the consistently high level of perceived moral obligation to activism for the protection or conservation of the environment in the form of, for instance, volunteering time or money to environmental groups, voting for pro-environmental political candidates or even joining pro-environmental political action. These are all activities that go beyond typical day to day household measures of environmental protection. Segment MO5 (*morally obliged if it's easy*) members feel less obliged to engage in environmentally friendly behavior that goes beyond household related activities. Members of this group feel little obligation to change their transportation behavior for environmental reasons and to engage in environmental activism of any kind.

3.3 Step 3: Profiling moral obligation segments

The main test of the validity of the moral obligation segments that were presented above is whether segments with high levels of moral obligation have indeed engaged in environmentally friendly behavior more frequently than those expressing low level of moral obligation. For this test the two survey questions on the frequency of past pro-environmental behavior at home and on vacation was used. A summated score was derived by adding up the responses of each individual across all behaviors, leading to a metric indicator of pro-environmental behavior. Two such indicators were derived: one for behavior in the home context, one for behavior on vacation. This is particularly important, because it is irrelevant

whether tourists protect the natural environment in their home country from a destination management point of view. Destination management is only concerned with ecologically protective behavior in the vacation context. Although it is reasonable to expect that individuals who behave environmentally friendly at home will do so in the vacation context as well, no study has so far investigated this empirically. Therefore past behavior was studied separately for both contexts in this study: significant differences between segments do indeed exist with respect to reported past behavior. Figure 2 depicts the distribution of the index of environmentally friendly behavior for each segment as a box-whisker plot. The boxes contain the inner 50 percent of the indices of segment members, the whiskers above and below the boxes contain the highest and lowest 25 percent, respectively, and the horizontal line in the box indicates the median value. The medians of the five segments have statistically significant differences both at home (Kruskal-Wallis rank sum test $\chi^2=338.7$, $df=5$, $p\text{-value} < 2.2e-16$) and on vacation ($\chi^2=157.3$, $df=5$, $p\text{-value} < 2.2e-16$).

As expected, Segment 6 shows the highest level of pro-environmental behavior, the opposite is true for Segment 1. Among the more discriminated moral obligation segments the *pro-environmental consumers* rank first, followed by the *environmental activists*, the *average moral obligation segment*, and finally the *morally obliged if its easy* segment. These findings are in line with prior studies which find a strong relationship between moral obligation to behave environmentally friendly and pro-environmental behavior (Kaiser and Shimoda 1999; Kals, Schumacher and Montada 1999; Berenguer, Corraliza and Martin 2005).

Furthermore, it can be seen from Figure 2 that the relative positions of the moral obligation segments in the home context and in the vacation context are the same, although the mean values are consistently lower in the vacation context and the variability is higher.

Two possible reasons can explain this systematic pattern: (1) individuals feel more morally obliged to behave environmentally friendly in their own local community in which they directly suffer from negative effects on the environment, or (2) tourist destinations do not typically provide all the infrastructure that is necessary to engage in environmentally friendly behavior. For instance, recycling bins are not available in all countries. Even if an Australian tourist would like to recycle garbage it may not be possible at certain destinations. It could also be that the generally lower level of pro-environmental behavior can be explained by reason (1) and the higher variability by reason (2). While the data set does not contain variables which would enable us to test reason (2), respondents were asked whether they feel more or less obliged to behave environmentally friendly at a tourist destination. This information enables us to assess whether reason (1) provides a plausible explanation. The analysis of this variable results in the finding that the vast majority of respondents (92 percent) feel more morally obliged to behave environmentally friendly at home, thus supporting the moral obligation hypothesis of context differences.

---- Insert Figure 2 here ----

Figure 3 depicts a comparison of stated past behavior in the two contexts on an individual, rather than segment level. This picture confirms the results from Figure 2 as well as the analysis of differences in moral obligation at home and at the destination: the main diagonal in this Figure (depicted by a dashed line) represents the location of individuals who behave equally environmentally friendly at home as they do on vacation. As can be seen, only few

individuals are actually located along this line. The majority of respondents are located below the main diagonal, indicating that they have higher environmental behavior indices at home than they do on vacation. The solid line in Figure 3 shows a linear regression line for the data, the corresponding linear model has a non-significant intercept but a highly significant slope. The estimated slope parameter is 0.7329, i.e., the average pro-environmental behavior on vacation is only about three quarters of that at home.

---- Insert Figure 3 here ----

This same analysis can also be undertaken separately for each of the moral obligation segments (Figure 4). This analysis reveals interesting additional information: in most segments behavior in these two contexts is not strongly associated. In the case of Segments MO3 and MO6, however, the regression lines are closer to the main diagonal (slopes closer to 1) than for the general population, hence pro-environmental behavior on vacation is more similar to the behavior at home. For Segment MO6 this is not a surprising finding given that this is the group of respondents that feel most morally obliged. In the case of Segment MO3 the results seem plausible: this segment is characterized by feeling strongly morally obliged to purchase environmentally friendly products. This is a kind of pro-environmental behavior that can probably be transferred more easily to a tourism destination than other behaviors (such as recycling, composting etc) can. The segment-wise analysis of the association between pro-environmental behaviors at home and on vacation thus provides preliminary support for reason (2) hypothesized above. In addition it provides insight into the most suitable approach

to reducing the environmental footprint of each segment at the destination. MO3 and MO6 – segments which demonstrate stable patterns of pro-environmental behavior across contexts – call for a demand-driven approach, whereas the remaining segments – characterized by a larger gap between pro-environmental behavior at home and on vacation – either should not be targeted or supply-sided measures would be required to reduce the size of their environmental footprint at the destination.

---- Insert Figure 4 here ----

Significant difference between these segments can also be identified with respect to environmental attitudes (ANOVA $p < 0.001$ with the sum across all NEP items representing the dependent variable). The boxplot is provided in Figure 5 showing that MO1 is described by the holding the lowest level of pro-environmental attitudes and MO3 and MO6 holding the highest level of pro-environmental attitudes. This is not surprising and reflects the results of the analyses presented above.

---- Insert Figure 5 here ----

With respect to socio-demographic differences, women are significantly more frequently members of Segments MO3 and MO6. Interestingly, however, none of the travel-related variables discriminate significantly between moral obligation segments. This is regrettable

from a destination management perspective because it would be easier to actively target high moral obligation segments if they would differ in travel related characteristics. On the other hand these findings support the proposition that demand-driven sustainable tourism management does not have to be limited to ecotourism: high moral obligation tourists are found in all contexts, in all kind of accommodation, they use the full range of information sources in the destination choice phase and they can be found among heavy travelers and light travelers. The potential to apply demand-driven sustainable tourism measures by targeting moral obligation segments can thus be extended to tourism contexts such as city tourism, culture tourism, event tourism and other forms which have so far not been considered to be a suitable context for improving tourism sustainability.

3.4 Step 4: Clustering of respondents based on vacation preferences

Given the limited number of descriptive information contained in the questionnaire used in this study, and given the fact that moral obligation segments can not be described by simple socio-demographics, simple travel-related characteristics or media behaviour directly, an alternative avenue has to be found to put the moral obligation segments into a context that is relevant to a destination manager. To achieve this, a second segmentation analysis is computed. This time vacation preferences as expressed by respondents are used as a segmentation base. This is a typical segmentation base in tourism, often referred to as benefit segmentation as it reflects which benefits people seek during their vacation at a particular destination. Furthermore this segmentation base is relevant, as benefits sought drive the destination choice process and are used to express, for instance to a travel agent, which kind of vacation one wants to undertake. Destination managers are used to working with the

concept of benefit segments. Relating moral obligation segments to vacation preferences, or benefits, therefore provides the context a destination manager needs to adopt a demand-driven approach to sustainable tourism.

Given that the vacation preferences were expressed by respondents on a binary answer scale, standard k-means analysis was used to construct preference segments (note that the data structure analysis of the preference data again did not indicate the natural existence of strongly separated groups of individuals in the data). The same procedure that was used for moral obligation segments was therefore also used to decide how many clusters to construct on the basis of preferences. Figure 6 depicts the resulting six vacation preference segments. That again a six-cluster solution was chosen is mere coincidence and does not reflect any preference of the authors for this particular number of clusters.

---- Insert Figure 6 here ----

Most of the resulting segments show very distinct vacation preferences. Segment VP2 members (who can be referred to as *budget fun-seekers*) deviate from the total sample most in that they need to take care not to exceed their planned budget. Fun, entertainment, letting go and enjoying a free-and-easy going time, meeting new people, enjoying good company and resting and relaxing are more important to *budget fun seekers* than for the other respondents. Segment VP4 (*culture tourists*) are driven by their high level of interest in culture and the life-style of local residents. Culture tourists also enjoy meeting new people, good company and the change of environment more than other respondents. Segment VP5 (*luxury tourists*)

want to enjoy luxury and get spoiled during their vacation. Fun and excitement play a major role for them and they do not want to pay attention to money or prices while on holiday.

Segment VP6 (*nature lovers*) is characterized by emerging itself in the destination. *Nature lovers* are more interested in culture and the life-style of locals than the other respondents, but – as opposed to pure culture tourists – also show interest in the landscape and like to experience nature. They explicitly state that maintaining the environment at the destination matters to them. Similar to the *budget funseekers* they have to make sure that they do not exceed their travel budget.

Segment VP1 does not show any particular preferences with respect to the vacation, Segment VP3 is more interested in each of the benefits listed than the total sample is. These segments are not interpreted in detail as there is a possibility that respondents who actually expressed their travel preferences in this particular way are confounded with respondents who used a response style of ticking all or none of the items. The clustering algorithm cannot discriminate between the two cases. Consequently those two segments have to be interpreted with care. Additional analyses would be necessary should destination management want to choose either Segment VP1 or VP3 as a target.

3.5 Step 5: Association analysis of moral obligation and vacation preference segments

Associating moral obligation segments with vacation preference segments leads to the conclusions that membership of moral obligation segments is reflected in vacation preference segment membership significantly, thus making it possible to provide a relevant context for moral obligation segments to destination management despite the limited number of

descriptive personal information in the data sets. More specifically a number of segments are strongly and significantly associated with each other (χ^2 test p-value=9.676e-12), as visualized in Figure 7 using a mosaicplot (Hartigan and Kleiner 1984; Meyer, Zeileis and Hornik 2006). It depicts associative relationships between two variables, in this case two independently derived segmentation solutions. Whether or not each combination of segments is significantly over-represented or not is indicated by the color code: dark blue shading indicates a significant over-representation, whereas dark red shading indicates significant under-representation.

---- Insert Figure 7 here ----

The following interesting segment combinations emerge from this analysis (overrepresented groupings including vacation preferences segments which are potentially contaminated by response styles are excluded): Segment combination MO1-VP5 (*Luxury tourists with low moral obligation*), segment combination MO2-VP2 (*Budget fun-seekers with an average moral obligation pattern*), segment combination MO5-VP2 (*Budget fun-seekers acting pro-environmentally if it's easy*), and segment combination MO6-VP6 (*Nature lovers with high moral obligation levels*).

Each of these segments can form the basis of a destination marketing strategy which takes into consideration both the environmental footprint of tourists and information relevant to destination managers in terms of vacation preferences will enable moral obligation segments to become actionable. Type MO6-VP6, for instance, differs distinctly from other segment

combinations both in travel behavior (for instance, they dislike hotels, but love camp sites) as well as general characteristics (for instance, they represent a fairly old market segment, have a significantly higher preference for public TV stations and read the local paper significantly more frequently than other groups). Members of the combined segment MO5-VP2 are younger, prefer to stay in holiday apartments and with friends and relatives more frequently, prefer watching cable TV channels, and tend to read Sunday newspapers more than the weekday issues.

CONCLUSIONS

The aim of this study was twofold: to assess whether tourists with different patterns of moral obligation to behave environmentally friendly could represent target segments for selective marketing aiming at reducing the ecological footprint of tourists at the destination. Second, to gain insight into the relationship of pro-environmental behavior at home and on vacation separately for each segment and derive suitable sustainable management approaches in dependence of the gap between the two contexts which is indicative of the stability of pro-environmental behavior.

The feasibility of demand-driven sustainable tourism management approaches was investigated by using the construct that has most consistently been identified as being predictive of environmentally friendly behavior as a segmentation base: moral obligation. The segmentation study resulted in six moral obligation segments which were clearly associated with significantly different levels of past pro-environmental behavior. They were not, however, related to general or travel-related personal characteristics, a result which (1) reflects results from previous studies in which the relationship of socio-demographics with pro-environmental behavior were inconsistent, and (2) indicates that tourist with low ecological footprints are by no means limited to young, old, rich, poor, city or ecotourists. On the one hand, this is an encouraging finding as it suggests that demand-driven approaches can be used in other than the ecotourism context to increase the environmental sustainability of destinations. On the other hand, it is discouraging for destination managers, because direct targeting based on simple personal characteristics is not possible.

Future research is needed which includes many more potential descriptor variables to determine whether there are direct actionable variables in which moral obligation segments differ. For the current study, in which only a limited number of such descriptors was available, a different approach was chosen to place moral obligation segments into a tourism context: moral obligation segments were associated with vacation preferences segments. This procedure resulted in combined segments which differed significantly in behavioral variables important for destination management to actually reach and communicate with the members of the segments. In sum, the demand-driven approach appears to offer a feasible and attractive complementary tool to supply-sided measures of sustainable destination management. It appears to be particularly suitable for segments which demonstrate stable pro-environmental behavior in various contexts. Future work is needed to reveal more personal and travel characteristics in which moral obligation segments differ from each other in order to improve direct targetability.

The comparative analysis of pro-environmental behavior in the home and vacation context revealed that people generally demonstrate higher levels of pro-environmental behavior at home. Two explanations of these systematic patterns are plausible: (1) that people feel more obliged to behave in an environmentally friendly manner at home and (2) that the infrastructure at the destination does not make it easy to continue the routine of typical pro-environmental behaviors at home. The first suggested explanation was directly tested based on the available data and confirmed the assumption with a vast majority of respondents expressing higher moral obligation at home. The second explanation could not be directly tested. However, the segment-wise analysis of the association between the home and vacation context demonstrated that the association was strongest for the highly morally obliged

segment and the segment that feels most morally obliged to engage in pro-environmental purchasing behavior. Such behavior can be transferred to the vacation context much easier than other activities, such as recycling, which depend on local infrastructure being available. Preliminary support for the infrastructure hypothesis thus emerged from our study, but future work is needed to test the two assumptions about reasons for the pro-environmental behavior gap in more detail. Such future research would require a qualitative approach to be taken in the investigation of reasons for differences in behavior. The Theory of Planned Behavior (Ajzen, 1988) would provide a valuable framework for such a study, as our study is limited to attitudes, although the opinions of important reference groups (social norms) and factors preventing people from behaving in an environmentally friendly way (perceived behavioral control) may provide valuable insight into understanding the identified behavioral differences. Furthermore it would be interesting to replicate our study in other contexts, such as overseas vacations or vacations at different domestic destinations and in doing so accounting not only for heterogeneity of tourists but also for heterogeneity of destinations.

APPENDIX 1 – Behavioral items

I switched off the light whenever leaving a room

I switched off the heating / airconditioning in unoccupied rooms

I sealed doors and windows to avoid heat / coolness escape

I read nature or environmental magazines

I engaged in outdoors leisure activities

I littered

I picked up litter that was not my own

I damaged trees or shrubs

I saved water

I repaired leaks or drips

I washed the car

I watered the lawn

I looked for ways to reuse things

I recycled newspapers

I recycled cans or bottles

I composted food scraps

I bought products that protect the environment

I bought household goods that save energy

I purchased refillable products

I purchased bio-degradable products

I took bags from home when going shopping

I walked instead of using the car

I used public transport instead of the car

I used my bicycle instead of the car

I drove at 90 km/h to save fuel

I donated money for an environmental group

I volunteered time to an environmental group or project

I wrote a letter supporting an environmental issues

I voted for a candidate who supported environmental issues

I joined political environmental action

REFERENCES

- Ajzen, I., 1988. *Attitudes, Personality and Behaviour*. Milton-Keynes, England: Open University Press.
- Ataljevic, I., and S. Doorne (2000). "Staying Within the Fence: Lifestyle Entrepreneurship in Tourism." *Journal of Sustainable Tourism*, 8 (5): 378-391.
- Barron, P., and B. Prideaux (1998). "Hospitality Education in Tanzania: Is There a Need to Develop Environmental Awareness?" *Journal of Sustainable Tourism*, 6 (3): 224-237.
- Bramwell, B., and B. Lane (2005). "From Niche to General Relevance? Sustainable Tourism, Research and the Role of Tourism Journals." *The Journal of Tourism Studies*, 16 (2): 52-62.
- Carlsen, J., D. Getz, and J. Ali-Knight (2001). "The Environmental Attitudes and Practices of Family Businesses in the Rural Tourism and Hospitality Sector." *Journal of Sustainable Tourism*, 9 (4): 281-297.
- CES (2007). <http://www.ces.vic.gov.au/ces/wcmn301.nsf/childdocs/-441BB07721D61152CA256F250028C5FB?open>, last accessed 13.3.2007.
- Chan, W.W., and J.C. Lam (2002). "A Study on Pollutant Emission Through Gas Consumption in the Hong Kong Hotel Industry." *Journal of Sustainable Tourism*, 10 (1): 70-81.
- Corraliza, J., and J. Berenguer (2000). "Environmental Values, Beliefs, and Actions: A Situational Approach." *Environment and Behavior* 32: 832-848

- Crouch, G., T. Devinney, S. Dolnicar, T. Huybers, J. Louviere, and H. Oppewal (2005) "New Horses for Old Courses. Questioning the Limitations of Sustainable Tourism to Supply-driven Measures and the Nature-based Contexts." ANZMAC CD Proceedings.
- Davis, D., and D.F. Gartside (2001). "Challenges for Economic Policy in Sustainable Management of Marine Natural Resources." *Ecological Economics*, 36 (2): 223-236.
- De Burgos-Jimenez, J., C. J. Cano-Guillen, and J. J Cespedes-Lorente (2002). "Planning and Control of Environmental Performance in Hotels." *Journal of Sustainable Tourism* 10 (3): 207-221.
- Dolnicar, S. (2004). "Insight into Sustainable Tourists in Austria: Data Based a Priori Segmentation Approach." *Journal of Sustainable Tourism*, 12 (3): 209-218.
- Dolnicar, S. (2006). "Nature-conserving Tourists: The Need for a Broader Perspective." *Anatolia*, 17 (2): 235-258..
- Dolnicar, S., G.I. Crouch, and P. Long (forthcoming). *Environmentally Friendly Tourists: What Do We Really Know About Them?* *Journal of Sustainable Tourism*.
- Dolnicar, S., and F. Leisch (forthcoming). *Selective Marketing for Environmentally Sustainable Tourism*. *Tourism Management*.
- Driml, S.M. (1997). "Bringing Ecological Economics out of the Wilderness." *Ecological Economics*, 23 (2): 145-153.
- Dunlap, R.E., and K.D Van Liere (1984). "Commitment to the Dominant Social Paradigm and Concern for Environmental Quality." *Social Science Quarterly*, 65: 1013-1028.

- Dunlap, R.E., and K.D. Van Liere (1978). "The 'New Environmental Paradigm': A Proposed Measurement Instrument and Preliminary Results." *Journal of Environmental Education*, 9: 10-19.
- Dunlap, R.E., K.D. Van Liere, A.G. Mertig, and R.E. Jones (2000). "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." *Journal of Social Issues*, 56(3): 425-442.
- Edgell, M.C.R. & Nowell, D.E. (1989). "The new environmental paradigm scale: Wildlife and Environmental beliefs in British Columbia." *Society and Natural Resources*, 2: 285-296.
- Fairweather, J.R., C. Maslin, and D.G. Simmons (2005). "Environmental Values and Response to Ecolabels Among International Visitors to New Zealand." *Journal of Sustainable Tourism*, 13 (1): 82-98.
- Font, X. and C. Harris (2004). "Rethinking Standards From Green to Sustainable." *Annals of Tourism Research*, 31 (4): 986-1007.
- Gössling, S. (1999). "Ecotourism: A means to Safeguard Biodiversity and Ecosystem Functions?" *Ecological Economics*, 29 (2): 303-320.
- Hartigan, J.A., and B. Kleiner (1984). "A Mosaic of Television Ratings." *The American Statistician*, 38: 32-35.
- Hunt, C.B. and E.R. Auster (1990). "Proactive Environmental Management: Avoiding the Toxic Trap." *Sloan Management Review*, 31 (2): 7-18.

- Inskeep, E. (1991). *Tourism Planning: An Integrated and Sustainable Development Approach*. New York: Wiley.
- Jennings, S. (2004). "Coastal Tourism and Shoreline Management." *Annals of Tourism Research*, 31 (4): 899-922.
- Johnson, C., J. Bowker, and H. Cordell (2004). "Ethnic Variation in Environmental Belief and Behavior: An Examination of the New Ecological Paradigm in a Social Psychological Context." *Environment and Behavior*, 36: 157 - 186
- Kaiser, F.G., and T.A. Shimoda (1999). "Responsibility as a Predictor of Ecological Behaviour." *Journal of Environmental Psychology*, 19 (3): 243-253.
- Kals, E., D. Schumacher, and L. Montada (1999). "Emotional Affinity Towards Nature as a Motivational Basis to Protect Nature." *Environment and Behaviour*, 31 (2): 178-202.
- Kaufman, L., and P.J. Rousseeuw (1990). *Finding groups in data*. New York: John Wiley & Sons, Inc.
- Leisch, F. (2006) A toolbox for k-centroids cluster analysis. *Computational Statistics and Data Analysis*, 51(2):526-544.
- Mazanec, J., K. Grabler, G. Maier, and K. Wöber et al (1997). *International City Tourism: Analysis and Strategy*. London: Pinter/Cassell.
- Meyer, D., A. Zeileis, and K. Hornik (2006). *VCD: Visualizing Categorical Data*. R package version 0.9-9.

Page, S. J., and K. Thorn (2002). "Towards Sustainable Tourism Development and Planning in New Zealand: The Public Sector Response Revisited." *Journal of Sustainable Tourism*, 10 (3): 222-237.

R Development Core Team (2006). "R: A Language and Environment for Statistical Computing and Graphics." R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, <http://www.R-project.org>.

Roberts J.A. & Bacon, D.R. (1997). "Exploring the subtle relationships between environmental concern and ecologically conscious consumer behaviour." *Journal of Business Research*, 40: 79-89

Rousseuw P.J. (1987). "Silhouettes: A Graphical Aid to the Interpretation and Validation of Cluster Analysis." *Journal of Computational and Applied Mathematics*, 20: 53-65.

Trumbo, C.W., and G.J. O'Keefe (2001). "Intention to Conserve Water: Environmental Values, Planned Behavior, and Information Effects. A Comparison of Three Communities Sharing a Watershed." *Society and Natural Resources*, 14.

Vail, D., and L. Hultkrantz (2000). "Property Rights and Sustainable Nature Tourism: Adaptation and Mal-Adaptation in Dalarna (Sweden) and Maine (USA)." *Ecological Economics*, 35 (2): 223-242.

Weiler, B., and S.H. Ham (2002). "Tour Guide Training: A Model for Sustainable Capacity Building in Developing Countries." *Journal of Sustainable Tourism*, 10 (1): 52-69.

Wunder, S. (2000). "Ecotourism and Economic Incentives — an Empirical Approach." *Ecological Economics*, 32 (3): 465-479.

Tables and Figures

Figure 1: Moral obligation segments

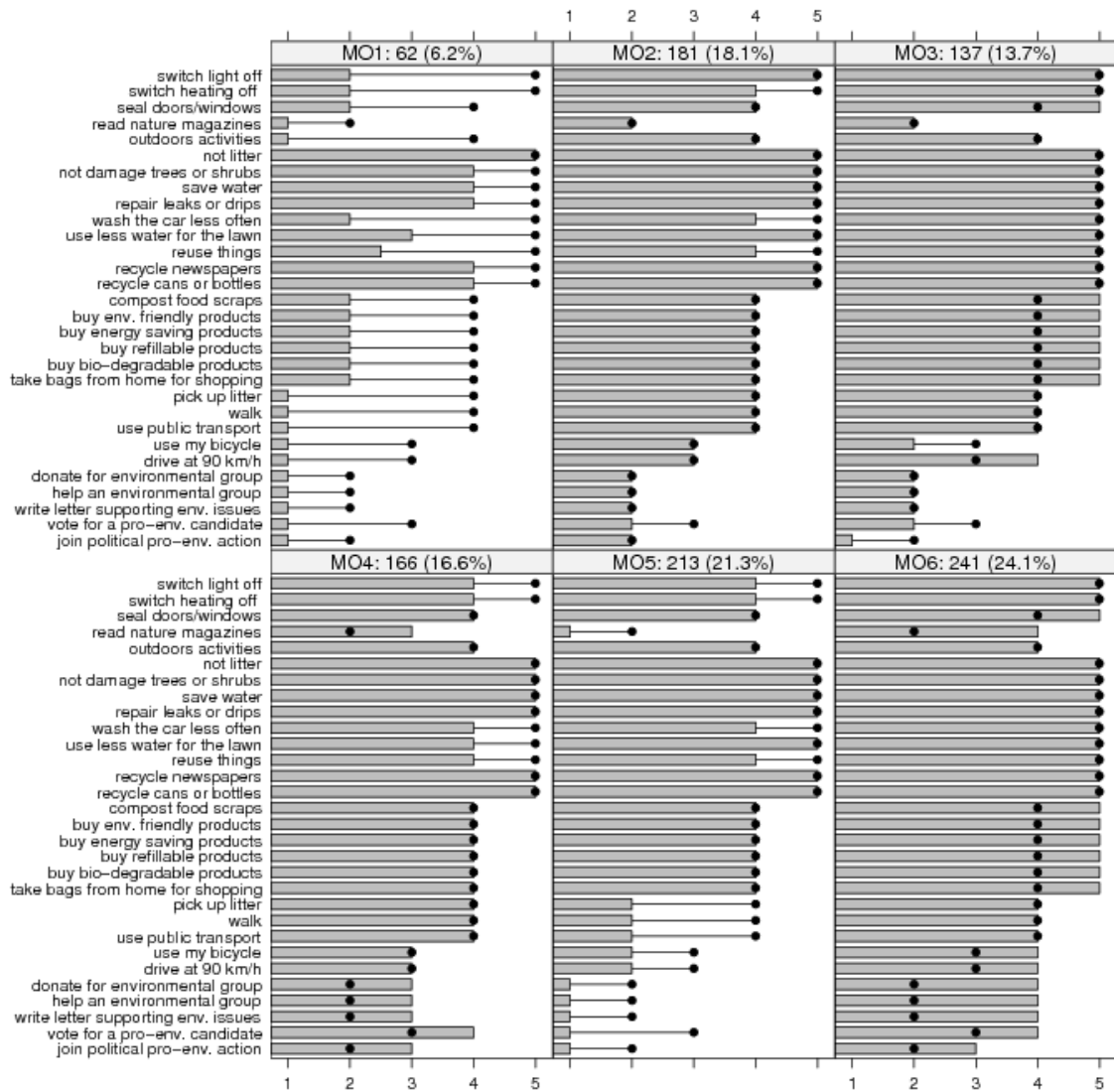


Figure 2: Pro-environmental behavior levels of moral obligation segments in different settings

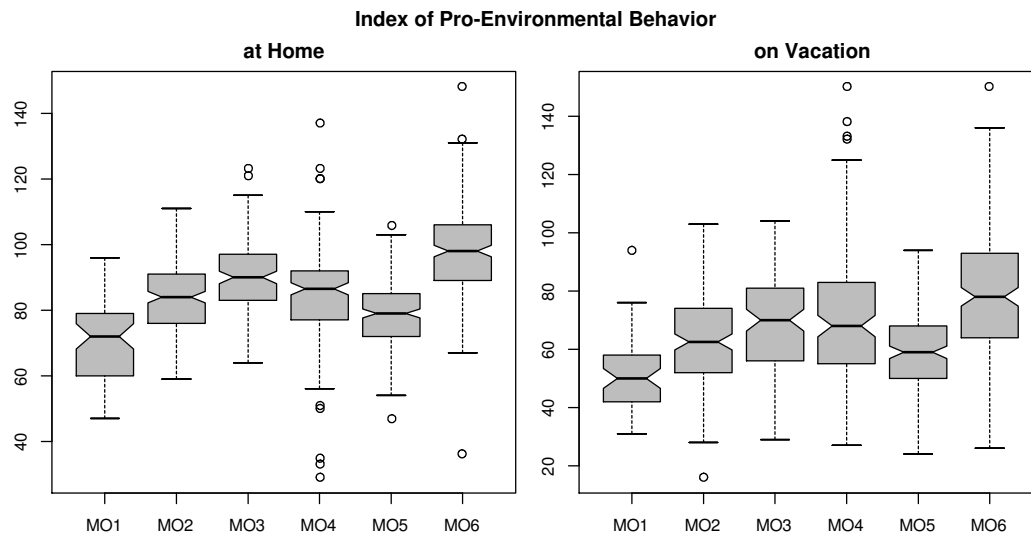


Figure 3: Association between pro-environmental behavior at home and on vacation.

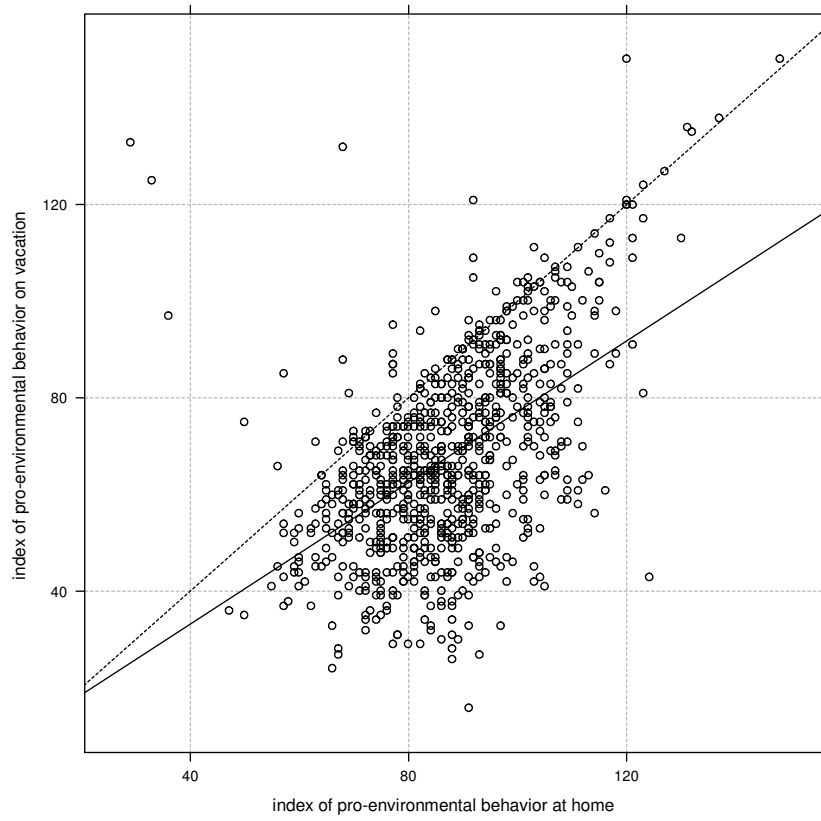


Figure 4: Association between pro-environmental behavior at home and on vacation (by segment).

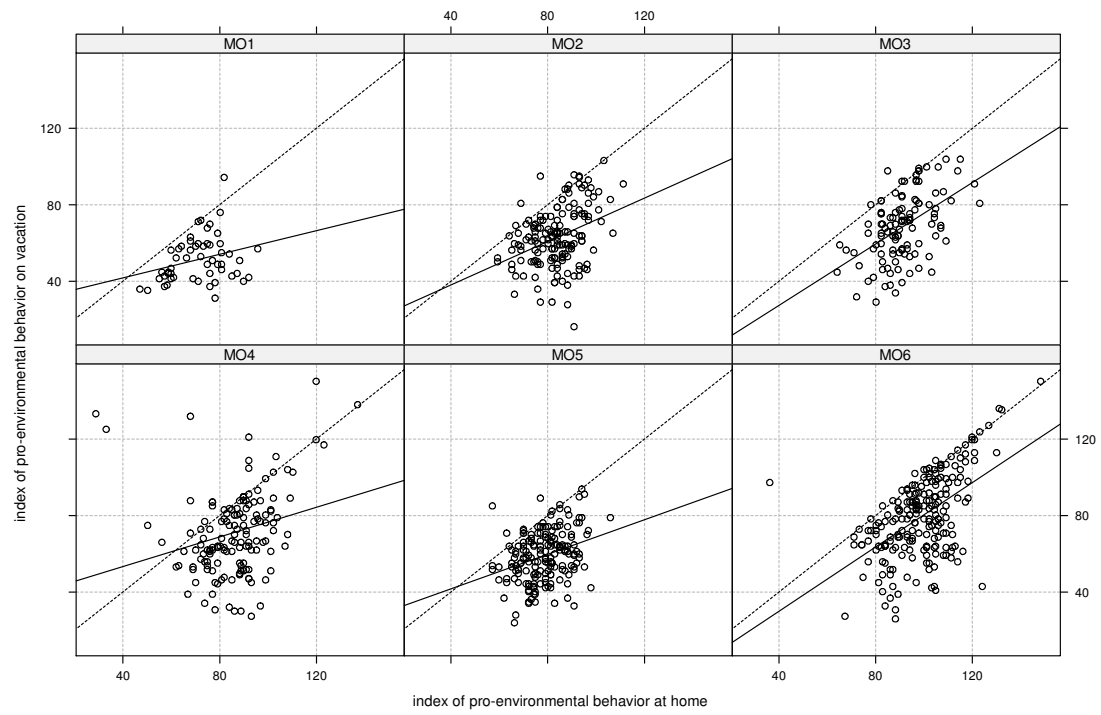


Figure 5: Differences in environmental attitudes across moral obligation segments

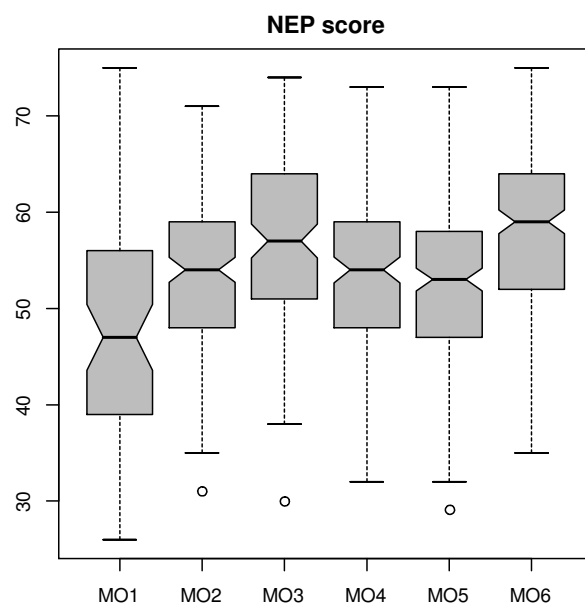


Figure 6: Vacation preference segments

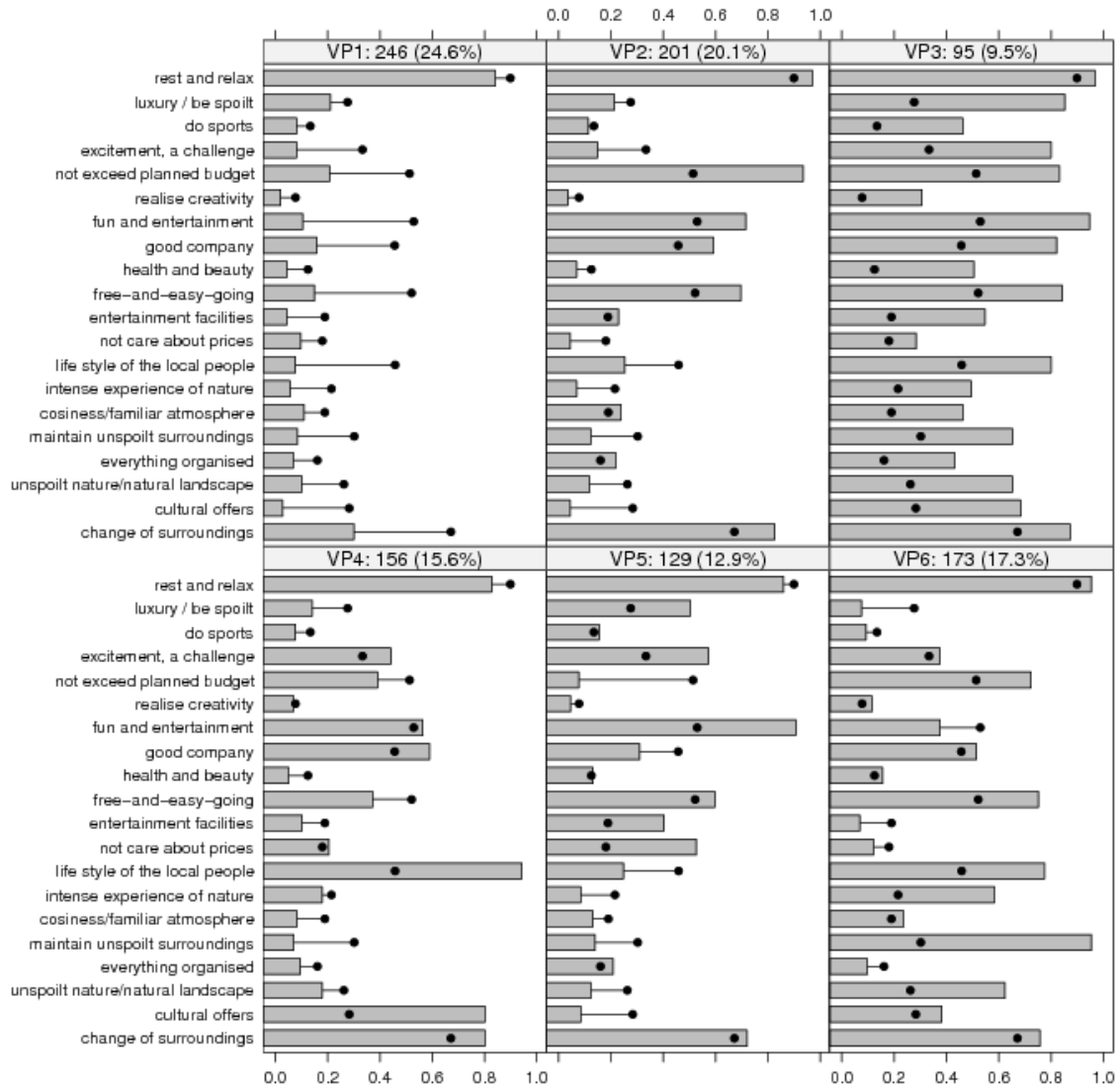
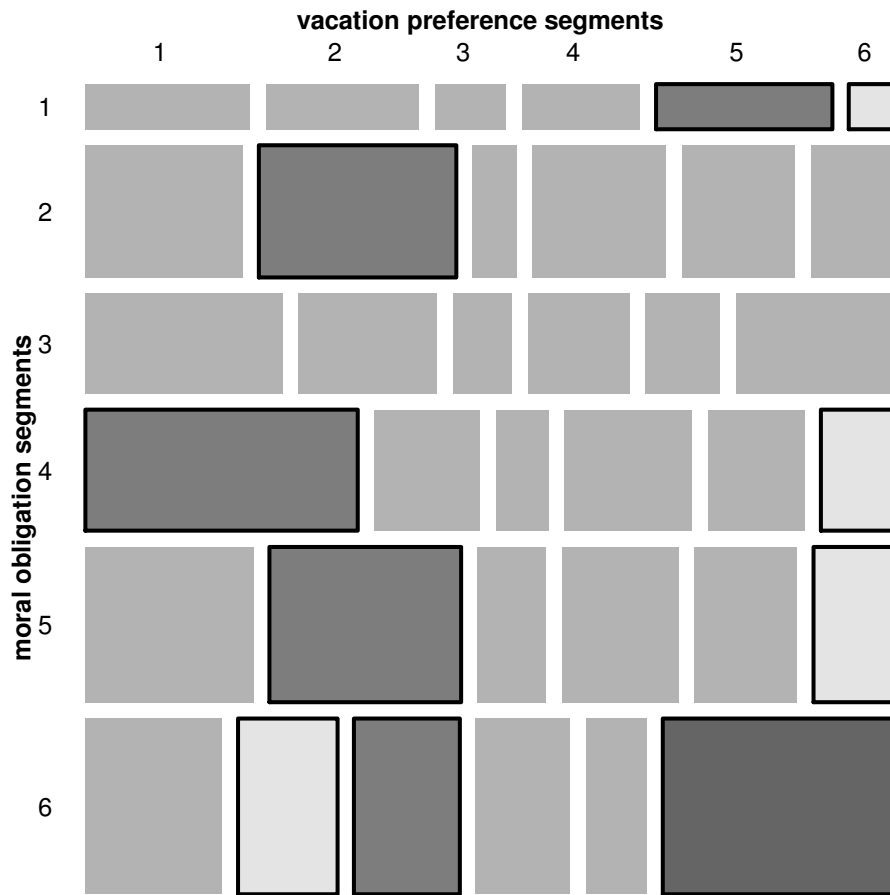


Figure 7: Relationship of moral obligation and vacation preference segments



ENDNOTES

ⁱ “Environmental sustainability is the ability to maintain the qualities that are valued in the physical environment” (CES, 2007).

ⁱⁱ Note that eco-tourism and nature-based tourism are not identical concepts, although most definitions of eco-tourism contain a reference to nature based activities of tourists.