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# Visitors' acceptance of negative ecological impacts in national parks:

## Comparing explanatory power from psychographic scales in a Norwegian mountain setting

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# **Visitors' acceptance of negative ecological impacts in national parks: Comparing explanatory power from psychographic scales in a Norwegian mountain setting**

## **Abstract**

Even in protected areas, it is inevitable that any human use will produce some impact on the natural resources. The present study sought to identify visitors' tolerance for potential negative ecological impacts resulting from tourism activities and facilities in a Norwegian national park context. The measurements were based on park visitors' expressed degree of acceptance of negative effects on particular species of wildlife (wild reindeer and raptors) and on vegetation.

Attitudes were analysed through the use of psychographic scales, reflecting respondents' nature orientations, their specific facility desires, their preferences in a wilderness setting and their concerns about human interaction with the natural environment. Findings demonstrated that the psychographic scales explained more variation in attitudes than most social background and trip characteristics. Higher levels of education among visitors were, however, strongly associated with increased ecological concern. The salient ecological awareness among park visitors in general signifies the potential strategic alliance between tourism and conservation interests.

*Keywords:* Nature-based tourism, National parks, Visitor attitudes, Psychographic scale, Ecological concern.

# Visitors' acceptance of negative ecological impacts in national parks: Comparing explanatory power from psychographic scales in a Norwegian mountain setting

## Introduction

*'For the Benefit and Enjoyment of the People'*. This well-known phrase, engraved on the stone arch marking the northern entrance to Yellowstone National Park (Est. 1872) symbolises the ideals behind the original concept of a national park: the earliest parks were "meant to function as reserves for scenic landscapes and as sanctuaries and resorts" (Hall & Frost, 2009, p. 308). The idea of ecological and species conservation within national parks, however, soon began to assume much more importance in western countries and, from the 1960s onwards, the ecological ethic became the prime consideration in the designation and management of the parks. During this period, the absence of human impact was considered to represent the highest form of ecological integrity – a way of thinking that is reflected in the International Union for Conservation of Nature (IUCN) classification system for protected areas (Eagles & McCool, 2002).

In recent decades, however, the human dimension of protected area management has regained importance in a number of countries, and we are once again seeing a shift in the concept of a national park, reflecting a return to its utilitarian roots (Hall & Frost, 2009, p. 308). In Norway, a country with a relatively short history of national parks (the nation's first park, *Rondane*, was established in 1962), the protection of nature has always been the primary goal of park designation (cf. the *Nature Conservation Act* of 1970). Despite recent shifts in the thinking behind national parks, the main purpose of Norwegian parks is still to safeguard biological diversity and ecological processes within protected areas (*Nature Diversity Act* 2009). However, the Act (§1) also states that "the environment provides a basis for human activity, culture, health and well-being, now and in the

future...". This dual function of nature preservation and what must be understood as mainly tourism/ recreation use is a characteristic of most national parks throughout the world (Hall and Frost 2009, p. 308).

The debate over 'preservation versus use' is evident in national parks throughout the world, and can generate conflict between different interest groups (McCool, 2009). A number of studies have documented various negative impacts on ecosystems resulting from visitation and tourism activities in natural areas (see, for example, Cunha, 2010; Liddle, 1997; Newsome, Moore & Dowling, 2002; Eldegaard, 2010; Hunter & Green, 1995; Buckley, 2004). The severity of these impacts may increase in the future, due to the fact that nature based tourism is one of the fastest growing sectors of international tourism (Fredman & Tyrväinen, 2010; Saarinen, 2005). National parks are becoming ever-more appealing tourism destinations (Reinius & Fredman, 2007), leading to increased park visitation in most countries (Wray, Espiner & Perkins, 2010; Balmford et al., 2009).

The growing interest in experiencing protected areas is often based on affection for nature, but with increased visitation, there is a mounting concern that tourists are 'loving the parks to death' (Berle, 1990). The present study seeks to identify national park visitors' tolerance for potential negative environmental impacts resulting from tourism activities and facilities. The data were collected through an internet survey among visitors to a national park region, consisting of the six municipalities, Dovre, Lesja, Lom, Sel, Skjåk, and Vågå, in *Nord-Gudbrandsdalen*, Southern Norway during the summer of 2009. The measurements were based on visitors' degree of acceptance of detrimental effects on certain species of wildlife (identified as susceptible to tourism developments by park managers in the region), and on vegetation. Attitudes were analysed using various psychographic scales.

## Theoretical background

### Environmental impacts of visitation

Tourism infrastructure and recreational activities in protected natural areas may impact on the environment in various ways (Edington & Edington, 1986; Buckley & Pannell, 1990; Hunter & Green, 1995; Buckley, 1999; 2004), see, for example, Spencely's 2005 review of negative environmental impacts on natural resources like air, water, geology, soil, landscapes, habitats and wildlife (p.138-139). The environmental consequences of tourism are, however, not easy to predict (Pigram, 1990), and environmental impact researchers have found it difficult to identify and assess causal relationships (Spencely, 2005; Hunter & Green, 1995). But despite the expressed concern that many studies within the field of *recreation ecology* typically lack a theoretical basis, and are seldom built on previous research (Monz et al., 2010; Eldegard, 2010, p. 8; Cole, 2004, p. 46, 55), there is evidence that tourism and recreation represent a driving force which can greatly reduce environmental quality (Petrosillo et al., 2007; Deng et al., 2002; Leung & Marion, 2000). An important feature of this body of research is that recreational impacts on *wildlife* and *vegetation* loss are frequently addressed (Monz et al., 2010).

### **Effects of tourism activities on wildlife and vegetation**

Based on a review by Boyle and Samson (1985), Sterl, Brandenburg and Arnberger (2008) argue that recreation activities in protected areas have negative effects on wildlife, despite the fact that a variety of measures have been implemented to avoid endangering animal species (see also Buckley, 2003, p. 230). Various types of wildlife stress and disturbance may occur (Monz et al, 2010), for example, altering the animals' habitat through tourism infrastructure, interrupting tranquillity through human activities (not necessarily involving direct contact with wildlife) or molestation through direct contact (Liddle, 1997). A number of authors have found that situation specific factors may also influence the level of wildlife disturbance – for example, the location of the tourist activity,

its direction and its speed of movement (see Sterl et al. 2008; Ingold 2005; Gander and Ingold, 1997). In addition, the sensitivity of species may vary temporally, and with the frequency of disturbance (Sterl et al., 2008). Different types of species are also to a varying degree sensitive or tolerant to human disturbance (Liddle, 1997, Kuss et al., 1990).

Vegetation impacts often occur rapidly during the initial development and use of a recreation site. Severe trampling may lead to vegetation loss, compositional changes and exposure of plant roots (Marion & Leung, 2001), and such activity may kill plants directly, reduce their vigour or their reproductive capacity (Hammit & Cole, 1998, p. 64-65; Cole, 2004, p. 53; Lynn & Brown, 2003). The effects of trampling are the most systematically studied mechanisms of recreational disturbances on natural systems (Monz et al., 2010) and unsurfaced trail treads are found to be susceptible to soil compaction, erosion, muddiness, and trail-widening or the proliferation of visitor-created side trails (Marion & Leung, 2001; Hammit & Cole, 1998). Different types of plants, vegetation and soils show different resistance to trampling, and the level of impact can be both strongly and weakly related to the amount of use; the amount and type of impact is related to the actual human behaviour and type of activity (Kuss et al., 1990).

### Environmental impacts and visitor experience

Ecosystems provide life-fulfilling conditions for humans, such as serenity, beauty, cultural inspiration and recreation, and visitor judgments of environmental impacts should therefore play an important role in natural resource management decision making (Floyd et al., 1997). Tourists have vested interests in the environment as a key determinant in the quality of their holiday experience and they are concerned about environmental conditions in the destinations they choose (Puhakka, 2011).

Understanding visitor attitudes is of value to resource management, since most recreation management relies on user inputs (Priskin, 2003). Any form of tourism can have negative impacts on

the resources on which tourism depends (Priskin, 2003; Butler, 1999) and this can in turn seriously affect the quality of visitors' experience (Marion & Leung, 2001, Deng et al., 2002). In addition to this appreciation of a high quality nature-based tourism experience, many individuals can also obtain contentment from the fact that a resource is not being exploited but is being maintained intact for its own sake or for the enjoyment of future generations – a type of valuation that has been labelled “existence value” (Pigram, 1990).

Hillery et al. (2001) suggest that there has been an increased awareness and sensitivity to environmental impacts among tourists over the past decades. In general, nature-based tourists are aware of environmental impacts associated with recreational activities, although to a variable extent (Priskin, 2003). An interest in experiencing nature can be tied to an ecological interest (Teisl & O'Brian, 2003). Wurzinger and Johansson (2006) identified a relationship between the degree of environmental concern and the amount a person focused on nature during the actual trip. Line and Costen (2011) documented that tourists with the highest environmental concern were most interested in taking part in nature-based tourism. Fairweather et al. (2005) found that tourists who expressed biocentric values were concerned with the environment in which they travel. This is in line with previous research by Weaver and Lawton (2002), who found that “hard ecotourists” (those travelling in smaller groups, visiting less accessible destinations and expecting fewer services) were more worried about the protection of nature than “soft ecotourists” (those who are more dependent on infrastructure and services).

Social background characteristics may play a significant role in the forming of attitudes related to environmental concern. Regarding the variables used in the present study, the literature suggests that young and well-educated adults typically have more pro-environmental attitudes than their social counterparts (Dunlap et al., 2000). Referring to Dolnicar et al. (2008), Puhakka (2011) points



out that several studies indicate that the environmentally friendly tourists are higher-educated with higher income levels and an interest in learning. Uysal et al. (1994) maintain that the literature demonstrates that educational level and environmental knowledge are consistently related to environmental attitudes. Studies have also shown that women often reveal greater concern for environmental impacts than men (see for example Uysal et al. (1994)), and these disparities are largely accounted for by differences in their particular value systems (Stern et al., 1995). Some authors have suggested that the link between demographics and environmental attitudes at present is somewhat more tenuous than what has been observed earlier, however, so such assumptions must be handled with care (Fransson & Gärling, 1999).

Most visitors to protected areas seem to understand that animals may be affected by recreational use (Dolsen et al., 1996). A study in an Austrian national park setting indicated that 40 % of the respondents were aware of recreational disturbance of wildlife, and that 12 % believed they could have disturbed wildlife on the day of the interview (Sterl et al., 2008). Information and education about the negative effects on wildlife is becoming an increasingly widespread way of raising visitors' awareness of their potential impacts on wildlife (Anthony, Steidl & McGarigal, 1995).

Trampling damage is unwelcome in scenic areas because of the destruction of attractive plants and the development of unattractive eroded soil surfaces and exposed roots (Monz et al, 2010; Marion & Leung, 2001). Such severe loss of vegetation is often found to be visually offensive among visitors and can degrade the aesthetics and also the functional value of recreational settings (Marion & Leung, 2001). Impacts on vegetation tend to be noticed immediately by visitors, and such visual effects are often compounded in areas most frequented by visitors (Lynn and Brown, 2003), i.e. along a few popular trails and destinations. A review of the literature comparing managers' and visitors' views of environmental impacts (including wildlife disturbance and vegetation attrition)

nevertheless shows that managers tend to view such impacts as more of an issue than visitors do (Manning, 1999; Vistad, 2004). Perceived environmental damage, however, is still found to be a common source of complaint among tourists in natural areas (Buckley & Pannell, 1990). Intact biodiversity is therefore very important for the tourism industry because, as noted by Buckley (1999, p. 49) “it is a critical product component for tourists who travel to look at scenic landscapes, most of which owe their particular character to vegetation and fauna as well as underlying terrain”.

Given the tourism industry’s reliance on intact biodiversity, it may seem surprising that there has not been a dramatic growth in the number of partnerships between tourism and conservation interests. Buckley (1999) advocates such an alliance, and highlights the importance of maintaining the integrity of the natural resources in the eyes of park visitors. Nature-oriented tourists are more likely to appreciate the benefits of nature and landscapes that have been sheltered from severe human impact, and therefore to support the conservation ideal of protected areas. A strong interest in nature preservation may therefore go hand in hand with a view of national parks as appealing tourism attractions.

### *Psychographic scales and visitors’ attitudes towards environmental impacts*

Researchers are increasingly interested in identifying and segmenting nature oriented tourists by their social or environmental attitudes (Luo & Deng, 2008). Psychographic scales may serve as a tool to capture individuals’ basic nature orientations, principal recreational interests and activities, and more general ecological concerns. In the following section we provide a description of the scales adopted for use in the present study.

### *Nature Orientations (NO) and Quest for Tourism Facilities (QTF) in a Nordic setting*

Using in-depth interviews, Uddenberg (1995) explored the meaning and significance of nature experiences in the lives of Swedes, and examined how they immerse themselves with nature. The study identified a variety of criteria, ranging from basic worldviews to more specific viewpoints and expressed activity interests. These criteria were used as input into a study of German, Dutch and Danish motor tourists in Norway during the summer season 2008 (Haukeland et al., 2010). Through an exploratory factor (principal component) analysis on responses to a series of questions (listed in Table 1), the following four key dimensions were extracted: '*Inspiration*' (the appreciation of nature and landscape as personal stimulation), '*Recreation*' (the enjoyment of serenity and undisturbed quality of nature), '*Challenge*' (the search for demanding physical activities) and '*Sightseeing*' (the pursuit of touring and comfort). These dimensions reflect what may be coined *Nature Orientations (NO)* in a Nordic setting. We run a confirmatory factor analysis of the exploratory factor solution from Haukeland et al. (2010). Then we made a new exploratory factor analysis of our data and a confirmatory factor analysis of this new exploratory factor solution. The same four dimensions were obtained in our data set as in Haukeland et al. (2010), based on exploratory factor analysis.

A range of questions (variables listed in Table 2) related to preferences for tourism infrastructure, facilities and services inside and outside national parks was also adopted in the same empirical research (Haukeland et al., 2010). Again, through an exploratory (principal component) analysis, four key dimensions related to the *Quest for Facilities (QTF)* in Norwegian national parks were identified. These were: '*Tracks & signposts*' (mainly for hiking and cycling purposes), '*Infrastructure & services*' (including large physical installations), '*Food & accommodation*' (quality meals and overnight stay facilities) and '*Tours & interpretation*' (visitor centres and guided tours). As for NO we run a confirmatory factor analysis of the exploratory factor solution from Haukeland et al. (2010), for QTF, and made a new exploratory factor analysis of our data and a confirmatory factor analysis of this

new exploratory factor solution. Again, the same four dimensions were obtained in our data set as in Haukeland et al. (2010), based on exploratory factor analysis, but the order of factors was altered in terms of explained variance.

### *The Wilderness Purism Scale and the New Ecological Paradigm*

The *Wilderness Purism Scale (WPS)* is a multidimensional construct, originally developed to measure the level of consensus between the wilderness dimensions stated in the US Wilderness Act (1964) and attitudes among wilderness users (Hendee et al., 1968; Stankey, 1973). The scale has since been modified and applied in a range of different studies and in different countries – see a review in Vistad & Vorkinn (2012). A key finding from these studies is that, although the purism scale comprises a number of interdependent dimensions, it is still meaningful to calculate a total purism score (see Jaakson & Shin, 1993; Shafer & Hammitt, 1995; Vistad, 1995; Vistad & Vorkinn, 2012). Studies in *Femundsmarka* (Vistad, 1995) and in *Rondane* (Vistad & Vorkinn, 2012) national parks in Norway, showed that strong purists were more sensitive than low purists to recreational impacts on vegetation and ground.

A fourth scale adopted in this study is the *New Ecological Paradigm (NEP)*, originally proposed by Dunlap and Van Liere (1978), and further developed by these, and other, authors (see Noe & Snow, 1990; Luzar et al., 1995; Dunlap et al., 2000). The construct aims to assess whether an individual has a pro-ecological worldview (termed “eco-centrism”) or not. There is a growing consensus that the items used in the *NEP* scale represent core elements in a worldview that influences attitudes and beliefs towards more specific environmental issues (Dunlap et al., 2000).

## **Assumptions in the present study**

In the present study, *visitors' acceptance of potential negative influence on wildlife (wild reindeer habitat and raptor nesting) and vegetation in a Norwegian national park setting* is scrutinized. Based on the existing literature available on this topic, we made a number of assumptions/ hypotheses which we tested through our research. These are outlined next. Our first assumption is that the acceptance of negative environmental impacts will vary with both social background characteristics and psychographic attributes, but that psychographic attributes will explain more variation in the visitors' expressed acceptance. This leads to our first hypothesis:

*H1: Psychographic scales will explain greater variation in expressed tolerance for negative ecological impacts than social characteristics and attributes connected to the actual tour.*

With regard to social characteristics, we assume that:

*H2: Female respondents will be less tolerant than their male counterparts.*

*H3: Younger respondents will be less tolerant than their elders.*

*H4: Well-educated respondents will be less tolerant than those with fewer educational qualifications.*

With regard to the influence of psychographic attributes' on acceptance of environmental impacts, we expect the following relationships within the various scales in question (*NO*, *QTF*, *WPS* and *NEP*):

*NO*

Previous research indicates that ‘*Challenge*’ and ‘*Sightseeing*’ orientations tend to require more (large scale) tourism facilities in a national park setting compared to the ‘*Inspiration*’ and ‘*Recreation*’ dimensions. We therefore assume that:

*H5: ‘Inspiration’ will lead to less tolerance for ecological impacts.*

*H6: ‘Recreation’ will lead to less tolerance for ecological impacts.*

*H7: ‘Challenge’ will lead to more tolerance for ecological impacts.*

*H8: ‘Sightseeing’ will lead to more tolerance for ecological impacts.*

### QTF

The ‘*Tracks & signposts*’ orientation corresponds to measures that have traditionally been used to accommodate visitors’ (hikers’) needs within national parks in Norway. We therefore assume that the ‘*Tracks & Signposts*’ dimension will be more in line with strict nature conservation mind-sets compared to expressed interests in more expansive developments within and outside park borders, i.e. the dimensions that have been labelled ‘*Infrastructure & service*’, ‘*Food & accommodation*’ and ‘*Tours & interpretation*’:

*H9: ‘Tracks & signposts’ will lead to less tolerance for ecological impacts.*

*H10: ‘Infrastructure & service’ will lead to more tolerance for ecological impacts.*

*H11: ‘Food & accommodation’ will lead to more tolerance for ecological impacts.*

*H12: ‘Tours & interpretation’ will lead to more tolerance for ecological impacts.*

### WPS

The literature suggests that people yearning for solitude and few physical provisions in a wilderness setting (strong purists) tend to be less accepting of negative ecological effects compared to non-purists. Thus we assume:

*H 13: Nature tourists with strong purist wilderness attitudes will demonstrate less tolerance for ecological impacts than non purists.*

### NEP

Pro-ecological (eco-centric) worldviews have been found to reduce the visitors' tolerance for negative ecological impacts in a national park setting. We therefore assume:

*H14: An expressed pro-ecological worldview (eco-centrism) will lead to less tolerance for negative ecological impacts.*

## Data and method

### Recruiting e-mail addresses

Data for the current study were gathered through the use of an internet survey. National and international respondents were recruited in *Nord-Gudbrandsdalen* during the period June to September, 2009. Potential participants were contacted on site, and asked to provide their email addresses for participation in the study. Information about the project and its purpose was provided at this point in six languages (English, German, Dutch, Swedish, Danish, and Norwegian). Two methods were used for participant selection: First, stratified (quasi-random) sampling at the roadside: All drivers of motor vehicles on the six main roads in the case area were stopped<sup>1</sup> and asked to fill in the recruiting scheme with email addresses when leaving the area at 18 (rotating) full weekdays the during summer season 2009. Only two per cent refused to be recruited at this stage.

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<sup>1</sup> The Norwegian Public Roads Administration gave the necessary permit and practical assistance.

Second, self-selected sampling at accommodation sites during the same period: 84 accommodation providers in the study area were asked to assist with the collection of email addresses. Ten refused to cooperate from the outset, and only 42 completed recruiting schemes were received (after two reminders). Ankre & Reinus (2010) discuss the possible weaknesses of this approach in further detail.

A total of 2719 e-mail addresses were collected (61.5% from roadside and 38.5% from accommodation providers). After deciphering and address corrections, 2510 respondents were eventually identified. 1318 of these (52.5 % of the net sample) confirmed their participation after a maximum of two reminders and completed the internet survey during the winter of 2009/2010. The questions were presented to the respondents either in Norwegian, German (for those residing in Germany, Austria and Switzerland) or English (for all other nationalities).

Of those who completed the internet survey, 63 % resided in Norway, 10 % in Germany, eight per cent in the Netherlands, four per cent in Sweden and four per cent in Denmark. Nine per cent lived permanently in another European country and three per cent outside Europe. This distribution of nationalities was approximately the same as among those who were initially recruited for the survey in-situ during the summer.

### Questionnaire and utilization of scales

The internet survey comprised questions about social background characteristics and the trip in *Nord-Gudbrandsdalen*, as well as indicators of the psychographic scales. The various scales; *NO*, *QTF*, *WPS*, and *NEP*, were based on different numbers of indicators. *NO* and *QTF* each possessed 21 items and were presented as five point Likert scale representing the respondent's expressed degree of importance, ranging from "completely unimportant" to "very important". The selection of *WPS*



indicators was built on experiences and recommendations from several Scandinavian studies (see review in Vistad & Vorkinn, 2012). In 1999, the scale was simplified and standardized and reduced to eight items (six covering attitudes towards physical service facilities and two items covering social attitudes) to allow for comparisons between different studies (Vorkinn, 2003). Our selection of wilderness attitude items is identical to these eight items. The degree of desirability on each item was stated on a seven point Likert scale varying from “very negative” to “very positive”. In the data analysis the value 7 always indicate the most purist position. The *NEP* indicators (15 items) build on Dunlap et al. (2000), but we used a reduced seven-item scale formerly applied in Norway by Kaltenborn et al. (2008). A five point Likert scale was used to capture whether the respondent agrees or disagrees, reaching from “fully agree” to “fully disagree. Due to the high number of questions/variables, the sample was split into two sub-samples. NO and QTF were included in sub-sample 1 (760 respondents) and WPS and NEP in sub-sample 2 (280 respondents).

### Types of data analysis

After exploratory factor analysis, confirmatory factor analysis was applied to validate the dimensions of NO and QTF, respectively, in sub-sample 1. Confirmatory factor analysis was also applied to the factor solution presented by Haukeland et al. (2010) (see Table 1 and Table 2). Only loadings above 0.40 from the exploratory factor analyses were considered as characteristics of the factors in our study (Raubenheimer, 2004). The components in the *WPS* and *NEP* scales in sub-sample 2 are handled as index scores, capturing the respondents’ levels of purism and eco-centrism from lowest to highest.

Multiple linear regression analyses were conducted to test the relationship between acceptance of negative ecological impacts in national parks due to tourism developments and social background characteristics, trip-related attributes and *NO/QTF* (model 1) or *WPS/NEP* (model 2). The dependent

variable was an index (sum score) for three indicators: acceptance of negative influence on wild reindeer habitat, raptor nesting and attrition of vegetation. These potential negative ecological impacts are regarded as particularly serious threats from tourism activities and facilities in Nord-Gudbrandsdalen (Haukeland, 2011; Nellemann et al., 2010; Strand et al., 2010). On each of the three dimensions the question related to the national parks in the area was: "What is the maximum amount of negative ecological impacts that you would find acceptable in developing new tourist activities?" The degree of acceptance of negative impacts (i.e., none, minor, medium, major) was measured on each dimension by means of a four point Likert scale for each indicator (1 representing "None", 2 representing "Minor", 3 representing "Medium", and 4 representing "Major" impacts).

## Results

### Nature Orientations (NO):

The *NO* scale is developed from a set of indicators which represent values, attitudes and behavioural inclinations among visitors in *Nord-Gudbrandsdalen* (Table 1). "Fresh air, clean water and an unpolluted environment" was seen as 'rather important' or 'very important' by 95 % of the respondents and received the highest rank among the various indicators listed. "Tranquility and peacefulness", various "sense impressions", "physical relaxation in nature" and "endorsement of good health" were also ranked as 'very important' by at least 50 % of the visitors. At the other end of the scale, the majority of respondents considered "challenges with a certain risk" as 'rather' or 'completely unimportant'.

Table 1 also shows the outcome of the factor analyses. Four key dimensions related to the ascribed meaning and significance of experiencing natural and landscape elements were identified: '*Recreation*', '*Inspiration*', '*Challenge*' and '*Comfort*'. The various orientations can be described as follows:

- 1) *'Recreation'*: Within this dimension, the importance of “experiencing tranquillity and peacefulness” and “fresh air, clean water and an unpolluted environment” was paramount. “Physical relaxation in nature”, “sense impressions”, “endorsing good health and recharging batteries” were also important elements.
- 2) *'Inspiration'*: Crucial aspects of this dimension in our study are “obtaining a deeper connection in life”, “experiencing nature’s magic and mysticism”, “finding inspiration in natural surroundings”, “feeling connectedness with landscape and nature” and “attaining a feeling of freedom”.
- 3) *'Challenge'*: Visitors in this dimension are “searching for challenges with a certain risk” and take an interest in “demanding physical activities in nature”<sup>2</sup>.
- 4) *'Comfort'*: The enjoyment of “comfort in natural surroundings” was a vital element of this dimension, but “closeness to co-travellers” and “sightseeing” interests were also important.

*Insert Table 1 here*

### [Quest for Tourism Facilities \(QTF\)](#)

The QTF scale is also an application of the same set of indicators that were utilized in Haukeland et al. (2010). They include the perceived importance of infrastructure, facilities, services, activities and visitor experiences in a national park context. The most sought-after facilities and experiences *outside* the park borders (Table 2) were: “an abundance of accommodation facilities, “local food specialties”, “visitor centres with exhibitions” and “guided tours/ sightseeing to see animals/ natural attractions”. These elements were seen as ‘rather’ or ‘very important’ by between two thirds and half of the respondents. At the other end of the spectrum, more than half of the respondents felt that “staged experiences for a greater audience” and “gondolas and similar great installations” were

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<sup>2</sup> Only two variables loaded on this particular dimension, which is add odds with the recommendation to require at least three components to represent one dimension (Thurstone, 1927). It was kept, however, due to the fact that the two variables in question were stable across the two data sets and also appeared with very distinctive scores.

‘completely unimportant’ or ‘rather unimportant’. *Within* the park borders, “more and better sign posting”, “more and improved rambling tracks” and “more nature paths for self-guiding” were seen as ‘rather important’ or ‘very important’ by a distinct majority of the visitors. Conversely, “motorboat trips on the lakes” was viewed by most visitors as ‘rather’ or ‘completely unimportant’.

Based on the findings from the factor analysis, the following descriptions of each dimension can be provided:

- 1) *‘Infrastructure & service’*: The main indicators which characterised this dimension were “interest in increased opportunities for various activities”, “staged experiences for a greater audience”, “gondolas and similar great installations” and “appreciating better options for motorboat trips on the lakes”.
- 2) *‘Tracks & signposts’*: Visitors in this dimension expressed a notable wish for “more and improved rambling tracks”, “more nature paths for self-guiding” and “more and better sign posting”.
- 3) *‘Tours & interpretation’*: This orientation included primarily “guided tours/ sightseeing to see natural and cultural attractions”, and an interest in “visitor centres with exhibitions”.
- 4) *‘Food & accommodation’*: This dimension was characterised by expressed interest in “well developed food and beverage facilities”, “an abundance of accommodation facilities” and “accommodation with good standard”.

The dimension *‘Infrastructure & service’* include facilities located both inside and outside the park borders, whereas *‘Tracks & signposts’* refer to requested measurements within park borders only. *‘Tours & interpretation’* and *‘Food & accommodation’* refer entirely to services and facilities located outside the national parks.

*Insert Table 2 here*

Internal consistency of the scales was high for the two most prominent *NO* factors, 'Recreation' and 'Inspiration' (Cronbach's alpha of 0.90 for both scales), and lower for 'Challenge' and 'Comfort' (0.65 and 0.50, respectively). The *QTF* scales all proved good consistency by alpha values ranking from 0.84 to 0.76. Although the same four dimensions were obtained in our data set as in Haukeland et al. (2010), based on exploratory factor analysis, for both *NO* and *QTF*, the confirmatory factor analysis of the new models, based on our data set, shows a better fit (Table 3). Notwithstanding this, while some of the goodness-of-fit parameters are close to threshold levels, that is,  $\geq 0.9$  for CFI and  $\leq 0.8$  for RMSEA (Byrne 2001), the chi-square is substantially above the threshold ( $< 2$ ), which indicates that there is still a scope for model improvement. Moreover, the construct reliability (CR) was below the threshold value ( $> 0.7$ ) for 'Comfort' and for 'Challenge', the latter only in the 2010 model though. Average variance extracted (AVE) was below the threshold value ( $> 0.5$ ) for all factors, except 'Recreation' in the 2010 model and 'Challenge' in the 2011 model.

*Insert Table 3 here*

#### Wilderness Purism Scaling (WPS)

More than four out of five respondents felt that the provision of track information at the start of walks, and at track junctions contributed to the enjoyment of a natural area. The same number expressed similar appreciation for well-maintained and signposted tracks. On the other hand, only one in four felt that the ability to experience solitude was an important element of their trip.

#### New Ecological Paradigm (NEP)

Among the various elements in the *NEP*, the most commonly supported statements were "the balance of nature is very delicate and easily upset" (more than four of five respondents agreed) and

“plants and animals have as much right as humans to exist” (more than three quarters of respondents agreed). Conversely, the following statements were typically *not* supported by study participants: “the balance of nature is strong enough to cope with modern industrial nations” (opposed by three out of five respondents) and “the so-called ”ecological crisis” facing humankind has been greatly exaggerated” (opposed by about half of respondents).

#### Linear regression analyses

“Acceptance of negative ecological impacts due to tourism activities and facilities in national parks” was treated as a dependent variable in the linear regression analysis. The index represented the sum score of three elements: wild reindeer habitat, raptor nesting and vegetation loss. The use of index score were due to the three separate scales being highly correlated ( $>.8$ ). Also, the index score fits better to the normal distribution, which is an underlying assumption in the OLS. Descriptive statistics for main study variables are presented in Table 4.

*Insert Table 4 here*

Half of the respondents in both samples accepted no negative impacts on raptor nesting, two fifths accepted no negative impacts on wild reindeer habitat and one third accepted no impacts on vegetation loss. Among those who accepted some ecological negative impacts, “minor impacts” was the most frequent choice and less than one in ten visitors felt that “major impacts” on any of the three indicators was acceptable.

Table 5 shows the results of the regression modelling, where we have applied stepwise regression in the selection of explanatory variables within sub-samples (applying inclusion criteria of  $p < 0.1$  and exclusion criteria of  $p < 0.15$ ). Consequently, multicollinearity problems were avoided in the models, as the variance inflation factor (VIF) of all explanatory variables

was below 2. The results are presented as two models for each of the two sub-samples, where Model 2 includes the psychographic scales. In both sub-samples the explanatory power of Model 2 is notably larger than that of Model 1. H1 is thus supported. Education on university level had a significant effect in both sub-samples on negative ecological impact tolerance. The longer a respondent had spent in education, the less likely he or she were to accept negative ecological impacts. Female visitors showed significantly lower levels of tolerance than their male counterparts in sub-sample 2 (but not so in sub-sample 1). Accordingly, H2 and H4 were supported by these findings. However, H3 is not verified because the respondents' age did not affect their stated tolerance for negative ecological effects on wildlife and vegetation loss. Regarding other social background or trip attributes, 'Small travel party' was the only variable in Model 2 in both sub-samples that had significant effects on acceptance of negative ecological impacts, i.e. in the smallest travel groups comprising one or two persons there is significantly less tolerance for negative ecological impacts than what is found in larger travel parties.

As regards *NO*, it can be observed from sub-sample 1 that '*Inspiration*' leads to less tolerance for negative ecological impacts, while '*Challenge*' and '*Comfort*' lead to greater acceptance of negative effects. Consequently, H5 is supported, H6 is not supported and H7 and H8 (somewhat modified as '*Sightseeing*' has been labelled '*Comfort*' in this context) are both upheld. A low variation in the response scale for '*Recreation*' may help to explain the insignificance of this factor in the regression analysis. Within the same sample the *QTF* dimensions '*Infrastructure & service*' and '*Food & accommodation*' produce a higher tolerance for negative ecological impacts. Thus H10 and H11 are supported, but H9 and H12 are not.

The linear regression analysis in sub-sample 2 reveals the isolated effects of the index scores for *NEP* and *WPS*. The sign on the *NEP* coefficient shows that higher expressions of a pro-ecological worldview (eco-centrism) are typically associated with low tolerance for the negative ecological impacts. This finding supports H14. The *WPS* coefficient is only significant at the 10% level, yielding only weak support for H13. (*WPS* would have been left out of the stepwise regression with a stricter inclusion/exclusion test of, respectively 0.05/0.1, partly due to its correlation with *NEP*.)

*Insert Table 5 here*

## Discussion and Conclusions

In general, the national park visitors in the study area of Nord-Gudbrandsdalen in Southern Norway expressed a low degree of tolerance towards ecological impacts due to tourism activities and facilities. This is in accordance with the assumptions that nature oriented tourists are tending to voice concern about environmental issues (Teisl & O'Brian, 2003; Wurzinger & Johansson, 2006; Line & Costen, 2011). This relationship is not surprising as the environmental conditions of the visited area affect directly the quality of the tourist experience (Puhakka, 2011; Marion & Leung, 2001; Deng et al., 2002). But also in general, negative ecological impacts may compromise life-fulfilling conditions (Floyd et al., 1997) or nature's "existence value" for nature-based tourists (Pigram, 1990).

### Psychographic scales

Nature-based tourists' awareness about environmental impacts may nevertheless vary between different segments (Priskin, 2003) and utilisation of psychographic scales is seen as adequate means to denote tourists' principal orientations, interests and concerns (Luo & Deng, 2008). The first two scales (*NO* and *QTF*) applied in the study are outcomes of recent research in a Scandinavian setting



(see Haukeland et al., 2010) whereas the latter two are well-known scales, developed in the 1960s and the 1970s (see Hendee et al., 1968; Stankey, 1973; Dunlap & Van Liere, 1978). Overall, the four dimensions on the *NO* scale identified in our study are very similar to Haukeland et al.'s 2010 findings in the Norwegian research discussed earlier. The main difference is that the '*Recreation*' and '*Inspiration*' orientations surface as factor no. 1 and factor no. 2 respectively in the present study, whereas they appeared in opposite rank in the Haukeland et al. (2010) study. In addition, the comfort aspect was more important in factor 4 in the study in attendance. As a result, we re-labeled this dimension '*Comfort*'. With regard to the *QTF* scale, the four orientations also corresponded closely with Haukeland et al. (2010) research. The only difference was that the factors' order changed in the present study (factors 1 and 2 and also factors 3 and 4 changed their positions mutually). Both scales have thus been corroborated to a certain extent in the present study, but the confirmatory factor analyses indicated that further development is warranted for increasing their validity and reliability. The more established psychographic scales (*WPS* and *NEP*) clearly distinguish between degree of purism and degree of eco-centrism in the survey in attendance.

#### Visitors' tolerance for potential negative effects on wildlife and vegetation loss

The findings signify that psychographic scales are, in general, appropriate tools for predicting visitors' tolerance for potential negative ecological impacts (in this case, on wild reindeer habitat, raptor nesting, and vegetation loss in a Norwegian national park setting) due to tourism activities and facilities. The utility of such scales may explain the increasing scholarly interest in identifying and segmenting nature oriented tourists by their social and environmental attitudes (see Luo and Deng (2008)).

It was assumed that social background factors would help to explain variations in the level of visitors' ecological concern. This study has confirmed Anthony et al.'s (1995) and also Dunlap et al.'s (2000) assertion that pro-environmental attitudes increase with higher educational levels. Differences in attitudes between men and women (Stern et al., 1995), however, were only supported by one of the two sub-samples. Further, no relationship between age and the level of concern over negative ecological impacts (Dunlap et al., 2000) was identified. This suggests that the relationship between social background factors and ecological concern may be weakening (Fransson & Gärling, 1999), although the study does not provide any longitude data to support this assumption. Trip attributes also seem to have some effect in the present study, as visitors in small travel parties express greater concern than members of larger groups.

The various psychographic scales have been shown to influence visitor acceptance of negative ecological effects from tourism activities and facilities in national parks. The *NO* dimension '*Inspiration*' represents a relatively high level of nature focus and thus supports Wurzinger and Johansson's (2006) assumption that this factor leads to a greater concern for the environment. The division between "hard" and "soft ecotourists" (Weaver & Lawton, 2002) is also evident in these findings, as '*Inspiration*' complies with the former and '*Comfort*' with the latter category. '*Challenge*' is also most likely to apply to the "soft ecotourists" as their focus tends to be more on the activity than the nature experience, and a higher level of services is sought within this dimension. Both '*Comfort*' and '*Challenge*' orientations are prone to less environmental concern. In the same vein, the *QTF* dimensions '*Infrastructure & service*' and '*Food & accommodation*' are in line with the "soft ecotourists' " greater acceptance of negative ecological impacts.

High score (*strong purism*) on the *WPS* scale produced a lower level of acceptance of detrimental environmental effects. However, the coefficient was only significant at the 10% level, failing to yield indubitable support to the hypothesised relationship. This is somewhat surprising compared to previous findings in Norwegian mountain areas (Vistad & Vorkinn, 2012; Vistad 1995). With regard to the *NEP* scale, the lower level of acceptance was much more pronounced (i.e. the stronger the pro ecological sentiments, the lower the acceptance of negative ecological impacts). This supports Dunlap et al.'s (2000) assumption regarding the implications of the pro-ecological (*ecocentric*) worldview.

#### Management implications

The salient ecological awareness among park visitors in our study (and, in particular, among highly educated individuals) should be encouraging for protected area managers. The findings suggest that nature-based tourists would be particularly receptive to improved and increased information on ecological issues and management actions, as suggested by Anthony, Steidl and McGarigal (1995) and Buckley (1990). Adequate information measures about the state of the environment and properly communicated management arrangements to prevent potential negative ecological impacts of tourism would probably be well understood (Uysal et al., 1994), supported and respected among many visitors, not least among the well educated segments who seem to take a very firm stand against such damaging consequences (Puhakka, 2011). In a country like Norway, with a strong emphasis on nature protection as the predominant goal for park designation and a subsequent restrictive management regime as regards tourism development (Haukeland, 2011), the attitudes revealed in this survey could serve as significant arguments for the inclusion of sustainable nature-based tourism in management visions and goals for the country's national parks. As maintained by Buckley (1999), an intact biodiversity is a critical product component for nature oriented tourists, and the forming of a strategic alliance and new partnerships between tourism and conservation

interests in the national parks could therefore become a viable option. The findings of our survey thus hold significant promise for the future.

#### Limitations and further research

The only indicator with high factor loading on 'Comfort' was "Enjoy comfort in natural surroundings". This might imply a flaw in the *Nature Orientation (NO)* scale, in that a single indicator cannot fully capture the dimension's variability. A relatively low consistency measure also suggests that there is a need for more accurate indicators underlying this dimension. In addition, the 'Challenge' dimension has few underpinnings and should be explored further. This research has, nevertheless, demonstrated the effectiveness of using psychographic scales to help explain visitors' levels of concern for the negative environmental impacts of tourism in a Norwegian national park setting.

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Table 1: Nature Orientation (NO). Factor analyses, where factor loadings lower than 0.4 are not shown and above 0.6 are in bold; n = 759.

<b>Construct</b>	<b>Item</b>	<b>Exploratory factor analysis (Haukeland et al. 2010)<sup>1)</sup></b>	<b>Confirmatory factor analysis (our data)</b>	<b>Exploratory factor analysis (our data)*</b>	<b>Confirmatory factor analysis (our data)</b>
<i>Recreation</i>	Tranquillity and peacefulness	<b>0.796</b>	<b>0.615***</b>	<b>0.830</b>	0.599***
	Fresh air, clean water and unpolluted environment	<b>0.694</b>	0.528***	<b>0.802</b>	0.528***
	Physical relaxation in nature	<b>0.743</b>	<b>0.607***</b>	<b>0.754</b>	<b>0.607***</b>
	Sense impressions	0.579	<b>0.612***</b>	<b>0.746</b>	<b>0.600***</b>
	Endorse good health	0.562	0.349***	<b>0.645</b>	0.551***
	Recharge batteries/ regain strength	0.543	0.420***	<b>0.640</b>	0.598***
	Experience nature's beauty	-	-	0.537	0.218***
	Obtain a feeling of freedom	-	-	0.410	0.118**
	Sightseeing on my own	-	-	0.490	0.347***
	Encounter something different from everyday life	-	-	0.443	0.175***
	Increase my knowledge/ understanding of nature	-	-	0.413	0.225***
<i>Inspiration</i>	Experience nature's beauty	0.598	0.460***	0.403	0.286***
	Encounter something different from everyday life	<b>0.649</b>	0.555***	0.458	0.405***
	Increase my knowledge/ understanding of nature	-	-	0.452	0.352***
	Obtain a deeper connection in life	<b>0.689</b>	<b>0.707***</b>	<b>0.809</b>	<b>0.735***</b>

	Experience nature's magic and mysticism	<b>0.693</b>	<b>0.713***</b>	<b>0.749</b>	<b>0.731***</b>
	Find inspiration in natural surroundings	<b>0.650</b>	<b>0.688***</b>	<b>0.727</b>	<b>0.705***</b>
	Feel connectedness with landscape and nature	<b>0.713</b>	<b>0.693***</b>	<b>0.719</b>	<b>0.701***</b>
	Obtain a feeling of freedom	<b>0.687</b>	<b>0.651***</b>	<b>0.620</b>	0.550***
	Experience something mighty and overwhelming	0.527	0.528***	0.504	0.575***
	Regain another pulse/ time rhythm	0.554	<b>0.619***</b>	0.590	<b>0.611***</b>
	Recharge batteries/ regain strength	0.445	0.219***	-	-
	Feel greater closeness to co-travellers	0.526	0.428***	-	-
<i>Challenge</i>	Search for challenges with a certain risk	<b>0.724</b>	0.260***	<b>0.836</b>	0.452***
	Demanding physical activities in nature	<b>0.688</b>	0.489***	<b>0.795</b>	<b>1.324***</b>
	Increase my knowledge/ understanding of nature	0.470	0.571***	-	-
	Endorse good health	0.557	0.243***	-	-
<i>Comfort</i>	Enjoy comfort in natural surroundings	<b>0.662</b>	0.417***	<b>0.856</b>	0.571***
	Sightseeing on my own	0.518	0.598***	0.453	0.124**
	Feel greater closeness to co-travellers	-	-	0.564	<b>0.783***</b>
	Experience something mighty and overwhelming	0.477	0.086*	-	-

<sup>1)</sup> In our exploratory factor analysis, inspiration explained 40.0% of the variance, recreation 8.2%, challenge 6.6%, and comfort 5.5%. In Haukeland et al. (2010), inspiration explained 37.9% of the variance, recreation 7.2%, challenge 6.4%, and comfort (sightseeing) 5.0%. The number of factors was determined using the variance explained by retained factors. Bootstrap tests were also applied to assess the robustness of the

estimated relations.

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .1$

Table 2: Quest for Tourism Facilities (QTF). Factor analyses, where factor loadings lower than 0.4 are not shown and above 0.6 are in bold; n = 759.

<b>Construct</b>	<b>Item</b>	<b>Exploratory factor analysis (Haukeland et al. 2010) <sup>i)</sup></b>	<b>Confirmatory factor analysis (our data)</b>	<b>Exploratory factor analysis (our data)*</b>	<b>Confirmatory factor analysis (our data)</b>
<i>Infra-structure &amp; service</i>	Increased opportunities for various activities	<b>0.656</b>	<b>0.665***</b>	<b>0.741</b>	<b>0.827***</b>
	Staged experiences for a greater audience	<b>0.666</b>	<b>0.766***</b>	<b>0.725</b>	<b>0.708***</b>
	Gondolas and similar great installations	<b>0.747</b>	<b>0.746***</b>	<b>0.683</b>	<b>0.704***</b>
	Better options for motorboat trips on the lakes	<b>0.659</b>	<b>0.622***</b>	<b>0.681</b>	<b>0.611***</b>
	More service persons	0.594	0.525***	0.597	<b>0.744***</b>
	Zoning of different activities	0.544	0.289***	0.407	0.575***
	More picnic areas	-	-	0.549	0.563***
	Purchase/ rent of clothes and outfits	0.471	0.232***	-	-
<i>Tracks &amp; signposts</i>	More and improved rambling tracks	<b>0.678</b>	<b>0.710***</b>	<b>0.813</b>	<b>0.751***</b>
	More nature paths for “self-guiding”	<b>0.723</b>	<b>0.722***</b>	<b>0.728</b>	<b>0.740***</b>
	More and better sign posting	<b>0.772</b>	<b>0.774***</b>	<b>0.782</b>	<b>0.814***</b>
	More cycling tracks	0.543	<b>0.692***</b>	0.596	<b>0.699***</b>
	More picnic areas	<b>0.675</b>	<b>0.741***</b>	0.439	0.310***
	More accessible information	<b>0.681</b>	<b>0.622***</b>	0.500	0.458***
	More service persons	0.533	0.277***	-	-
	Increased opportunities for various activities	0.501	0.213***	-	-

	Zoning of different activities	0.490	0.375***	-	-
<i>Tours &amp; interpretation</i>	Guided tour/ sightseeing to see animals/ natural attractions	<b>0.794</b>	<b>0.852***</b>	<b>0.770</b>	<b>0.852***</b>
	Guided tour/ sightseeing to cultural attractions	<b>0.755</b>	<b>0.842***</b>	<b>0.725</b>	<b>0.860***</b>
	Visitor centres with exhibitions	<b>0.689</b>	0.496***	<b>0.696</b>	0.493***
	Purchase/ rent of clothes and outfits	0.407	0.324***	0.489	0.466***
	More accessible information	-	-	0.485	0.243***
	Local food specialities	-	-	0.472	0.381***
	Supply of roads, etc	0.479	0.383***	-	-
<i>Food &amp; accommodation</i>	Well developed food and beverage facilities	<b>0.754</b>	<b>0.960***</b>	<b>0.719</b>	<b>0.986***</b>
	Abundance of accommodation facilities	<b>0.750</b>	0.591***	<b>0.760</b>	0.585***
	Accommodation with good standard	<b>0.785</b>	<b>0.779***</b>	<b>0.754</b>	<b>0.771***</b>
	Local food specialities	0.586	<b>0.600***</b>	0.511	0.423***

<sup>1)</sup> In our exploratory factor analysis, infrastructure & service explained 33.9% of the variance, tracks & signposts 9.1%, tours & interpretation 7.4%, and food & accommodation 6.9%. In Haukeland et al. (2010), tracks & signposts explained 37.9% of the variance, infrastructure & service 9.6%, food & accommodation 7.1%, and tours & interpretation 5.7%. The number of factors was determined using the variance explained by retained factors. Bootstrap tests were also applied to assess the robustness of the estimated relations.

\*\*\* p< .001, \*\* p< .01, \* p< .1

Table 3: Fit indices of factor models, and construct reliability (CR) and average variance extracted (AVE) for the factors.

	<b>Model based on Haukeland et al. (2010)</b>		<b>Model based on our data</b>	
	Nature orientation	Quest for facilities	Nature orientation	Quest for facilities
$\chi^2$ / df ratio	8.003 (p < .001)	6.530 (p < .001)	6.801 (p < .001)	5.075 (p < .001)
Comparative fit index (CFI)	0.837	0.842	0.866	0.890
Root mean square error of approximation (RMSEA)	0.096	0.086	0.088	0.073
<b>CR / AVE</b>				
<i>Recreation</i>	0.868 / 0.533		0.854 / 0.391	
<i>Inspiration</i>	0.882 / 0.421		0.883 / 0.448	
<i>Challenge</i>	0.451 / 0.189		0.856 / 0.787	
<i>Comfort</i>	0.378 / 0.213		0.499 / 0.304	
<i>Infra-structure &amp; service</i>			0.763 / 0.342	
<i>Tracks &amp; signposts</i>			0.829 / 0.379	
<i>Tours &amp; interpretation</i>			0.722 / 0.374	
<i>Food &amp; accommodation</i>			0.770 / 0.466	
			0.835 / 0.423	
			0.804 / 0.426	
			0.743 / 0.361	
			0.758 / 0.460	



Table 4: Descriptive statistics for main study variables, n = 1,318

	Sub-sample 1 (n=760)			Sub-sample 2 (n=278)		
	Mean	SD	Range	Mean	SD	Range
Female	.38	.487	0 – 1	.33	.472	0 – 1
Bachelor	.31	.463	0 – 1	.38	.487	0 – 1
Master/doctorate	.40	.491	0 – 1	.40	.491	0 – 1
From Denmark or Sweden	.04	.204	0 – 1	.18	.382	0 – 1
From Germany *	.14	.349	0 – 1			
Overnight visit	.76	.427	0 – 1	.79	.404	0 – 1
<b>Psychographic dimensions</b>						
<i>Infra-structure &amp; service</i>	2.592	.766	1 – 5			
<i>Tracks &amp; signposts</i>	3.445	.777	1 – 5			
<i>Tours &amp; interpretation</i>	3.240	.708	1 – 5			
<i>Food &amp; accommodation</i>	3.253	.835	1 – 5			
<i>Recreation</i>	4.288	.561	1 – 5			
<i>Inspiration</i>	4.002	.652	1 – 5			
<i>Challenge</i>	2.911	.960	1 – 5			
<i>Comfort</i>	3.526	.738	1 – 5			
<i>NEP</i>				3.67	.647	1.86 – 5.00
<i>WSP</i>				3.28	.901	1.38 – 7.00

\* Due to a coding error no German (speaking) respondent was assigned to sub-sample 2.

Table 5: Linear regression: Acceptance of negative ecological impacts due to tourism activities and facilities in national parks<sup>a)</sup> regressed against respondent's characteristics (Model 1) and respondent's characteristics and *NO*, *QTF*, *WPS* and *NEP* scale-based (Model 2). Sub-samples 1 and 2. Standardized Coefficients.

		Sub-sample 1		Sub-sample 2	
Variable	Description	Model 1 <sup>b)</sup>	Model 2 <sup>c)</sup>	Model 1 <sup>d)</sup>	Model 2 <sup>e)</sup>
Female	Dummy (1/0). 1: Female respondent			-.141**	-.111**
Bachelor	Dummy (1/0). 1: Completed bachelor degree	-.160***	-.131***	-.143*	-.156**
Master/doctorate	Dummy (1/0). 1: Completed master/doctorate degree	-.214***	-.177***	-.257***	-.241***
From Denmark or Sweden	Dummy (1/0). 1: Respondent's place of residence is either Denmark or Sweden	.071*	.105***		
From Germany	Dummy (1/0). 1: Respondent's place of residence is Germany <sup>f)</sup>	-.080**	.028		
Overnight visit	Dummy (1/0). 1: Overnight stay in Northern Gudbrandsdal	-.088**	-.041		
Small travel party	Dummy (1/0). 1: Total number of persons (adults+children) the travel costs cover is one or two	-.061	-.067*	-.098	-.096*
Knowledge of NPs	Number of the national parks known in the region			-.109*	-.111*
Travel experience in NPs	Number of the national parks visited			.074	.114**
factor 2 – <i>NO</i>	<i>Inspiration</i> (composite)		-.211***		
factor 3 – <i>NO</i>	<i>Challenge</i> (composite)		.090**		
factor 4 – <i>NO</i>	<i>Comfort</i> (composite)		.103**		
factor 1 – <i>QTF</i>	<i>Infrastructure &amp; service</i> (composite)		.179***		
factor 4 – <i>QTF</i>	<i>Food &amp; accommodation</i> (composite)		.118***		
<i>WPS</i>	<i>Purist</i> (index)				-.109*
<i>NEP</i>	<i>Environmentalist</i> (index)				-.383***

<sup>a)</sup> Index: Negative influence on wild reindeer habitat, raptor nesting and vegetation

<sup>b)</sup> Adj.  $R^2 = 0.05$ .  $n=713$

Significance levels: \* $<0.1$ . \*\* $<0.05$ . \*\*\* $<0.0$

<sup>c)</sup> Adj.  $R^2 = 0.14$ .  $n=712$

<sup>d)</sup> Adj.  $R^2 = 0.08$ .  $n=249$

<sup>e)</sup> Adj.  $R^2 = 0.24$ .  $n=249$

<sup>f)</sup> Germany was not included in sample 2 due to a coding error

