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Are interest groups different in the factors determining landscape preferences?

Maria Bacher¹, Janette Walde², Caroline Pecher³, Erich Tasser^{3*}, Ulrike Tappeiner^{1,2}

¹ Institute of Ecology, University of Innsbruck, Sternwartestraße 15, 6020 Innsbruck, Austria

² Department of Statistics, University of Innsbruck, Universitaetsstraße 15, 6020 Innsbruck, Austria

³ Institute for Alpine Environment, European Academy of Bozen/Bolzano, Viale Druso 1, 39100 Bolzano, Italy

Abstract

In the last decades, rural landscape in Europe has evolved from an agricultural by-product to an important public good. This development creates not only new challenges to farming practices, it also makes participation and public involvement an indispensable tool for sustainable landscape planning. This is especially true for many European mountain regions, where tourism represents an important source of income and conflicts between locals' and tourists' interests should be avoided. In our study, we analyze whether discrepancies in the perception of the Alpine landscape can be located between locals and tourists and, if these differences exist, in which aspects these two groups are differing. A model employing three general factors able to describe landscape preferences regardless of the personal background is suggested and validated by confirmatory factor analysis. Our major finding shows that an attractive landscape for tourists does not have to be contradictory to a landscape that supports a high living quality for locals. Compromises in landscape planning between locals' and tourists' requirements seem often not to be necessary as they, generally, do not differ in the way they experience and assess the landscape.

Keywords:

Landscape preferences, landscape change, survey, Confirmatory factor analysis, locals, tourists

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*Corresponding author. Email: erich.tasser@eurac.edu

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1 Introduction

“Landscape has an important public interest role in the cultural, ecological, environmental and social fields, and constitutes a resource favourable to economic activity (...), and it is important to cooperate towards its protection, management and planning”. This excerpt from the European Landscape Convention (ELC – Council of Europe, 2000) illustrates the importance of sustainable management and planning for the landscape development in Europe. The aesthetical value (Jorgensen, 2011), local’s quality of life (Barroso et al., 2012), the attractiveness as a tourist destination (Drabkova, 2012), food production and food security (Howley et al., 2012) and the supply of essential ecosystem services for our society (Lamarque et al., 2011; Garcia-Llorente et al., 2012) are just a few examples, which illustrate the significance of the landscape.

According to the ELC, “‘Landscape’ means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (Preamble of the European Landscape Convention, Council of Europe 2000.). This definition includes elements from both a positivistic and constructivist landscape theory (cf. Geiling and Leibenath, 2015). The positivistic view assumes that the landscape is an object, which exists independently from mankind (cf. Kühne, 2009). Causal laws and constant relationships between events or variables exist behind the landscape development (Lach, 2014). Contrary to that, the constructivist view assumes that the landscape is a construct in our mind that is variable, individual and, thus, requires a concurrent consideration of social and physical aspects (cf. Kühne, 2009). This implies that, for a successful landscape planning, the public and its opinion needs to be involved in planning processes.

In European mountain regions, agriculture is one of the main landscape designers and, for a long time, rural landscape was not much more than a by-product of the agricultural activity. Nowadays, rural landscape is listed as an important public good

(Cooper, Hart & Baldock, 2009) and developments such as competitive pressure due to the free market economy, the rise of mass tourism and an increasing urbanisation strongly impact the alpine agriculture, creating new challenges to farming practices (Barroso et al., 2012). In this context, the intensive land-use of well-situated sites faces the reduced management (or abandonment) of marginal sites, which leads to a natural reforestation (Gellrich et al., 2007; Soliva & Hunziker, 2009). Furthermore, the farmers’ role as mere food producer is often replaced by the idea of a multifunctional agriculture, which concentrates on sustainable forms of production and supports public services such as recreation functions (Potter & Burney, 2002; Foley et al., 2005; Jongeneel et al., 2008). These developments illustrate that the agriculture and, consequently, the rural landscape are undergoing major changes and planning strategies to ensure a positive development and preserve the resource landscape are of crucial importance. In this context, various and often conflicting interests need to be considered and it is, therefore, of essential need to involve not only decision-makers in agriculture, politics and tourism in guiding landscape development, but also the public opinion (Bauer et al., 2009; Sevenant & Antrop, 2008).

In the last years, many studies have analysed the complex human-landscape relationship, using various approaches and methods (cf. van Zanten et al., 2014). In this context, central areas of research have been landscape aesthetics in general (de Groot & van den Born, 2003) and differences between social groups (Junge et al., 2011; Buijs et al., 2009), place meanings and place attachment (Smith et al., 2011; Rollero & De Piccoli, 2010) or identity processes, inter alia in connection with landscape as a cultural heritage (Tempesta, 2010). Moreover, landscape preferences in connection with spatial structures (Schirpke et al., 2013; Dramstad et al., 2006; Fontana et al., 2014) have been analysed and the influence of plant diversity and biodiversity in general (Lindemann-Matthies et al., 2010; Junge et al., 2009; Fontana et al., 2014) has become more relevant in the context of landscape perception.

Since tourism represents an important source of income in many Alpine regions, also tourists' evaluation of the landscape changes, especially the assessment of reforestation and the so-called rewilding are of great interest. In this context, various studies found rather positive attitudes towards this development, in particular when compared with locals (Höchtel, 2005; Hunziker, et al. 2008; Fhyri et al., 2009). Findings therein suggest that locals and tourists see and evaluate landscape and landscape change in a different way. Such discrepancies would have a strong impact on regional landscape planning. If differing preferences between these two groups of interest exist, it is worth to pursue closely the nature of these differences. In our study we analyse whether such discrepancies in the perception of landscape between locals and tourists can be statistically located and, if these differences exist, in which aspects these groups are differing. To answer these questions, we firstly develop a model employing three general factors (cf. Fig.1) that are able to describe landscape preferences regardless of the personal background. Based on a study by Gehring (2006) and further literature research (Kaplan & Kaplan, 1989, 1995; Twigger-Ross & Uzzell, 1996, Nasar, 2000; Purcell & Nasar, 1992; Bischof, 1985, 1993; Kaiser & Hartig, 1993) we supply a higher order structure that combines key characteristics of different well-established theoretical approaches regarding landscape assessment. In a second step, we transform the model contents into questions, integrate them into a standardized questionnaire and carry out a survey among locals and tourists. After that, a confirmatory factor analysis is employed to validate the suggested model. In this context, the following questions are investigated:

- (1) Are there any generally valid factors that are able to explain both local's and tourist's landscape preferences?
- (2) How do locals and tourists differ in their landscape perception?

In our opinion, the results of this study are of great importance as they are a first attempt to explain both locals' and tourists' landscape perception and

preferences considering various factors. Our model indicates if requirements regarding a landscape differ between locals and tourists, i.e. if locals and tourists do really see and evaluate the same landscape in a different way.

This information might give an indication on how oncoming changes in the structure of the landscape are perceived and evaluated by locals and tourists. Therefore, it represents an important assistance in establishing future guiding and policy strategies.

2 Methodology

In the following, we describe our methods step by step. Firstly, we developed a theoretical model based on the literature (cf. *2.1 Theoretical background*). Secondly, we integrated the model components into a questionnaire, carried out a survey with locals and tourists in spring/summer 2010 (cf. *2.2 Study area and survey*) and estimated our model (cf. *2.3 Statistical approach*).

2.1 Theoretical background

Out of the amount of studies that have analysed the complex human-landscape interaction in the last decades, we have chosen five theoretical approaches to form the basis for our suggested model (cf. Tab.1). The selection has been made with the objective to consider well-established theories regarding human-landscape interaction covering a wide range of different research fields. The selected theoretical approaches are manifold and, at first sight, their connections are not obvious. Only a closer look reveals links between them and gives an idea of a possible common background.

In the following, we will point out these similarities that lead us step by step to our suggested model:

- Familiar environments support the feeling of security and safety as they are well-known and offer a low level of new information.

Table 1: Overview of the five theoretical approaches used for our suggested model

Theory	Related concept(s)	Content	Author(s)
1. Concept of familiarity	Familiarity	Familiarity as an important factor in landscape assessment	Nasar, 2000; Purcell & Nasar, 1992
2. Model of Socio-Emotional-Regulation	Security Safety Autonomy	Natural environment as a framework for a positive social interaction	Bischof, 1985; 1993; Fuhrer, Kaiser & Hartig, 1993
3. Attention Restoration Theory	Compatibility Being-away Fascination	Natural environment as a promoter of relaxation and “effortless attention”	Kaplan & Kaplan, 1989; 1995
4. Information Processing Theory	Complexity Mystery	Preference for landscapes, which stimulate and facilitate information processing	Kaplan & Kaplan, 1989
5. Concept of place-identity	Particularity	Positive identity formation in relation with the surrounding environment	Twigger-Ross & Uzzell, 1996

- Compatible environments enable and support people’s interests and aims, which in turn stimulates exploration and can, therefore, be connected with the concepts of complexity, mystery, fascination and particularity.

- Complex and mysterious landscapes provoke effortless attention and request reflection, which is strongly connected with the experience of fascination.

- Mysterious, complex and fascinating landscapes stimulate exploration and enable the acquirement of new information.

- Particular and distinctive landscapes offer a high level of new information, which can be connected to the experiences described for complexity, mystery and fascination.

- The feeling of autonomy is connected with the experience of being-away as both concepts refer to a self-directed situation, which is free of demands of others.

2.2 Hypothesised concept spanning model

Based on the theoretical considerations above, we suggest three interrelated factors of theoretical concepts that can be interpreted as (1) Feeling of security, (2) Feeling of stimulation and (3) Feeling of self-direction (cf. Fig. 1). The first factor marks a safe and familiar landscape with a low level of new information. The second factor enables the feeling of stimulation, as complex and exciting landscapes are accompanied by a higher level of available information. The last factor refers to landscapes able to support people’s self-determination.

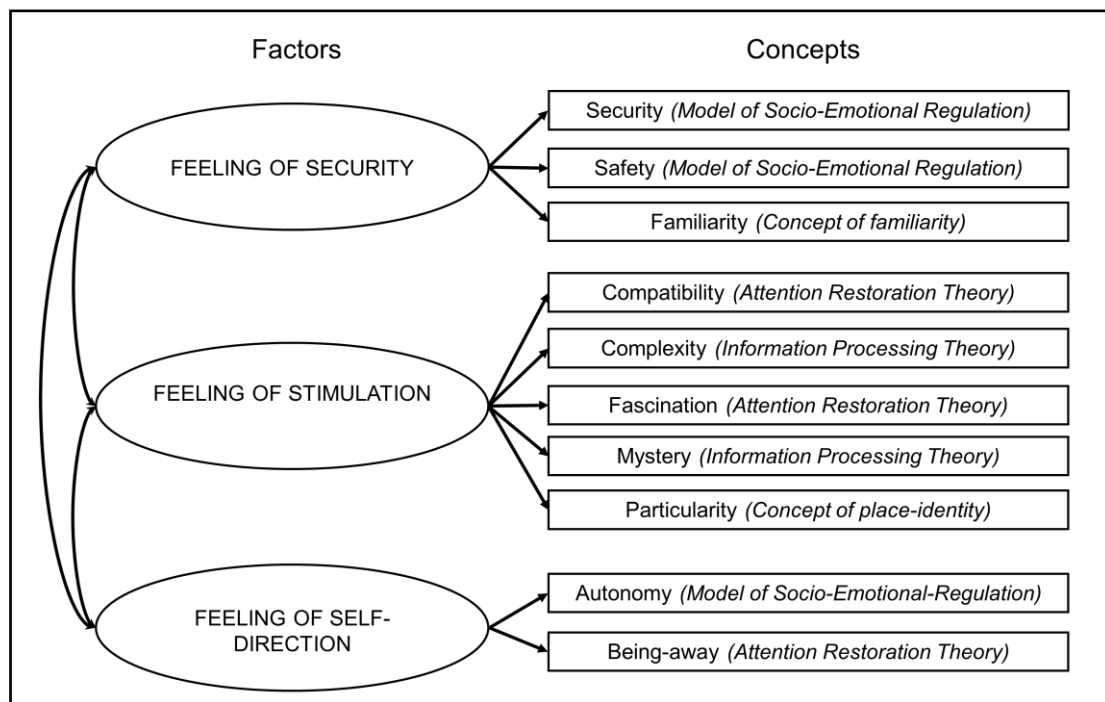


Figure 1. The three factors of interrelated theoretical concepts: feeling of security, stimulation and self-direction (based on Gehring, 2006)

The importance of the three factors security, stimulation and self-direction in the context of human-landscape interaction is confirmed by different studies, which mention the experience of security, stimulation and self-direction as fundamental human needs and important factors related to psychosocial development (Gebhard, 2001; Schwartz 2001) that can be very well fulfilled in natural and near-natural environments (Clayton, 2003). However, the individual constitution determines, among other things, the requirements and demands concerning the landscape. In our particular case, this means the stronger the feeling for security, the bigger the desire for peaceful landscapes with familiar elements. The bigger the desire for stimulation, the stronger is the wish for diverse, compatible and special landscapes that enable new experiences. Finally, the higher the demand for self-direction and autonomy, the bigger is the desire for landscapes rather free of restrictions that enable the feeling of freedom.

2.3 Study area and survey

The items that were chosen to measure landscape-related expectations were integrated into a

standardised questionnaire concerned with Alpine landscape and its development (cf. Bacher et al., 2012 and supplementary material). Face-to-face interviews with locals and tourists were carried out in Central Alps: the Province of Tyrol situated in Western Austria, and its southern neighbour, the Autonomous Province of Bozen/Bolzano, South Tyrol (Italy). Both regions are subject to the typical recent changes in the agricultural sector with intensification of well situated sites and reduced management and/or abandonment and natural reforestation of marginal sites. Despite of the immediate proximity, the extent of these changes varies, especially due to different legal situations and differences in the system of agricultural support. Accordingly, landscape scenery differs between the regions, especially in favoured sites, which are characterised by extensive fruit monocultures in South Tyrol, while in Tyrol the intensive use of grassland and vegetable-growing plays an important role. These differences increase the validity of the survey as it reflects not only a local, small-scale opinion, but represents a more complex and holistic point of view of landscape preferences in the Central Alps.

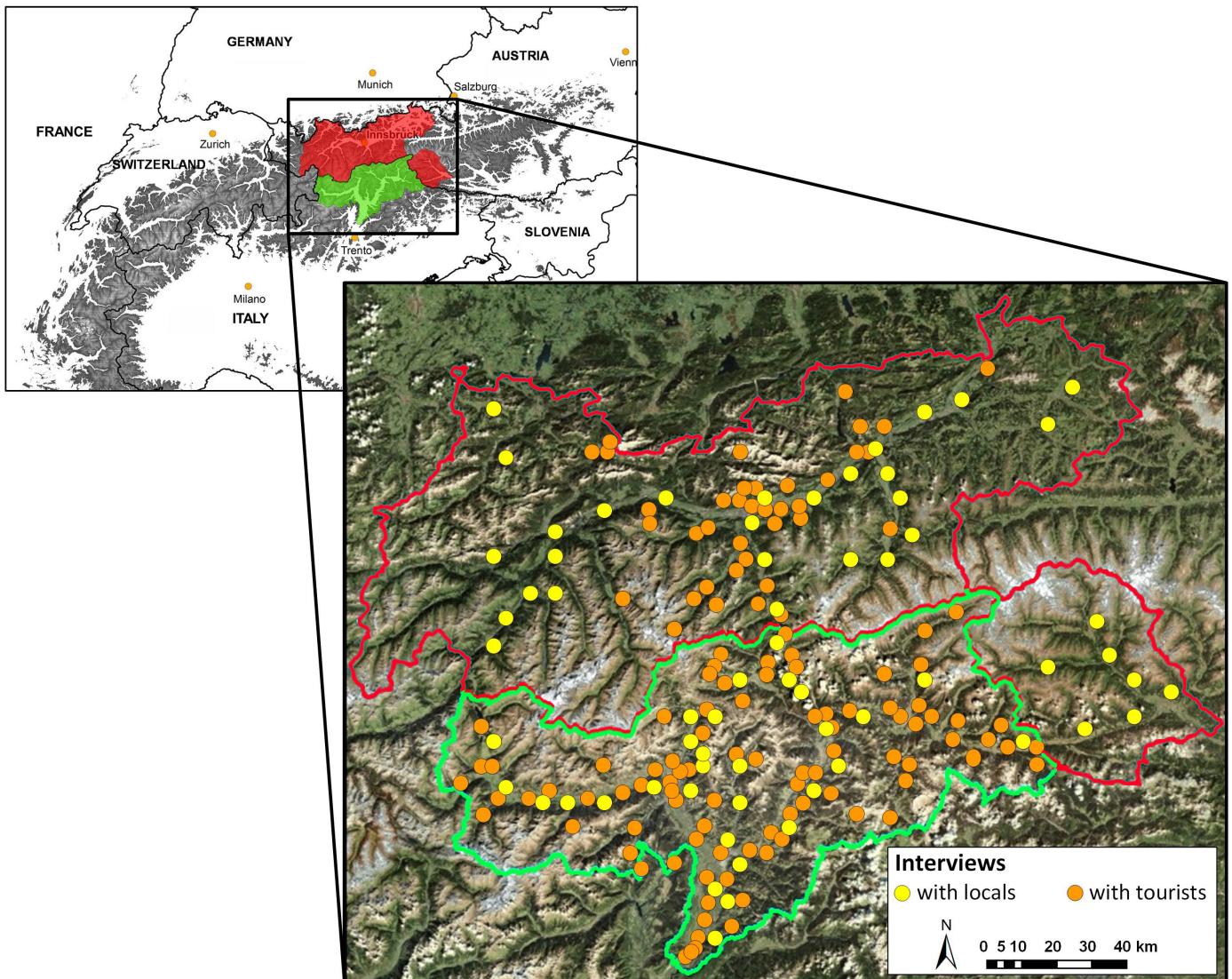


Figure 2. The study area spans the Province of Tyrol (Austria, in red) and the Autonomous Province of Bozen/Bolzano - South Tyrol (Italy, in green). Interviews with locals (yellow points) and tourists (red points) were carried out throughout the entire study area.

A questionnaire on the topic “Landscape in the Alps—What do you expect from it?” was developed in a close collaboration of experts in ecology, landscape research, agriculture and sociology. It consisted of two parts, one related to the contents and one for the collection of personal data. In the content-related part, the study participants’ expectations from a mountain landscape, their aesthetical perception as well as their opinion on the mountain agriculture and ecological services were collected using seven five-point Likert-scale questions.

In the presented study, we make use of one set of questions/items, which we have developed as follows: for each theoretical concept selected from

the literature (cf. Table 1), one corresponding item/question to be integrated into the questionnaire was chosen (cf. Table 2). The study participants were asked to indicate their level of agreement with each of the scale items by means of a five-point Likert scale from (1) applies completely to (5) applies not at all.

Questionnaires are the most commonly used non-quantitative method for sampling landscape preferences of various groups. They are a valuable source of quickly available information and are useful for determining the relative importance of different cultural ecosystem services or the preferences for extremely divergent landscape categories (Arthur

Table 2: The three interrelated factors security, stimulation and self-direction and the corresponding items/questions integrated into the questionnaire and labels

Questions/Items		Item label/ Related concept
Feeling of security	I feel secure in an Alpine landscape. ^a	Security
	I don't feel threatened in an Alpine landscape. ^a	Safety
	I feel familiar with a landscape in the Alps. ^e	Familiarity
Feeling of stimulation	An Alpine Landscape should be manifold. ^b	Compatibility
	There is plenty to discover for me in an Alpine landscape. ^c	Complexity
	An Alpine Landscape should be mysterious. ^b	Fascination
	An Alpine landscape should make regions special. ^d	Mystery
	An Alpine landscape should enable me to do whatever I like. ^c	Particularity
Feeling of self-direction	When I am in a landscape in the Alps, I want to feel free from demands and expectations. ^a	Autonomy
	When I am in an Alpine landscape, I feel far away from my obligations. ^c	Being-away

^a Based on Fuhrer and Kaiser (1993)

^b Based on Bauer (2005)

^c Based on Laumann et al. (2001)

^d Based on Twigger-Ross and Uzzel (1996)

^e Based on Nasar (2000)

et al., 1977; Berkel & Verburg, 2014). However, methodically it can be quite difficult to carry out such kind of studies. Past studies have shown that, especially in the case of questionnaires, besides the personality and the socio-economic profile of an observer, also the location affects what he/she observes or means (Amir & Gidalizon, 1990). While carrying out surveys and interpreting their results can be difficult, they offer an insight into how humans perceive the attributes and qualities that contribute to what we believe is a landscape.

The questionnaire was available in German and Italian. To test the comprehensibility of the questionnaire we carried out a pre-test for the final questionnaire with 97 students of the University of Innsbruck.

The interviews were carried out during 2010 with the aim to collect a representative sample in the two study regions. Therefore, the interviewers got directly in touch with the single study participants, gave them a brief introduction to the project and asked them to fill in the questionnaire. The participants compiled the questionnaire without any help of the interviewers. Such face-to-face interviews offer advantages over self-completion methods such as postal and online surveys, because respondents are more likely to give their undivided attention when an interviewer is present. The interviewers can also help in the case the study participants should have difficulties in understanding – of course, without introducing bias by leading the study participant or explaining the questions in own words. In order to standardize the survey procedures all interviewers

were prepared and trained for the interview process. In total, 880 locals (358 Tyroleans and 522 South Tyroleans) and 1736 tourists (783 /Tyrol, 953/ South Tyrol) were interviewed. The questioning of the locals was handled by a professional polling institute (Sinfotel Service Center) between October 2010 and February 2011. The sample of the locals was statistically representative regarding age, gender and urban-rural distribution (cf. Fig. 2). In addition, since the questionnaire was available in German and Italian, it was possible to cover two of the three official languages in South Tyrol. To obtain a representative tourist sample, a group of five collaborators of the University of Innsbruck and the EURAC went to various sites of touristic interest in summer 2010 (lakes, cableways, cultural sights, huts etc., cf. Fig. 2) in order to reach a broad range of study participants (e.g. active holiday makers, urban tourists, families, seniors). The interviews were conducted in different contexts, at different times and with different weather conditions to keep any bias as minimal as possible.

2.4 Statistical approach

Confirmatory factor analysis (CFA) was used to test the established measurement model and its appropriateness in order to obtain insights in the human-landscape relationship. Additionally, the method was applied to investigate whether the same measurement model holds across the two samples (tourists and locals).

First, the model was estimated for the sample of the tourists and the locals separately in order to analyse the suitability of the measurement model and the generalizability within these two populations. Second, an examination of measurement invariance enabled to determine whether the items and the underlying constructs meant the same to both groups (Cheung & Rensvold, 2002). Therefore, we used multiple-group CFA to conduct a sequence of increasingly more restrictive tests of invariance across the tourists and the locals. On the basis of extensive simulations, Cheung & Rensvold (2002) determined that a Δ CFI value higher than

0.01 was indicative of a significant drop in fit and invariance was violated. Supplementary, a sub-sample approach was applied that enables both distributional free post-hoc tests at a fixed overall significance level and an investigation of the stability of the findings. For this purpose 1,000 subsamples of size 880 were randomly drawn from the population of the tourists. For each subsample the model was estimated and all relevant criteria were computed. Therewith the distributions of all regression weights and characteristics were obtained. 95% - confidence intervals were computed for each parameter using the empirical distribution of the sub-samples with sample size 880, the same as for the locals. In order to keep the appropriate significance level, a Bonferroni-Holm correction was applied.

The confirmatory factor analysis (CFA) was computed using the software AMOS 18.0.0.

3 Results

The factor “feeling of security” comprises the three items “security”, “safety” and “familiarity”, the factor “feeling of stimulation” the five items “complexity”, “fascination”, “mystery”, “particularity”, “compatibility” and the factor “feeling of self-direction” the two items “autonomy” and “being-away”. The reliability of scale-items relative to their hypothesized dimensions was adequate (Cronbach’s alpha > 0.6), with one exception for the tourists, but still acceptable (cf. Table 3). Therefore, all factors showed acceptable internal consistency.

The item means were significantly below the scale’s neutral value of 3 (Table 3) indicating that both groups showed consistent preferences and a high level of acceptance for each of the items (the one sample Wilcoxon signed rank test indicated median values significantly below 3, too).

Confirmatory factor analysis (CFA) revealed highly significant (p -value < 0.01) standardized regression coefficients. All were larger than 0.5 with one

Table 3: Descriptive statistics for each item respectively for each related concept together with Cronbach’s alpha (α) for the factors are shown. SE is the abbreviation for standard error of mean, n denotes the sample size – and α if deleted gives the value of Cronbach’s alpha if the item in the corresponding row is excluded from the computations.

Factors and item	Locals (n = 880)				Tourists (n = 1736)			
	Mean	SE	α	α if deleted	Mean	SE	α	α if deleted
Feeling of security			.667				.766	
Security	1.52	.031		.621	1.50	.036		.683
Safety	1.42	.029		.557	1.28	.031		.731
Familiarity	1.54	.033		.498	1.64	.039		.635
Feeling of stimulation			.636				.523	
Complexity	1.77	.028		.600	1.77	.042		.434
Fascination	2.01	.033		.582	1.59	.038		.444
Mystery	2.34	.037		.548	2.50	.060		.454
Particularity	1.79	.029		.633	1.77	.043		.489
Compatibility	2.06	.033		.554	1.93	.046		.470
Feeling of self-direction			.612				.618	
Autonomy	2.10	.039		---	2.02	.048		---
Being-away	2.69	.042		---	2.21	.053		---

Table 4: As goodness of fit measures the relative χ^2 (χ^2/df , df denotes the degrees of freedom), the goodness of fit (GFI), the adjusted goodness of fit (AGFI), the comparative fit index (CFI), the standardized root mean squared error (SRMR), the root mean squared error of approximation (RMSEA) and its 90%-confidence interval were computed. Obtained model fit indices with recommended values (e.g., Byrne, 2006) are given for the locals and for the tourists.

Statistic/Model characteristics	fit	Recommended value	Obtained value	
			Locals	Tourists
χ^2			93.962	85.632
df			32	32
χ^2/df		< 5 (3)	2.936	2.676
Goodness of fit (GFI)		> 0.9	0.959	0.960
AGFI		> 0.9	0.930	0.932
CFI		> 0.9	0.931	0.899
SRMR		< 0.08	0.057	0.058
RMSEA		< 0.05	0.047	0.044
90%-CI for RMSEA		Upper limit < 0.1	[0.036, 0.058]	[0.033, 0.055]

Table 5: Obtained values for the factor reliability, average extracted variance and discriminant validity are given.

Factors	Reliability ρ_f		Average extracted variance $\rho_{vc(f)}$		Discriminant validity Squared inter factor correlations	
	Locals	Tourists	Locals	Tourists	Locals	Tourists
Feeling of stimulation [1]	0.682	0.643	0.309	0.266	[1] - [2] 0.017	[1] - [2] 0.026
Feeling of security [2]	0.755	0.653	0.510	0.388	[1] - [3] 0.518	[1] - [3] 0.292
Feeling of self-direction [3]	0.708	0.701	0.499	0.545	[2] - [3] 0.001	[2] - [3] 0.029

Note:

$$\rho_f = \frac{\left(\sum_{i=1}^p \lambda_{fi}\right)^2}{\left(\sum_{i=1}^p \lambda_{fi}\right)^2 + \sum_{i=1}^p Var(\varepsilon_i)}$$

and

$$\rho_{vc(f)} = \frac{\sum_{i=1}^p \lambda_{fi}^2}{\sum_{i=1}^p \lambda_{fi}^2 + \sum_{i=1}^p Var(\varepsilon_i)}$$

where λ_{fi} indicates the standardized estimate of the correlation between factor f ($f = 1,2,3$) and item i ($i = 1, \dots, p$), and $Var(\varepsilon_i)$ is the variance of the individual measurement errors.

exception for the locals (item “particularity” had a smaller loading of 0.39).

Model fit was evaluated employing various fit indices which are given in Table 4 together with their recommended values. As only the comparative fit index (CFI) for the tourists did slightly not meet the required threshold, the three-factor model produced an appropriate fit to the data. Hence, the suggested model proved to be successful in describing landscape preferences both for tourists and locals.

Given these appropriate fit results for the factor model we examined the reliability, average variance extracted and the discriminant validity of the three factors using the stringent procedure outlined by

Fornell & Larcker (1981) and recommended by Podsakoff et al. (2000).

For both interest groups factor reliability was satisfactory, i.e. all $\rho_f > 0.6$ (cf. Table 5). However, the average extracted variance ($\rho_{vc(f)}$) of the factor “Feeling of stimulation” was less than 50% and regarding the tourists also for the factor “Feeling of security”. As a small amount of explained variance in the items by the factor could cause instable results, the findings of the sub-sampling approach were investigated concerning this matter. Both the deviation of the sub-sampling estimates of all regression parameters and the deviation of their standard errors were very small (less than 3.3% with respect to the parameter estimate with the entire sample) indicating stable and reliable results in order

to be able to proceed with our analysis (using the bootstrap approach the results were even better).

In terms of discriminant validity, the factor “Feeling of security” had no significant correlation with the other two factors for both samples. The discriminant validity criterion was violated regarding the factors “Feeling of Self-direction” and “Feeling of Stimulation”. Those two factors are not completely independent of each other for both samples indicating a close contentual connection between these two factors.

The previous CFAs enabled us to test the appropriateness of the model underlying human-landscape relationship within each sample. Still, evidence is lacking that the established measurement model is invariant across these two interest groups. A sequence of increasingly more restrictive tests of measurement invariance was conducted (detailed results are given in Tables 3, 4 and 5). The first test specified that across the two samples all factors had the same variable loadings on them. Investigating the

criteria, $\Delta CFI = 0.039 > 0.01$, the null hypothesis had to be rejected and we concluded that at least one item’s loading was significantly different between the locals’ and the tourists’ sample. In order to find out which of the items caused the significant difference in the fit, the results of the sub-sampling approach were employed. A 95%-confidence interval (CI) for all standardized regression weights was computed. The confidence level was kept at 95% (therefore the CIs were calculated using a 99.5% level of confidence in order to guarantee the appropriate overall confidence level). All standardized regression weights of the locals fell into the confidence interval of the tourists except the regression weights belonging to the items “familiarity”, “mystery”, “compatibility”, and “autonomy”. The estimates of the locals were for all of these variables slightly larger (cf. Fig. 3) indicating that these variables correlated higher with the corresponding factor for the locals than for the tourists. Accordingly, the concepts of familiarity, mystery, compatibility and autonomy are slightly more important for locals than for the tourists.

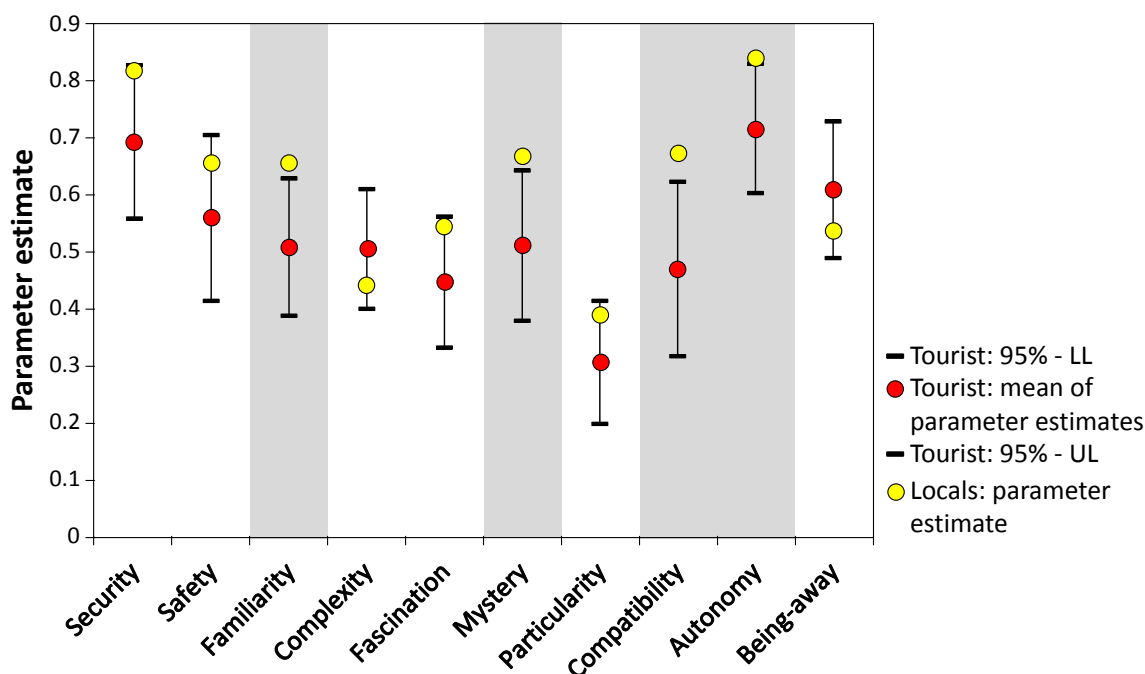


Fig. 3: The results of the sub-sampling approach are shown. The lower limit (LL) and the upper limit (UL) of the 95%-confidence interval for each item are given. The overall confidence level was kept at 95% by applying a Bonferroni-Holm correction. A statistically significant difference in the parameter estimate of the locals from the one for the tourists is indicated by the shaded columns.

After identifying the differences in factor loadings, the results for the invariance of the error variances of the items across the samples were investigated (Table 3). Although the fit was still acceptable, this set of constraints could not be considered invariant because ΔCFI was 0.078, exceeding the critical value of Cheung & Rensvold (2002). To understand better why the set of error variances was not equivalent, we inspected the estimates. This analysis revealed a significant difference across the samples of two out of ten error variances. The variances of “familiarity” and “fascination” were higher for the tourists than for the locals indicating that the reliabilities of these items were lower for the tourists. This result indicated a slightly different interpretation of these items between locals and tourists. Under the heading of partial measurement equivalence in terms of error variances we removed the equality constraint on these two error variances. The revised model did not result in a significant drop in fit ($\Delta CFI = 0.001$).

Finally, we tested for the invariance of factor variances/covariances across the samples. We examined whether each of the three factors showed equal variance across the samples, and whether the interrelations among these factors were the same. This test supported invariance of factor variances/covariances as ΔCFI was less than 0.01.

4 Discussion

Locals' and tourists' landscape preferences can be modelled employing the suggested factors: both groups prefer landscapes that offer security as well as stimulation and possibilities for personal fulfilment. Accordingly, locals and tourists generally do not differ in the way they experience and assess the landscape.

The existence of these three factors corroborates findings from other studies which name security, stimulation and self-direction as central in different contexts of human-landscape interaction. Especially the importance of the factor of security is confirmed

by a Scandinavian study in Helsinki concerning social value mapping of urban green areas (Tyrväinen et al., 2007). The case-study identified peacefulness not only as one of the most important values associated with favourite places and landscapes, it was also suggested to be a central feature that most people want to experience in their home environment. In turn, the most negatively experienced areas were described *inter alia* as scary.

Furthermore, our suggested factors are often mentioned in relation with the concept of place attachment, which analyses the emotional bond between people and important places in their lives (Scannell & Gifford, 2010). The reasons for why people develop a strong bond with certain places are not yet clarified, but it is speculated that this special connection serves several functions (Chatterjee 2005, Rollero & de Piccolo, 2010). In this context, Billig (2006) names security and safety as central functions of place attachment. In his case study in Gaza region, he showed that place attachment is a central distinctive feature in the context of risk perception: Jews with a strong attachment were more likely to believe that living in the Gaza was safe. Fried (2000) corroborates this finding by arguing that people are likely to remain close to places they feel attached to because they offer a feeling of security and protection. According to our findings, this experience of security and safety, in turn, strengthens self-confidence and allows for exploration.

Furthermore, place attachment and the related feelings of security, stimulation and self-direction are also important in the context of social capital. A research review concerning the development of the concept of place attachment over the last 40 years argued that places, which can offer on one hand security and refuge and on the other hand challenge, novelty and prospect are often subject to the most intense attachments (Lewicka, 2011). This, in turn, enhances the development of social capital and the associated benefits (e.g. economic productivity, cf. Halpern 2005). Finally it can be stated, that the above mentioned findings regarding place attachment and its related values clearly corroborate our results.

Another concept referring to human-place relationship is the often discussed concept of place meaning (Smith et al., 2011, 2012; Wynveen et al., 2012). Farnum, Hall & Kruger (2005) indicate that, in contrast to place attachment, place meaning includes individuals and their experience with their environment and their experiences related with a location. A case study in the US concerning place meanings and desired management outcomes (Smith et al., 2011) examined different dimensions of place meanings, inter alia the dimensions of self-expression and self-efficacy, which seem to be particularly relevant for our study, as they are comparable to our values of self-direction and stimulation. In this context, self-expression is associated with how places provide opportunities for individuals to convey their self-fulfilment. This concept is closely related to both stimulation and self-direction as it includes the feelings of compatibility, stimulation, autonomy and independence.

The second related dimension is self-efficacy, which represents the meanings associated with doing things or spending time in the related place. In this context, the dependence of specific types of leisure-time activities is one of the most obvious examples of self-efficacy meanings. This, in turn, is clearly comparable to the values of compatibility and, subsequently, to the feeling of stimulation.

Last but not least, the importance of the factors security, stimulation and self-direction as central human value orientations is supported by Schwartz (1992, 1994a, 1994b), who presents in his work of value content and value structure ten motivational types of values, inter alia our three suggested factors. According to Schwartz (2001), these factors are of similar importance when describing the preferences for the same landscape, but from different views, i.e. locals and tourists. With our study, we can even go one step further by saying that these factors are also of equal value in different nations and cultures.

The theoretical model developed in the course of this study is, in general, able to describe the landscape preferences of locals and tourists. However, there are slight differences between the groups in the concrete

manifestation of some concepts. Accordingly, the impact of the factors on the concepts of familiarity, mystery, compatibility and autonomy is slightly more important for locals than for the tourists. A finding that does not really surprise as especially the concepts of familiarity, compatibility and autonomy describe an ideal home landscape.

The model presented in this study is has been built on the basis of selected well-established theories regarding the human-landscape interaction available at that time. Since then, important progress has been made in the field of constructivist landscape research. In accordance with a variety of possible factors influencing the landscape development, a multitude of constructivist landscape approaches have been developed that aim at exploring the complex human-landscape relationship more and more in detail and contribute, thus, to a pluralistic landscape planning (cf. Gailing & Leibenath, 2015; Kühne, 2009; Leibenath, 2013; Leibenath & Otto, 2014). These approaches, which can partly overlap, are based on different assumptions, have different implications and contribute, thus, to a fruitful discussion and continuous improvement of the social construction of landscapes. The historical institutionalism, for instance, points to the importance of rules and norms that influence the acting of individuals or groups and it assumes that the material and social sphere are separated (cf. Gailing & Leibenath, 2015). The phenomenological constructivism, instead, assumes the social reality to be a construct (cf. Leibenath 2013) and Leibenath (2013) goes one step further by adding the assumption that this social reality is constructed through and via the language. The discourse theory, which can be seen as an important basis of constructivist landscape research, assumes that landscapes are systems of meaning, which includes all what is material and social (cf. Gailing & Leibenath, 2015; Leibenath & Otto, 2014). Recent studies have contributed to a better understanding and an empirical application of the discourse theory (Gailing & Leibenath, 2015; Leibenath & Otto, 2014).

In a future approach, these new developments around the social construction of landscapes should be taken into account. In any case, the obtained

results provide a valuable source of information that can contribute to a better understanding of the human-landscape relationship.

5 Conclusions

An essential result of our investigation is that both locals' and tourists' landscape preferences can be traced to at least three generally valid factors. The feelings of security and stimulation in connection with the possibility to self-direction: these are important ingredients for a positive human-landscape interaction.

With regard to future land-use and regional development planning, we suggest that landscape planning and management should ensure that people get the possibility to experience all of these three feelings in a landscape. Transferred to practice, this may mean that locals as well as tourists feel comfortable with varied landscapes that provide both clearly and neatly arranged structures that do not hide surprises; and open, disordered and complex spaces that can offer challenge and stimulation for individual fulfilment. The presence of this variety of landscapes seems to be a key feature of a positive and sustainable landscape development.

Moreover, our results give a strong indication that locals' and tourists' agree on many aspects of landscape assessment, their expectations regarding landscape are not as conflicting as often discussed.

Finally, compromises in landscape planning between locals' and tourists' requirements often do not seem to be necessary as both groups are satisfied if the three factors are given at a high level.

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