atmosphere

MDPI

Article

Rain, Rain, Go Away, Come Again Another Day. Weather Preferences of Summer Tourists in Mountain Environments

Robert Steiger [1,2,*], Bruno Abegg [2,3] and Leandra Jänicke [3]

[1] Institute of Public Finance, University of Innsbruck, Universitätsstraße 15, 6020 Innsbruck, Austria
[2] Institute of Geography, University of Innsbruck, Innrain 52, 6020 Innsbruck, Austria; bruno.abegg@uibk.ac.at or abegg@alps-gmbh.com
[3] alpS GmbH, Grabenweg 68, 6020 Innsbruck, Austria; jaenicke@alps-gmbh.com
* Correspondence: robert.steiger@uibk.ac.at; Tel.: +43-512-5077-0220

Academic Editors: Daniel Scott and Stefan Gössling
Received: 8 April 2016; Accepted: 26 April 2016; Published: 29 April 2016

Abstract: Weather and climate are important factors for travel decision-making and overall tourist satisfaction. As central motivators for destination choice, they directly and indirectly influence demand patterns and can be a resource and limitation for tourism at the same time. In this paper, results of an *in-situ* survey of mountain summer tourists (n = 733) in the Alps in Southern Germany are presented. Respondents rated 'rain' as the most important aspect of weather during their holiday. During a 7-day holiday, 2.1 days of continuous rain are accepted, and 3.1 days of days with thunderstorms. The ideal temperature range is between 21 and 25 °C, thus lying 4–7 degrees lower than for beach tourism. Temperatures below 15 °C and above 30 °C are perceived as unacceptable. Statistically significant differences were found for several tourist types: Older tourists are more sensitive to heat, tourists with sports activities are more tolerant to cool temperatures, first-time visitors are more sensitive to rain and families with children prefer higher temperatures. From the results, some implications for mountain destinations arise: mountain destinations could be promoted as a heat refuge, and attracting sports tourists might be a promising way to reduce weather sensitivity; however, some variety of well-promoted weather independent attractions seems to be mandatory.

Keywords: climate; tourism; tourist; weather; sensitivity; preferences; alpine summer tourism; mountains; Germany

1. Introduction

Climate and weather are important resources and influencing factors in the tourism system. For destinations, climate often is an integral component of the image and it is the basic precondition for many tourism products (e.g., snow-based tourism). For tourists, climate information is relevant in the pre-trip phase for timing of the holiday, destination choice and planned activities. During the trip, weather has a major impact on available activities, holiday experiences and overall satisfaction [1], which may influence future travel behavior [2].

Four main approaches to investigate the tourism-climate interface can be distinguished: (1) climate indices; (2) revealed preferences; (3) observed on-site and recollected past behavior of tourists; and (4) stated behavior and preferences. The topic of climate change has fundamentally increased the number of publications in all these categories, because it adds dynamics to a formerly perceived static system.

Climate indices are used to assess the climatic suitability of a location for tourism purposes and to compare climatic attractiveness between destinations. Mieczkowski [3] was the first to apply an expert-based tourism climate index (TCI) on a global scale. This index was subsequently used

to assess potential changes in climatic attractiveness for tourism due to climate change (e.g., [4–6]). Other scholars adapted the TCI specifically for beach tourism [7,8]. A major limitation of the TCI is that the rating and weighting of weather variables were not empirically tested. These limitations were overcome by further advancements, *i.e.*, the climate index for tourism (CIT) [9] and the holiday climate index (HCI), with the latter distinguishing between urban and beach tourism [10].

Tourists' weather preferences can be revealed by investigating statistical relationships between demand indicators (e.g., attendance, overnight stays) and weather/climate variables. Thus, the overall impact of weather and/or climate on tourism demand including (unknown) adaptation of tourists can be identified. With identified relationships, potential changes in the temporal and regional distribution of tourist flows can be modeled. Applications of that approach exist for destinations on a global [11], regional [12–15] and local scale [16]; and for specific tourist attractions like national parks [17], golf courses [18] and ski areas [19,20].

Observed real behavior of people in tourism environments (e.g., a beach) allows identifying the limits of acceptance and tolerance of weather conditions [21]. Furthermore, on-site adaptations of tourists, e.g., through hiding in the shade, use of clothes *etc.*, can be derived [22]. Recollected experiences with weather conditions also give insight into real behavioral adaptations, incorporating greater spatial and temporal scales than possible in observed behavior studies [2].

With stated-behavior of tourists conducted in interviews or surveys, the impact of hypothetical situations on tourist behavior can be assessed and tested. This approach was frequently used for assessing potential impacts of snow deficient winter seasons on tourism (e.g., [23–25]), more recently focusing on spatial redistributions of demand [26,27]. Applications for the summer season exist for mountain tourism [28], investigating whether climate change would have beneficial impacts, and beach tourism [29] looking at stated behavior to media reports about heat waves in the Mediterranean. Stated preferences studies are used to derive perceived ideal, acceptable and unacceptable weather conditions and thresholds. Apart from general assessments [30], there are studies focusing on beach tourism (e.g., [10,29,31–33]), urban tourism [10,29,34], mountain tourism [35,36] or camping tourism [37]. These studies show that tourists' weather preferences differ between tourism environments, such as beach, urban and mountain tourism. Further differences were identified between nationalities [36,38]; tourists coming from temperate and tropical climate regimes [39]; tourists travelling domestically and internationally [40]; and tourism segments: elderly people seem to be more sensitive to heat, but also less sensitive to cold than younger tourists [34,35,39]. Nevertheless, Rutty and Scott [39] conclude that "interaction between climate preferences and age or other socio-demographics (e.g., travelling with children) remains insufficiently understood" (p. 266).

In this paper, we want to address some of the knowledge gaps with an *in-situ* survey conducted with overnight tourists in a mountain destination in Bavaria (Germany). To our knowledge, only two studies exist to date specifically dealing with mountain tourism [35,36]. Both were conducted *ex-situ*, one with a limited number of respondents complicating further segmentation of the sample [35], the other using a convenient sample of university students with limitations concerning representativeness [36]. Furthermore, we want to investigate potential differences between tourism segments by age, activity, family status and travel experience.

2. Methods

The survey was conducted in ten municipalities in the district of Miesbach (Bavarian Alps, Southern Germany; Figure 1) during the last week of August 2014 (Table 1). The region is a nationally renowned tourism destination with 2.1 million overnight stays (65% thereof in the summer half year). Tourists were randomly chosen in populated areas such as town centers, lakes, mountain huts *etc.* and were asked to fill out the questionnaire, provided that they stayed at least one night in this region for recreational purposes. As 92% of tourists in this region come from Germany, only German-speaking tourists were surveyed.

Figure 1. Survey region.

Table 1. Technical specifications of the survey.

Specification	This Survey
Type of survey	*In-situ* survey (questionnaires) with German speaking tourists (=a stay of at least 1 night)
Place	Touristic points of interest in ten municipalities in the district of "Miesbach" (Bavarian Alps, Southern Germany)
Time of survey Duration of survey Valid questionnaires	25–29 August 2014 Approximately 10 min n = 733
Data scale used for weather preferences	Ordinal (5-point Likert scale) and metric

The questionnaire was structured into three parts: information on the holiday (e.g., timing of booking, motives, and activities), weather preferences and acceptable thresholds, and socio-demographics. In order to enable comparison with existing studies on tourists' weather preferences, we tried to use established types of questions [39], e.g., respondents had to state the relative importance of weather parameters on a 5-point Likert scale, and encircle ideal and non-acceptable temperature ranges [29]. For rain, we distinguished between days with longer-lasting, continuing rain, and days with showers caused by thunderstorms and asked for the acceptable threshold (days) within a one week holiday. This is in contrast to Rutty and Scott [39], who offered categories of duration of rain in minutes/hours per day to be chosen. The ideal sky condition was operationalized by weather symbols in five categories (from sunny to very cloudy). For wind, no subsequent question related to its relative importance was provided, as it proved to be the least important weather parameter in previous studies [29,36,39], and because it is probably difficult for tourists to estimate wind speed in a mountainous environment.

Common limitations of *in-situ* surveys also apply for this study. As a matter of fact, our sample only consists of tourists that chose to go on a holiday in this region. Tourists who perceive the climate in this region to be generally unsuitable are thus not covered by our sample. Furthermore, the survey was conducted on five consecutive days, where continuous good or bad weather could significantly affect weather perceptions. Fortunately, the weather was a mix of cool rainy and warm sunny days, being typical for that region in summer, so we do not expect the sample to be biased due to extraordinary good or bad weather.

3. Results

In total, 733 valid questionnaires were collected. The sample consists of slightly more male (51.2%) than female respondents (48.8%). The average age is 53; almost three quarters of the sample are 45 years or older (<25: 3.5%; 25–34: 8.8%; 35–44: 15.9%; 45–54: 23.2%; 55–64: 22.8%; 65 and older: 25.8%). The age structure of the sample corresponds well with other tourist surveys in the region [41] and is thus considered to be representative of summer tourists in this destination.

The most important reason for choosing this destination is the attractive landscape, followed by good accessibility and culture (Table 2). Pleasant climate is obviously not the main attraction for tourists in this region.

Table 2. Factors for destination choice.

Factors	Chosen as			Sum
	Main Reason	Second Most Important Reason	Third Most Important Reason	
Attractive landscape	65.4%	18.9%	6.0%	90.3%
Good accessibility	10.8%	16.0%	13.3%	40.1%
Culture	4.7%	17.8%	16.3%	38.8%
Variety of leisure activities	5.2%	13.1%	14.5%	32.8%
Pleasant climate	4.0%	16.6%	8.0%	28.6%
Price	0.9%	3.4%	5.1%	9.4%
Other	9.0%	5.6%	8.3%	22.9%

The main motive for the mountain holiday is "relaxation" (73.1%), followed by "sports activities" (15.4%). As hiking is the main activity for 51.3% of respondents, it can be assumed that the majority of respondents perceives physical activity as an important component of relaxation in their holiday.

In order to analyze potential differences in weather perception between tourism segments, additional variables were generated based on travel and socio-demographic information: first-time visitors (51%) and repeat visitors (49%); tourists with sports (*i.e.*, hiking, cycling) as the main activity (55%) and less physical activity (*i.e.*, sun bathing, golfing, sightseeing; 45%); older (65 and older) (26%) and younger age groups (74%); and tourists with children below the age of 16 (23%) and tourists travelling without children (77%). In the latter group, respondents older than 50 years were excluded from the sample, as there is a high negative correlation of respondents with children and age, and consequently differences between respondents with and without children could also be caused by the age of respondents and not by the family status.

Little rain was rated as the most important aspect of weather for a holiday in the Bavarian Alps (Table 3), closely followed by sunshine and pleasant temperatures. Wind was much less important, but with a larger standard deviation.

Table 3. Importance of weather aspects for a holiday in the Bavarian Alps.

Weather Aspect	Mean Value (5-Likert Scale)	Standard Deviation
Little rain	4.33	0.948
Sunshine	4.20	0.954
Pleasant temperatures	4.16	0.964
No strong winds	3.17	1.237

Statistically significant differences in tourists' assessment of weather aspects were found with age, activities and if they were first-time visitors. In the older age group (65 and older), the order of importance differed, as pleasant temperatures were rated as the most important aspect of weather (Table A1 in the Appendix). Sunshine was less important for respondents preferring sports activities (*i.e.*, hiking, cycling) (4.14) than for respondents with non-sports activities (4.27). The same applies to repeat-visitors (4.12) compared to first-time visitors (4.27).

Respondents were subsequently asked about ideal and/or unacceptable conditions of each of these meteorological parameters except wind (see methods section). During a one-week holiday in the Bavarian Alps, the average acceptable number of days with continuous rain is 2.1 and for thunderstorm-like showers it is 3.1 days (Figure 2). The standard deviation is higher for days with thunderstorms (SD = 1.84) than for days with continuing rain (SD = 1.24). For continuous rain, significant differences were found between first-time (2.04 days) and repeat-visitors (2.25 days), and between tourists travelling with children (2.15 days) and without (1.97 days). The acceptable number of days with thunderstorms differed significantly in almost all analyzed tourism segments, with first-time visitors (2.92 compared to 3.22 days), older respondents (2.75 compared to 3.18 days) and tourists with non-sports activities (2.9 compared to 3.2 days) being more sensitive to thunderstorms.

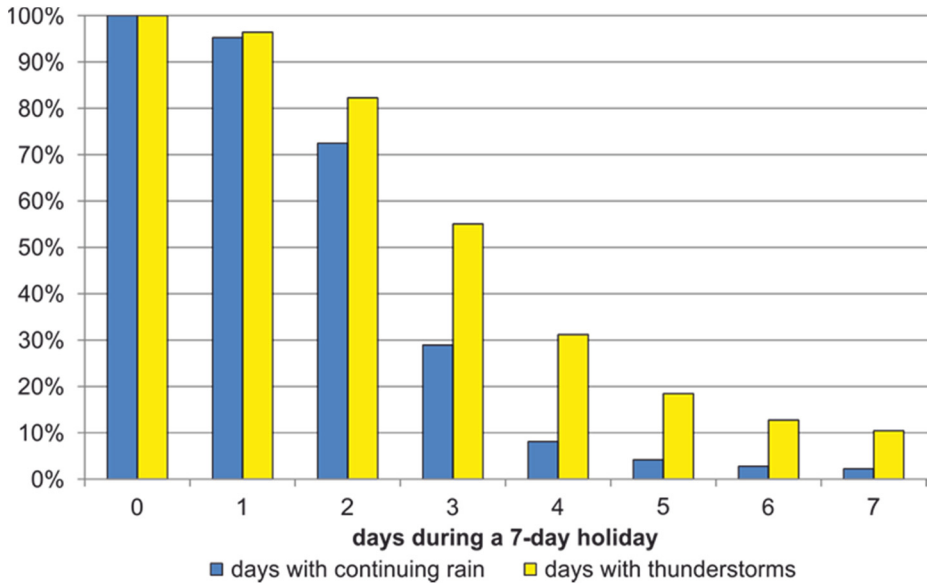

Figure 2. The acceptable number of days with rain during a 7-day holiday.

The sky condition perceived as 'ideal' during the holiday is 'slightly cloudy' (72.7%), followed by 'sunny' (13.7%) and 'cloudy (12.1%), with no significant differences between the segments. Note that the wording 'ideal' likely leads to different answers than 'acceptable'. In our case though, 'sunny' obviously was not perceived as being the optimal condition. This may be due to health concerns, e.g., more intense radiation at higher elevations.

The temperature range (Figure 3) perceived as ideal for a holiday in the Bavarian Alps is between 21 and 25 °C (median of the sample). Significant differences were found with regard to age, activities and family status. The lower threshold of the ideal temperature range is lower for respondents engaging in sports activities (21.1 °C) than for respondents not engaging in sports activities (21.57 °C) and also lower for tourists without children (21.05 °C compared to 21.92 °C). The upper threshold of the ideal temperature range is lower in the older age cohort (24.39 °C) than in the younger age cohort (25.05 °C). The same pattern can be seen for travelers without children (24.82 °C) compared to families with children (25.69 °C).

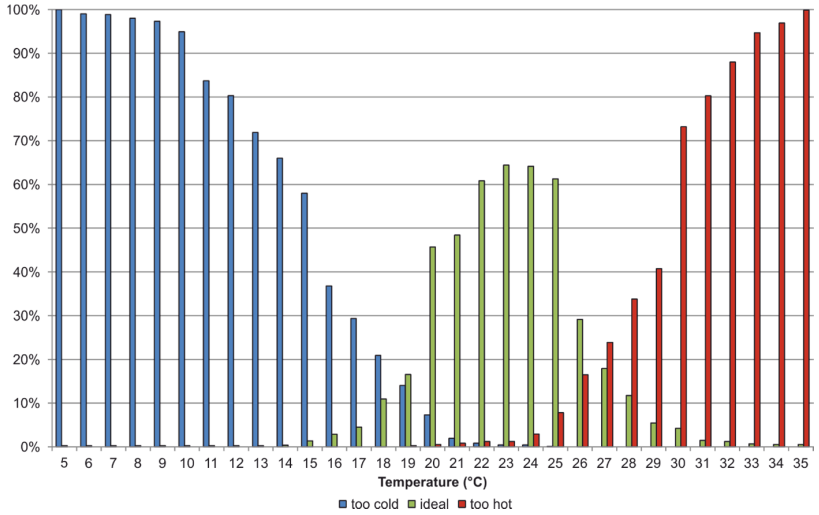

Figure 3. Temperatures perceived as ideal, too hot and too cold. Note: The remaining percentages to 100% are not shown for better readability and refer to temperatures not being chosen by respondents, thus being neither too cold, ideal or too hot.

The majority of respondents perceived temperatures ⩾30 °C as 'too hot' and ⩽15 °C as 'too cold' (Figure 3). Significant differences for the heat threshold exist between first-time visitors (29.55 °C) and repeat-visitors (29.17 °C), the younger (29.55 °C) and the older age cohort (28.85 °C) as well as for families with and without children (30.27 °C and 29.52 °C, respectively). For the 'too cold' threshold, significant differences were found for families with and without children (15.61 °C and 14.54 °C, respectively) and tourists with and without sports activities (14.35 °C and 14.92 °C).

The distribution of stated thresholds of ideal, too hot and too cold temperature shows that convenient numbers were chosen far more often than other temperature values (Figure 4), although we did not ask for a single temperature value (like e.g., [36]) but for a range of ideal and unacceptable temperatures. For the lower threshold of the ideal temperature range, a clear peak at 20 °C can be seen (30% of respondents). For the upper threshold of the ideal temperature range, the peak is at 25 °C (33%). The threshold for temperatures perceived as too cold has a major peak at 15 °C (21%) and a minor peak at 10 °C (11%). The 'too hot' threshold shows a clear peak at 30 °C (32%). This may indicate that a considerable share of respondents was challenged by 1 °C increments in the temperature scale and thus many respondents rather chose the 'easy' numbers.

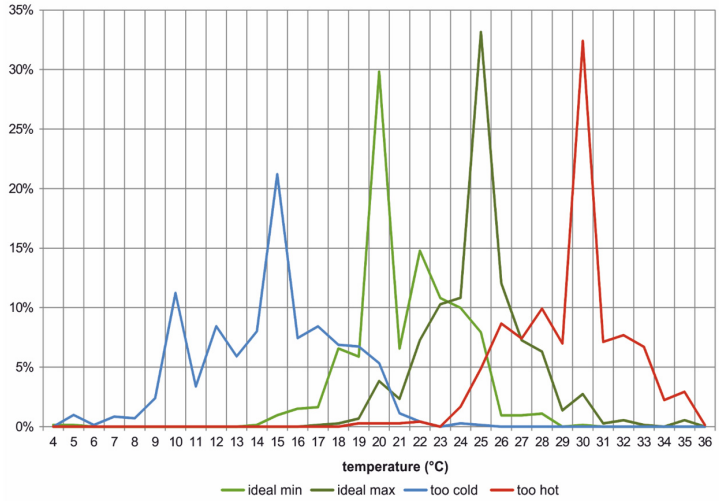

Figure 4. Distribution of answers for ideal and unacceptable temperatures.

4. Discussion

To our knowledge, this is the first *in-situ* assessment of mountain summer tourists' weather preferences; some main findings from previous *ex-situ* assessments [35,36] can be confirmed (Table 4): Rain is the most relevant weather aspect in a mountain tourism environment, while wind is the least relevant. In our sample, sunshine was rated more important than temperature, but with only little difference in average rating between these two aspects. The ideal sky condition is 'slightly cloudy', confirming Scott *et al.* [36] '25% cloud cover'. Temperatures $\geqslant$ 30 °C are perceived as 'too hot' in our sample, consistent with Dubois *et al.* [35]. As their threshold for 'too cold' was noted to be unreliable, our threshold of 15 °C adds some new detail to temperature preferences of summer tourists in the mountains.

Table 4. Main results compared to other mountain tourism studies.

	Scott *et al.* (2008) [36]	**Dubois *et al.* (2009) [35]**	**This Study**
Ranking of weather parameters	(1) rain (2) temperature (3) sunshine (4) wind	(1) rain (2) temperature (3) sunshine (4) wind	(1) rain (2) sunshine (3) temperature (4) wind
Ideal sky conditions Ideal temperature Temperature thresholds (too cold/too hot)	25% cloud cover 20.5 °C not asked	not asked not asked 9 °C [a]/30 °C	Slightly cloudy 21–25 °C 15 °C/30 °C
Number of acceptable days with rain (mean)	not asked	not asked	2.1 days (cont. rain) 3.1 days (thunderstorm showers)
Sample	*Ex-situ*, convenience sample (students), n = 831	*Ex-situ*, Internet-User, m (mountain tourists)	*In-situ*, overnight guests, n = 733

[a] Dubois *et al.*'s [35] comment: "unreliable since the sample contains a small part of spring holidays" (p. 12).

New findings from our study for mountain tourism include the temperature range perceived as ideal, the acceptable number of days with rain and differences of weather preferences between several tourist groups. The ideal temperature range for the majority of respondents in our sample is from 21 °C to 25 °C. The lower boundary of the ideal temperature is close to Scott *et al.*'s [36] arithmetic mean of ideal temperature of 20.5 °C, but it is barely comparable as different questions were asked. Comparing our results with a sample of beach tourists using the same questions [39] reveals considerable lower thresholds (by 4–7 °C) for a mountain tourism environment.

The acceptable number of days with rain depends on the type of rain: temporary showers caused by thunderstorms are more acceptable than continuing rain. While outdoor activities can still be executed on days with thunderstorms predominantly occurring in the second half of the day, continuing rain prevents many outdoor activities or makes these activities rather unpleasant. Respondents accept two days of continuing rain during a one-week holiday probably because some rainy days are to be expected in this climate and the region offers some variety of indoor tourist activities.

One important finding in our study is that preferences can vary between certain tourist types. Older tourists appear to be more sensitive to heat, which might also be the reason why 'pleasant temperature' is the most important weather aspect opposed to 'rain' in all other groups. An age-dependent increasing sensitivity to heat is medically proven and caused by a range of physiological reasons [42]. The sensitivity to heat differing by age was also mentioned by other authors in the tourism climate literature (e.g., [35,39]), but so far—to our knowledge—did not turn out to be statistically significant as in our case.

Tourists practicing sports activities are more tolerant towards cool temperatures, rainy days and cloudiness. One reason might be that physical activity increases body temperature and consequently lower temperatures are more likely to be tolerated. Another reason could be that the physical activity itself is the primary motivation and thus less favorable weather conditions are accepted more easily.

Repeat-visitors are less sensitive to rainy days (both continuous rain and thunderstorms) than first-time visitors. Past experiences with rainy weather in this region and knowledge of alternative indoor activities are likely reasons for that lower sensitivity to rain.

Families with children prefer higher temperatures than tourists without children. This may be due to the fact that cooler temperatures require more clothing and can reduce the time that can be spent outdoors with children. Why families also accept a higher number of days with continuous rain remains unknown.

The results, however, also raise methodological issues. For temperature, respondents tended to choose convenient values (e.g., 15 °C, 20 °C, *etc.*). While this is important knowledge for weather information services and marketing [43], the suitability of derived thresholds for preference-based tourism climate indices (e.g., [9,10]) is limited, because a gap between stated preferences and real experienced temperatures must be expected. This gap is likely to produce different results in *ex-situ versus in-situ* studies. In *in-situ* surveys, current weather conditions can affect responses and perceptions both positively and negatively. To some extent, this could be alleviated with repeated survey campaigns during one summer season. Still, current experience (*in-situ*) and imagination or memories of past experiences (*ex-situ*) can lead to different results.

Another important concern is differences between tourist groups. As shown, statistically significant differences exist for several weather variables and tourist groups. But, at least for temperature, the absolute differences are rather small, being below a difference of 1 °C in most cases (see Table A1 in the annex). The mentioned gap between perceived or stated temperature preferences and real temperatures as well as the tendency to choose convenient values may result in smaller or larger differences between groups than existing in reality.

The survey campaign lasted for one week and covered one destination only. Although the sample size of 733 respondents is sufficient for detailed analysis and segmentation, another level of detail could be added if the survey campaign was repeated several times during the summer season. This could not be done due to limited time and financial budget. Due to the nature of an *in-situ* survey, we could only include visitors, meaning that we could not capture preferences and perceptions of tourists not travelling to that destination, maybe to some extent because of the expected weather conditions. Thus, we assume that weather sensitivity is lower in our sample than in the entire tourist population, *i.e.*, the German market.

The findings from this study and the methodological challenges raise important questions for future research. In general, socio-demographic segmentation within different types of activities or main motives for the holiday could give further insight into the complexity of weather preferences. The revealed difference between sports and non-sports activities asks for deeper investigations of the weather preferences for different leisure activities. It is likely that a wide range of weather situations is suitable for some activities, while for other activities, more specific (and rare) weather conditions are required. For better understanding the difference between first-time and repeat visitors, research on weather expectation and experienced weather might give some new insight. Weather preferences of families with children are also an important objective for future research, not least to the fact that an increasing number of destinations and hotels focus on this market segment. Further knowledge on the effects of weather-independent attractions on holiday experience and satisfaction could also give important information for reducing the weather dependency and improving the image of destinations.

Finally, three implications for the tourism industry can be drawn from the results. (1) Mountain destinations can be promoted as a cool refuge during hot summer periods, especially for the temperature-sensitive older age group. The record heat summer of 2003 in Europe has shown some potential for increasing demand from populated pre-alpine regions to (especially short-distance) mountain destinations [44]; (2) Attracting more tourists engaged in sports activities might actually reduce weather sensitivity of the destination as this group has shown a higher tolerance towards cooler, wetter and cloudier conditions; (3) Some variety of weather-independent attractions is mandatory.

But the revealed higher sensitivity of first-time visitors to rain puts some emphasis on better promotion of these attractions.

5. Conclusions

The present study adds some new details to the growing body of literature in the tourism-climate interface. It is one of only a few studies [35,36] investigating the weather sensitivity of tourists in a mountain environment and it is—to our knowledge—the only *in-situ* study in this tourism environment. The research indicates that weather preferences and sensitivity differ significantly between tourist types (age, family status, sportive *versus* relaxation seeking tourists and first-time *versus* repeat visitors). Generally, older tourists prefer lower temperatures than younger tourists, sportive tourists tolerate cooler temperatures than non-sportive tourists, families with children prefer higher temperatures than tourists without children, and repeat visitors are less sensitive to rainy days than first-time visitors.

These identified differences between tourist types raise some questions on climate indices. In many of these studies it is assumed that tourism is universal, *i.e.*, no differentiation between different tourism products and/or environments is made. Likewise, no uniform tourist exists, the term 'tourist' is rather a sum of potentially very different types of tourists with different motives, preferences and activities, influencing the individual importance of weather and consequently the sensitivity to weather aspects. These differences also call for further research in this sector, investigating differences between: sports activities, weather expectations, weather experiences and resulting satisfaction; travel groups with and without children; and the effect of weather-independent attractions in temperate latitudes with unstable or unreliable weather conditions.

Acknowledgments: We would like to thank our students of the Geography masters course who conducted the field survey. We also thank the reviewers for constructive feedback to improve the paper.

Author Contributions: Robert Steiger and Bruno Abegg designed the questionnaire, Robert Steiger wrote the manuscript, Leandra Jänicke analyzed the data, Bruno Abegg contributed to the introduction, discussion and conclusion sections of the paper.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix

Table A1. Detailed results per tourist segment.

		Visitation			Age			Activities			Family Status		
		First-Time Visitor	Repeat Visitor	*p*-value	Younger Age Cohort (<65)	Older Age Cohort (65+)	*p*-value	Sports Activities	Non-Sports Activities	*p*-value	Without Children	With Children	*p*-value
Rating of weather variables (1 = not important; 5 = important)	no strong winds	3.22	3.12	0.277	3.17	3.13	0.593	3.13	3.22	0.214	3.23	3.38	0.212
	little rain	4.38	4.29	0.165	4.33	4.31	0.967	4.34	4.32	0.989	4.29	4.39	0.381
	sunshine	4.27	4.12	0.013 *	4.18	4.25	0.354	4.14	4.27	0.027 *	4.16	4.34	0.167
	pleasant temperatures	4.16	4.16	0.769	4.07	4.39	0.000 ***	4.13	4.19	0.322	4.03	4.19	0.129
range of ideal temperature (°C)	lower threshold	21.25	21.36	0.646	21.36	21.09	0.141	21.1	21.57	0.039 *	21.05	21.92	0.002 ***
	upper threshold	24.87	24.88	0.634	25.05	24.39	0.003 **	24.76	25.03	0.509	24.82	25.69	0.006 ***
unacceptable temperatures (°C)	too hot	29.55	29.17	0.029 *	29.55	28.85	0.001 ***	29.47	29.24	0.457	29.52	30.27	0.024 **
	too cold	14.78	14.41	0.112	14.75	14.3	0.087	14.35	14.92	0.013 *	14.54	15.61	0.012 **
Acceptable number of rain days	continuous rain	2.04	2.25	0.049 *	2.13	2.19	0.913	2.1	2.18	0.324	1.97	2.15	0.043 *
	thunderstorms	2.92	3.22	0.046 *	3.18	2.75	0.001 ***	3.2	2.9	0.04 *	2.88	3.23	0.171

* $p \leqslant 0.05$, ** $p \leqslant 0.01$, *** $p \leqslant 0.001$.

References

1. Scott, D.; Hall, C.M.; Gössling, S. *Tourism and Climate Change. Impacts, Adaptation & Mitigation*; London and New York Routledge: London, UK, 2012.
2. Gössling, S.; Abegg, B.; Steiger, R. "It was raining all the time!": Ex post tourist weather perceptions. *Atmosphere* **2016**, *7*. [CrossRef]
3. Amelung, B.; Viner, D. Mediterranean tourism: Exploring the future with the tourism climatic index. *J. Sustain. Tour.* **2006**, *14*, 349–366. [CrossRef]
4. Amelung, B.; Nicholls, S. Implications of climate change for tourism in Australia. *Tour. Manag.* **2014**, *41*, 228–244. [CrossRef]
5. Scott, D.; McBoyle, G.; Schwartzentruber, M. Climate change and the distribution of climatic resources for tourism in North America. *Clim. Res.* **2004**, *27*, 105–117. [CrossRef]
6. Moreno, A.; Amelung, B. Climate Change and Tourist Comfort on Europe's Beaches in Summer: A Reassessment. *Coast. Manag.* **2009**, *37*, 550–568. [CrossRef]
7. Perch-Nielsen, S. The vulnerability of beach tourism to climate change—An index approach. *Clim. Chang.* **2010**, *100*, 579–606. [CrossRef]
8. Mieczkowski, Z. The tourism climatic index: A method of evaluating world climates for tourism. *Can. Geogr.* **1985**, *29*, 220–233. [CrossRef]
9. De Freitas, C.R.; Scott, D.; McBoyle, G. A second generation climate index for tourism (CIT): Specification and verification. *Int. J. Biometeorol.* **2008**, *52*, 399–407. [CrossRef] [PubMed]
10. Scott, D.; Rutty, M.; Amelung, B. An Inter-Comparison of the Holiday Climate Index (HCI) and the Tourism Climate Index (TCI) in Europe 2016. *Atmosphere* **2016**, submitted.
11. Hamilton, J.M.; Maddison, D.J.; Tol, R.S.J. Effects of climate change on international tourism. *Clim. Res.* **2005**, *29*, 245–254. [CrossRef]
12. Falk, M. A dynamic panel data analysis of snow depth and winter tourism. *Tour. Manag.* **2010**, *31*, 912–924. [CrossRef]
13. Falk, M. Impact of weather conditions on tourism demand in the peak summer season over the last 50 years. *Tour. Manag. Perspect.* **2014**, *9*, 24–35. [CrossRef]
14. Hamilton, J.M.; Tol, R.S.J. The impact of climate change on tourism in Germany, the UK and Ireland: A simulation study. *Reg. Environ. Chang.* **2007**, *7*, 161–172. [CrossRef]
15. Töglhofer, C.; Eigner, F.; Prettenthaler, F. Climatic and economic impacts on tourism demand in Austrian ski areas. *Clim. Res.* **2011**, *46*, 1–14. [CrossRef]
16. Köberl, J.; Prettenthaler, F.; Bird, D.N. Modelling climate change impacts on tourism demand: A comparative study from Sardinia (Italy) and Cap Bon (Tunisia). *Sci. Total Environ.* **2015**, 1039–1053. [CrossRef] [PubMed]
17. Scott, D.; Jones, B.; Konopek, J. Implications of climate and environmental change for nature-based tourism in the Canadian rocky mountains: A case study of Waterton Lakes National Park. *Tour. Manag.* **2007**, *28*, 570–579. [CrossRef]
18. Scott, D.; Jones, B. The impact of climate change on golf participation in the Greater Toronto Area (GTA): A case study. *J. Leis. Res.* **2006**, *38*, 363–380.
19. Falk, M. The demand for winter sports: Empirical evidence for the largest French ski-lift operator. *Tour. Econ.* **2015**, *21*, 561–580. [CrossRef]
20. Shih, C.; Nicholls, S.; Holecek, D.F. Impact of weather on downhill ski lift ticket sales. *J. Travel Res.* **2009**, *47*, 359–372. [CrossRef]
21. De Freitas, C.R. Weather and place-based human behavior: Recreational preferences and sensitivity. *Int. J. Biometeorol.* **2015**, *59*, 55–63. [CrossRef] [PubMed]
22. De Freitas, C.R. Tourism climatology: Evaluating environmental information for decision making and business planning in the recreation and tourism sector. *Int. J. Biometeorol.* **2003**, *48*, 45–54. [CrossRef] [PubMed]
23. Behringer, J.; Bürki, R.; Fuhrer, J. Participatory integrated assessment of adaptation to climate change in Alpine tourism and mountain agriculture. *Integrat. Assess.* **2000**, *1*, 331–338. [CrossRef]
24. Dawson, J.; Scott, D.; Havitz, M. Skier demand and behavioural adaptation to climate change in the US Northeast. *Leis./Loisir* **2013**, *37*, 127–143. [CrossRef]

25. Unbehaun, W.; Pröbstl, U.; Haider, W. Trends in winter sport tourism: Challenges for the future. *Tour. Rev.* **2008**, *63*, 36–47. [CrossRef]
26. Rutty, M.; Scott, D.; Johnson, P.; Jover, E.; Pons, M.; Steiger, R. Behavioural adaptation of skiers to climatic variability and change in Ontario, Canada. *J. Outdoor Recreat. Tour.* **2015**, *11*, 13–21. [CrossRef]
27. Rutty, M.; Scott, D.; Johnson, P.; Jover, E.; Pons, M.; Steiger, R. The geography of skier adaptation to adverse conditions in the Ontario ski market. *Can. Geogr.* **2015**, 391–403. [CrossRef]
28. Pröbstl-Haider, U.; Haider, W.; Wirth, V.; Beardmore, B. Will climate change increase the attractiveness of summer destinations in the European Alps? A survey of German tourists. *J. Outdoor Recreat. Tour.* **2015**, *11*, 44–57. [CrossRef]
29. Rutty, M.; Scott, D. Will the Mediterranean Become "Too Hot" for Tourism? A Reassessment. *Tour. Plan. Dev.* **2010**, *7*, 267–281. [CrossRef]
30. Gomez-Martin, B. Climate potential and tourist demand in Catalonia (Spain) during the summer season. *Clim. Res.* **2006**, *32*, 75–87. [CrossRef]
31. De Freitas, C.R. Recreation climate assessment. *Int. J. Climatol.* **1990**, *10*, 89–103. [CrossRef]
32. Mansfeld, Y.; Freundlich, A.; Kutiel, H. The relationship between weather conditions and tourists' perception of comfort: The case of the winter sun resort of Eilat. Available online: http://www.urbanclimate.net/matzarakis/papers/Book_Nato.pdf (accessed on 28 April 2016).
33. Moreno, A. Mediterranean tourism and climate change: A survey-based study. *Tour. Hosp. Plan. Dev.* **2010**, *7*, 253–265. [CrossRef]
34. Wirth, K. Auswirkungen des Klimawandels auf den Tourismus im Mittelmeerraum: Prognosen anhand einer Umfrage in München. Master Thesis, Ludwig Maximilian Universität, München, Germany, 2010.
35. Dubois, G.; Ceron, J.P.; van de Walle, I.; Picard, R. *TEC, CREDOC. Climat, Météorologie et Fréquentation Touristique: Comportements et Stratégies des Touristes*; Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer: Paris, France, 2009.
36. Scott, D.; Gössling, S.; de Freitas, C.R. Preferred climates for tourism: Case studies from Canada, New Zealand and Sweden. *Clim. Res.* **2008**, *38*, 61–73. [CrossRef]
37. Hewer, M.J.; Scott, D.; Gough, W.A. Tourism climatology for camping: A case study of two Ontario parks (Canada). *Theor. Appl. Climatol.* **2015**, *121*, 401–411. [CrossRef]
38. Denstadli, J.M.; Jacobsen, J.K.S.; Lohmann, M. Tourist perceptions of summer weather in Scandinavia. *Ann. Tour. Res.* **2011**, *38*, 920–940. [CrossRef]
39. Rutty, M.; Scott, D. Differential climate preferences of international beach tourists. *Clim. Res.* **2013**, *57*, 259–269. [CrossRef]
40. Rutty, M.; Scott, D. Comparison of climate preferences for domestic and international beach holidays: A case study of Canadian travelers. *Atmosphere* **2016**, *7*, 30. [CrossRef]
41. Tegernseer Tal Tourismus. Der Tegernsee. In *Die Urlaubsdestination in Oberbayern. Daten und Zahlen zum Tourismus am Tegernsee 2013*; Tegernseer Tal Tourismus: Tegernsee, Germany, 2014.
42. Kovats, R.S.; Kristie, L.E. Heatwaves and public health in Europe. *Eur. J. Publ. Health* **2006**, *16*, 592–599. [CrossRef] [PubMed]
43. Scott, D.; Lemieux, C. Weather and Climate Information for Tourism. *Procedia. Environ. Sci.* **2010**, *1*, 146–183. [CrossRef]
44. Serquet, G.; Rebetez, M. Relationship between tourism demand in the Swiss Alps and hot summer air temperatures associated with climate change. *Clim. Chang.* **2011**, *108*, 291–300. [CrossRef]