

# Perception of Crowding

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## Highlights

- 63 % of those surveyed in summer 2022 perceived the situation as more or less crowded. The value is on the borderline of the "definite problem zone"
- Perception of crowding has an impact on overall satisfaction and satisfaction with the atmosphere on site
- There are structural differences according to age, gender, region, visit type, visit frequency and means of transport. However, the correlations are by no means as clear and one-dimensional as previous studies suggested.

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## Introduction

One of the reasons for establishing digital visitor management systems can be to avoid overcrowding and crowding (Schmücker et al., 2022).

Objective data (counts) or subjective assessments by visitors, residents or businesses can be used to identify "overcrowding", "crowding", "crowdedness" or "crowding". This analysis is about the subjective perception of crowding by visitors in selected German destinations in summer 2022.

The individual perception of "overcrowding", "crowding" or "crowdedness" has several causes (on the concept of proxemics, cf. Hall, 1963). These include the actual situation, the expectation of the situation and inter-individual differences (Jacobsen et al., 2019; Jin et al., 2016; Miller & Nardini, 1977; Zehrer & Raich, 2016) or "situational variables of the environment, characteristics of other tourists encountered, and personal characteristics of the individual" (Neuts & Nijkamp, 2012, p. 2135). In this respect, the study of "overcrowding", "crowding" or "crowdedness" can be compared to the expectation-fulfilment model of quality perception (Oliver, 1980). Crowding perception is thus a socio-physical construct (Neuts & Nijkamp, 2012). Objectively existing density of people is necessary but not sufficient for the perception of crowding (Stokols, 1972). A distinction can also be made between positive crowding ("It's great that there's so much going on here!") and negative crowding ("It's too crowded for me here!") (Reif, 2019).

While the term "crowding" is used almost universally in English-language studies, it is difficult to find a German-language equivalent. Conceptually, a distinction has long been made between "spatial crowding" (restriction of movement) and "human crowding" (many people) (Harrell et al., 1980; Machleit et al., 1994). Terms such as

"fullness", "abundance", "large numbers of people", "crowding" or similar are not applicable. The term "overcrowding" captures the meaning of "spatial crowding", but is inclined in a somewhat more negative direction due to the word component "over". "Crowding" avoids the word "over" but has a more negative connotation of physical intrusiveness. For lack of better alternatives, we use the term "overcrowding" in the survey question and in the evaluation.

## Empirical results from other studies

In a meta-analysis of crowding perceptions, Shelby et al. (1989) examined 35 studies of outdoor activities in the USA using a nine-point Likert scale first employed by Heberlein & Vaske (1977). The scale is asymmetrical: scale points 1 and 2 are rated as "non-crowded", scale points 3 to 9 as "crowded". The authors estimate that regions with a share of up to 50 % "crowded" (scale points 3 to 9) are in the "no problem range". If the proportion of respondents answering with "crowded" is above 65%, then there is definitely a problem (Shelby et al., 1989, p. 287). However, these estimates are neither compellingly derived nor has the scale been psychometrically evaluated.

In a European meta-study on forest use, Arnberger & Mann (2008) determined "crowded" proportions of 10 to 64 percent in 16 studies, but on very different scales (bi- and unipolar with two, three, five, seven and nine points).

In a study in the Danube Floodplain National Park (Austria), Arnberger & Brandenburg (2007) determined a clear correlation with previous use experience among 383 respondents in the summer of 2001 or 2022 using a four-point scale ("not crowded at all", "not crowded", "crowded at spec. times or places", "overall crowded"): the more visits already completed,

the more likely crowding was reported in the groups "locals" and "regional visitors". Locals reported crowding most frequently, regional visitors somewhat less frequently, and "tourists" least frequently.

On the nine-point Likert scale, Kalisch (2012, p. 74) determined a mean value of 1.87 (SD=1.61, n=509) for the Hamburg Hallig (Schleswig-Holstein) in spring/summer 2009, with a higher value at weekends, but only a marginally higher value among residents (locals) compared to visitors (tourists).

In a study at Kailua Beach (Hawaii) in summer 2019 using the nine-point scale, Szuster et al. (2021, p. 10) determined a proportion "crowded to some degree" (scale points 3 to 9) of 63% with a mean of 3.74 (SD 2.38, n = 452). The proportion "Moderately or extremely crowded" (scale points 5 to 9) is reported as 38%.

In a survey in the Zillertal (Tyrol) in winter 2013 with a five-point scale ("too many, many, neutral, not many, few visitors"), Zehrer & Raich (2016, p. 92) recorded a share of 41 % for "many" and another 41 % for "too many". Older respondents, women and first-time visitors reported "many" or "too many visitors" more frequently. Furthermore, a clearly negative influence of crowding perception on visitor satisfaction was reported.

Using the example of a festival in South Korea, Kim et al. (2016) found a positive influence of human crowding and a negative influence of spatial crowding on visitor satisfaction. Also, the perception of crowding as negative has a negative effect on the attractiveness of a destination (Li et al., 2017).

In a survey study at Strecksee and Gaisalpsee (Allgäu Alps) in the summer of 2021, Didier & Knubben (2022) investigated subjective

assessments using both parameterised image templates and a simple yes/no question ("Did you feel there were too many people on the path or at the lake?"). The incidences for "too many people" vary between 16% and 75%, depending on the actual number of visitors. Locals tend to think that there are "too many people on the way or at the lake" more often than non-local visitors. The authors attribute this to a "last settler's effect" (Groothuis, 2010).

In an earlier study, Jin & Pearce (2011) were also able to show that the preferred and tolerated number of visitors is below the actual number of visitors in many periods, using the example of the culturally important destination Xi'an (China) with 287 respondents in autumn 2007.

Sun and Budruk (2017) demonstrated that nationality has a moderating influence on the perception of crowding. Similar findings were made by Jin, Hu & Kavan (2016), who confirmed travel motivation as an influencing variable for crowding perception in addition to nationality.

There are also crowding studies on urban spaces (Neuts, 2021; Neuts & Nijkamp, 2012; Neuts & Vanneste, 2018; Popp, 2012). For visitors in Hamburg, Reif (2019, p. 276), also using the nine-point Likert scale, calculated a mean of 4.56 ( $SD=2.26$ ,  $n=163$ ) with a Low 2 box occupancy of 22% and a Top 2 box occupancy of 8%. The crowding feeling was higher on Saturdays and correlated quite significantly with a feeling of unwelcome, but only weakly with overall satisfaction.

Within the framework of the monitoring "Sustainability in Holiday Travel", a module "Crowding and Information" was processed in 2022/23 (Schmücker et al., 2023, p. 58 ff.). Of the 47.8 million holiday travellers in 2021, 43% reported that they felt it was "too crowded" at times during their holiday. 56% answered "no", just under 1% made no statement. The authors report a slightly negative age gradient and

significant differences depending on the destination (in Scandinavia: 19%, in Germany: 39%, on the Mediterranean: 50%). Situations where crowding was most frequently perceived were travelling to and from the destination, shopping on site, city centres and eating out on site.

The analysis of existing studies shows that crowding can occur in all types of destinations and is not linked to a specific environment. It can occur in rural and urban areas. Furthermore, it becomes clear that the perception of crowding is a socio-physical and subjective construct that is influenced by different environmental variables; in other words, the perception of crowding is multi-dimensional.

## Method

### *Study profile*

The data presented here come from a large-scale survey conducted as part of the AIR project, for which the Institute for Sustainable and Innovative Tourism Development (INIT) at Kempten University of Applied Sciences was responsible. In the period from July to October 2022,  $n = 5,557$  personal interviews were conducted at 13 locations using the CAPI method. With the exception of Füssen and the North Sea region, the interviews were conducted exclusively from Friday to Sunday. The respondents were approached at random. The data are not representative, but allow meaningful conclusions to be drawn about structures and relationships.

The sample is not balanced with regard to survey locations and times. For example, different numbers of cases were generated on different days of the week for each survey location and survey day, which can have an influence on the results.

The results presented here only cover a part of the total range of questions available.

### Survey question

We used a unipolar, ten-point scale with verbalised endpoints (1 = not at all crowded; 10 = extremely crowded) and numbered scale points (pseudometric scale). The construct "crowding" was verbalised as "overcrowding". The survey question is: "Do you feel that your destination is crowded with people today?"

We use, following Shelby et al. (1989) and Szuster et al. (2021), the following categorisation of the unipolar ten-point scale:

Table 1: Categorisation of scale points

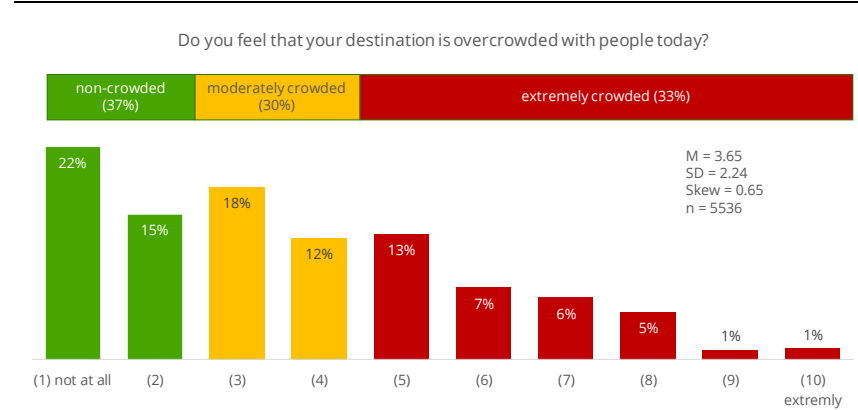
Scale points	Meaning
1 and 2	non-crowded
3 and 4	moderately crowded
5–10	extremely crowded
3–10	crowded (to some degree)

## Results

Of the total of 5,557 respondents, 5,536 could be considered in the evaluation of the survey question. The mean value of the answers for the survey question is 3.65 (SD=2.24) with positive skewness (0.646, right skew, Figure 1).

Looking at the first two scale points, the proportion of "not overcrowded" respondents is 37%. The proportion of "overfilled" respondents is 63%, i.e. at the border of the "definite problem zone" according to Shelby (1989). The proportion of respondents with scale points from 5 to 10 (severely overcrowded) is 33%.

Figure 1: Crowding perception, all respondents



Data: INIT 2022

### Study region

Crowding perception varies depending on the study region (Table 2) and ranges from under 50% (Sauerland, rural Allgäu) to just under 60% (Ruhrtalradweg) to rather critical values just under or even over 70% (North Sea coast, Baltic Sea coast, Füssen). Statements cannot be made for all survey locations due to insufficient case numbers, but on the North Sea coast the locations Sylt (71%) and Sankt Peter-Ording (74%) are particularly affected and the lowest values occur at Mönnesee (44%) and Hopfen am See (48%).

Table 2: Crowding perception by study region

	non-crowded (1 and 2)	moderately crowded (3 and 4)	extremely crowded (5–10)	crowded (3–10)
Sauerland	54	19	28	47
Allgäu – rural	52	26	22	48
Ruhrtalradweg	41	24	35	59
Nordseeküste	33	40	27	67
Ostseeküste	31	23	46	69

Data: INIT 2022, figures are row percentages

### Time of day and day of week

Other studies have shown that actual visitor frequency is lower in the morning and during the week than from lunchtime onwards and at weekends (Didier & Knubben, 2022; Szuster et al., 2021). We do not measure the actual frequency here, but the crowding perception. Nevertheless, it seems worthwhile to examine the daily and weekly pattern.

To analyse the time of day, we read out the hourly value, so the time of day "8" covers the hour from 8:00 to 8:59, the time of day "11-13" the period from 11:00 to 13:59.

Figure 2: Crowding perception by time of day

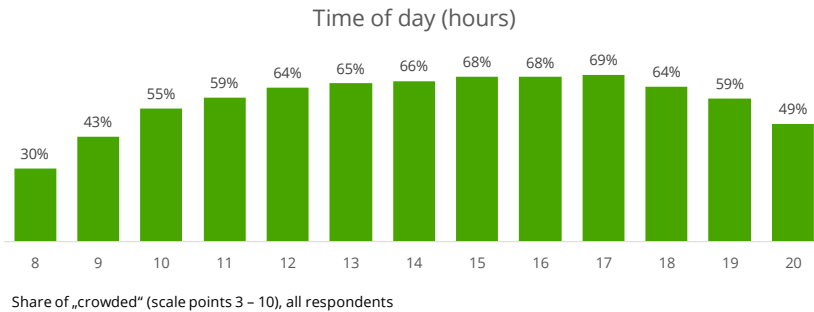
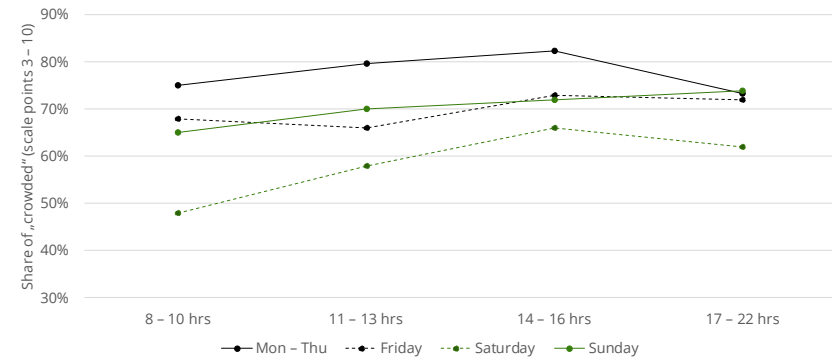


Figure 2 shows that the diurnal pattern is as expected (scale values 3 to 10 are shown, i.e. "crowded"): Building up values in the morning with peak values in the afternoon time.

Since only the Füssen and North Sea sites were surveyed outside the weekend, only the data from these two sites are considered in the analysis

of the weekdays (n = 2,590). The weekly trend shows the highest crowding values on the weekdays Monday to Thursday and lower values on Friday, Saturday and Sunday. The diurnal cycle is basically similar on the different days, but the "evening bend" is missing on Friday and Sunday (Figure 3).

Figure 3: Crowding perception by time of day and day of week



Share of „crowded“ (scale points 3 – 10), respondents in Füssen and Nordsee

### Demographics

As in the study by Schmücker et al. (2023), we find an at least slightly negative age gradient (crowding perception decreases somewhat with age,  $\chi^2$  [df = 4, n = 5,536] = 9.8, p = .043) and, as in the study by Zehrer & Raich (2016), a slightly increased crowding perception among women ( $\chi^2$  [df = 2, n = 5520] = 9.5, p = .009; 16 respondents classified themselves as "diverse" when asked about gender).

Table 3: Crowding perception by age and gender

	- 39 y	40–59 y	60 y +	male	female
n =	1.623	2.495	1.418	2.641	2.879

non-crowded (1 and 2)	36	37	37	39	35
moderately crowded (3 and 4)	28	30	32	30	31
extremely crowded (5–10)	36	33	31	32	35

Data: INIT 2022, figures in percent

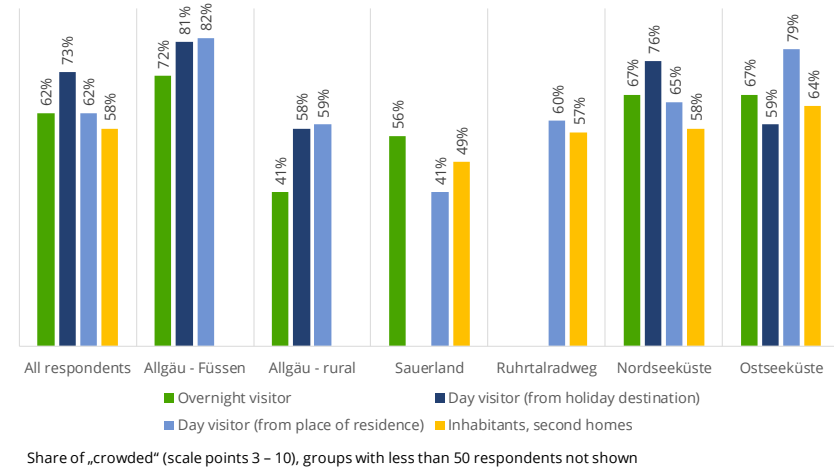
No data is available on the nationality of the respondents, but it is possible to differentiate according to place of residence (Germany or abroad). Here, however, there are no significant differences with regard to crowding perception. There are also no relevant differences between the respondents with regard to the level of education.

### Visit type

For the analysis, we distinguish between overnight visitors (within a radius of up to approx. 4 km from the survey location), day visitors from the holiday resort, day visitors from the place of residence and locals (both with primary and secondary residence).

Overall, crowding perception is highest among holiday resort day trippers (73%), followed by overnight guests and day trippers from the place of residence (62%) and finally by locals (58%). However, the findings of Arnberger & Brandenburg (2007) and Kalisch (2012), according to which locals perceive crowding more strongly, cannot be confirmed here. The analysis according to the survey regions also does not provide a uniform picture.

Figure 4: Crowding perception by visit type and survey region

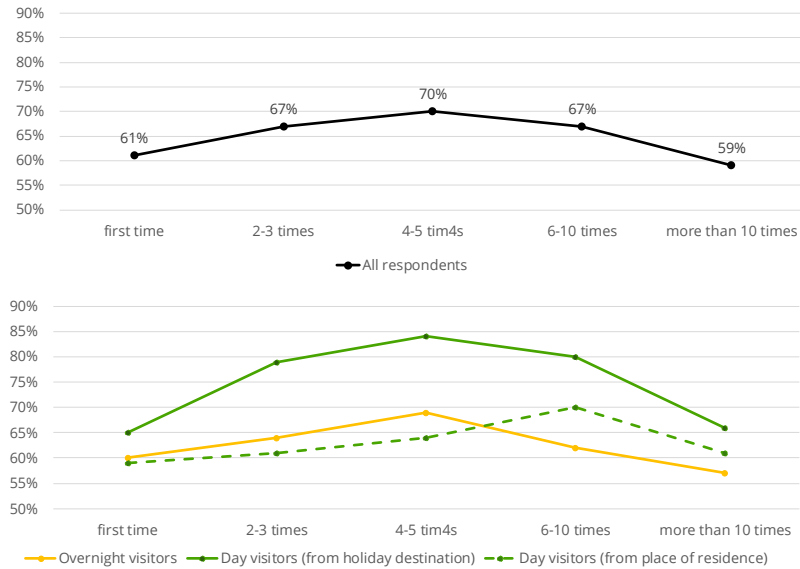


Data: INIT 2022, figures in percent

### Visit frequency

Crowding perception initially rises with increasing visit experience and then falls again. First-time visitors have a very slightly lower crowding perception compared to repeat visitors (Figure 5,  $\chi^2$  [df = 4, n = 5474] = 40.9,  $p < .001$ ). Crowding perception reaches its maximum among those who are there for the fourth or fifth time and then drops again. The maximum only sets in somewhat later for the residential day trippers. The locals (first or second home) were not considered here, because the vast majority of them have been there more than ten times. This results in a more differentiated picture than in the studies by Zehrer & Raich (2016) or Arnberger & Brandenburg (2007).

Figure 5: Crowding perception according to visit frequency



Share of „crowded“ (scale points 3 – 10)

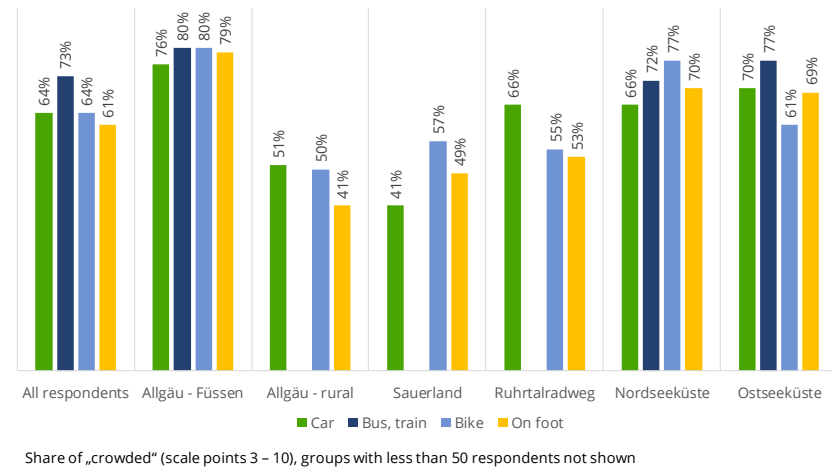
Data: INIT 2022, figures in percent

### Mode of transport

The mode of arrival could have an influence on crowding perception, as examples reported from the field often refer to overcrowding in car parks.

In fact, however, we see the highest crowding scores among those arriving by bus or train (Figure 6). However, the pattern is not the same in all survey regions and in some regions the shares of rail and bus arrivals are very low, so they are not shown separately here.

Figure 6: Crowding perception by main mode of transport



Data: INIT 2022, figures in percent

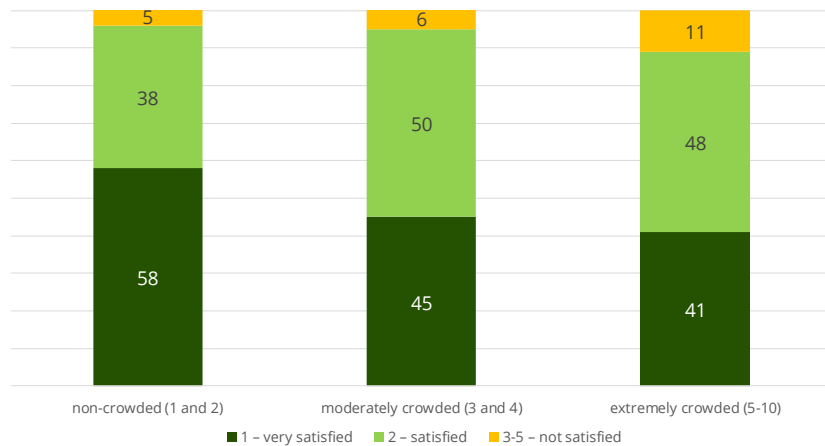
### Influence on satisfaction

It can be assumed that a perception of overcrowding (at least with regard to "spatial crowding") has a negative influence on the overall satisfaction with the excursion. Because of the clearly skewed distribution, we have grouped the satisfaction surveyed on a five-point scale into three groups for the analysis.

The hypothesis can be confirmed with the available data (Figure 7,  $\chi^2$  [df = 4, n = 5489] = 160.4, p < .001).

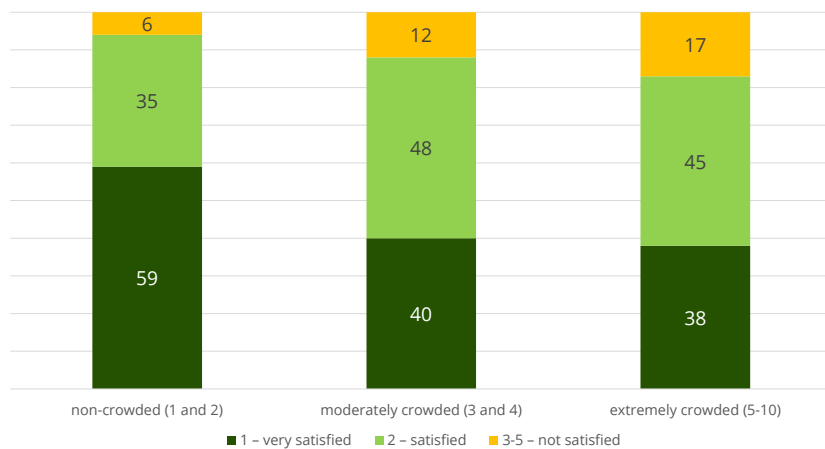


Figure 7: Overall satisfaction according to crowding perception



Data: INIT 2022, figures in percent

Figure 8: Satisfaction with the atmosphere/flair according to crowding perception



Data: INIT 2022, figures in percent

A similar picture emerges not only for overall satisfaction, but also for partial aspects of guest satisfaction, e.g. for the atmosphere and the flair of the place. It is known from other studies that - in the sense of the "collective gaze" (Urry, 1990) - there is a positive crowding and people like to be there where there is also something going on (Popp, 2009). In our data, we also find around 38% of respondents who perceived it as very crowded on site, but were very satisfied with the atmosphere and flair. Nevertheless, it clearly shows that the more crowded it is perceived to be, the less satisfied people are with the atmosphere ( $\chi^2 [df = 4, n = 5410] = 252.5, p < .001$ ).

## Outlook

The survey data available so far are not correlated with the actual number of visitors. It is therefore the subjective assessment of the respondents, not the objectively measured number or density of people on site. Other studies have done this type of analysis (Arnberger & Brandenburg, 2007; Didier & Knubben, 2022; Jin & Pearce, 2011). A similar study is planned as part of the AIR project.

For future studies on this topic, it is also relevant to record how the crowding perception behaves depending on the number of people expected on site. In this survey, this issue could not be statistically verified, as only 26 people informed themselves in advance about an expected number of people. Based on Reif (2019), it can be hypothesised that rationalisation strategies are at work here, which ensure that guests inform themselves in advance, adjust to a crowd and this has an influence on the perceived level.

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## Notes

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