



Exploring crowding in tourist settings: The importance of physical characteristics in visitor satisfaction

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ABSTRACT

The aim of this study is to validate the comprehensive model of crowding posited by Baum and Paulus (1987) and establish the weighting of each factor in the assessment of crowding and in satisfaction with tourist settings. 486 participants completed scales assessing crowding and satisfaction with the last tourist setting visited. The structural equation model obtained showed that social stimulation, privacy level, behavioral constraints, and social setting characteristics are indicators of the evaluation of the impact of setting, that explains crowding. Crowding does not have a significant effect on satisfaction with the tourist experience; however, a negative rating of the physical setting characteristics was found to be closely related to tourist satisfaction.

1. Introduction

In most social sciences, the term ‘crowding’ is used to refer to a situation in which there are a large number of people in a given space, and as such the concept is often equated with an objective measure of excessive population density (García, López-Colásb, & Módenes, 2018). However, in Environmental Psychology, a distinction is drawn between crowding and population density, largely based on the work done by Stokols (1972). This author used the term ‘density’ to refer to the objective physical aspects of a spatial situation (the number of people per defined area) and ‘crowding’ to refer to the psychological aspects (negative perceptions) of that situation.

Since then, the term ‘crowding’ has been used by environmental psychologists to describe the subjective state experienced by an individual in a social situation where the population density may not be high, but where that individual considers it to be inappropriate for the setting’s intended use (Kuentzel & Heberlein, 1992). It is therefore a psycho-environmental process that arises from the interpretation that individuals make of a specific social situation where resources are considered to be insufficient and that leads to stress (Evans & Cohen, 1987). From this perspective, it must be considered that, even though crowding continues to be directly contingent on physical factors such as density and available space, it is the personal and situational factors, such as social interaction and satisfaction with the setting that will

determine the degree of discomfort (Nagar & Paulus, 1997). The need to include physical, social, and psychological factors when studying crowding in tourist settings was recently taken up in a number of studies examining a wide range of tourist contexts (Alsolami, Embi, & Enegbuma, 2017; Jacobsen, Iversen, & Hem, 2019; Song & Noone, 2017). The aim of this study was to examine which dimensions of crowding are related to general perceived crowding and its relation with tourist satisfaction in different contexts.

2. Literature review

2.1. Theories explaining crowding from the perspective of Environmental Psychology

A number of different theories have been posited from Environmental Psychology to understand perceived crowding, each with its own emphasis on different personal or contextual factors (Hombrados-Mendieta, 2010). For example, some authors have identified excessive social stimulation or high activation as the root cause behind the feeling of crowding, while for others it is due to the lack of control over the behaviors that can be carried out or over the degree of privacy involved (Altman, 1975; Andereck, 1997; Consiglio, Angelis, & Costabile, 2018; Knowles, 1978; Stokols, 1972; Worchel, 1978).

In an attempt to unite these different approaches, Baum and Paulus

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(1987) produced a comprehensive model that aims to explain crowding by including all of the variables proposed by the other models. Thus, crowding would be the result of a person's subjective evaluation of the impact of the setting on the amount of social stimulation they are exposed to, the loss of privacy that this entails, the degree to which constraints are perceived to be placed on behaviors, and the perceived threats to personal control. Further, these authors posit that certain physical and social setting characteristics can increase or decrease the negative evaluation of the impact and that certain personal variables can act as mediators.

According to this model, crowding is produced by the concurrence of all these factors but may be more or less relevant depending on the context. For example, in one study, Nagar and Paulus (1997) used a residential crowding scale to measure four of these factors (spaciousness, positive relationships, negative relationships, and uncontrolled disturbance) and were able to confirm their influence on psychological variables of health and wellbeing and on variables rating the setting, with differences observed in the weighting of each factor. The validity of the model posited by Baum and Paulus (1987) could be confirmed by simultaneously measuring all of the variables it includes in other social contexts. This study proposes examining the weighting of these factors in the assessment of crowding and satisfaction with different tourist settings. Results can be useful when designing tourist spaces to improve the visitor experience and the setting itself.

2.2. Studies of crowding in recreational contexts

Although several studies have explored some positive effects of crowding (Jacobsen et al., 2019; Kim, Lee, & Sirgy, 2016), the study of crowding has historically been linked with studies of the negative effect that high population density can have on physical and mental health (Galle, Gove, & McPherson, 1972; Levy & Herzog, 1974). This is why crowding has most often been studied in special contexts such as prisons or hospitals, while other, residential contexts such as cities, homes, schools, or workplaces have only gradually been incorporated (Evans, Rhee, Forbes, Allen, & Lepore, 2000; Gómez-Jacinto & Hombrados-Mendieta, 2002). However, the concept of crowding is also of considerable interest for the study of people's satisfaction with their environments. In this vein, different studies are looking at the influence of perceived crowding in recreational and tourist contexts (Jin, Hu, & Kavan, 2016; Jurado, Damian, & Fernández-Morales, 2013; Lee & Graefe, 2003; Neuts & Nijkamp, 2012; Zehrer & Raich, 2016).

Many of these studies of crowding in natural environments have been conducted in places, such as river recreation areas or mountains, where people go to carry out specific activities (Budruk, Stanis, Schneider, & Heisey, 2008; Luque-Gil, Gómez-Moreno, & Peláez-Fernández, 2018). In these studies, consideration was given to previous experiences with the context and to expected and preferred levels of contact, as set out in the model developed by Westover (1989). In this model, personal and situational variables are observed to be determining factors in the perception of crowding, showing that density alone does not suffice to provoke discomfort. However, few studies have examined the effects of personal factors on crowding (Jurado et al., 2013; Papathanassis, 2012; Rasoolimanesh, Jaafar, Marzuki, & Mohamad, 2016). Further, the type of activity taking place can even turn crowding into something positive, if the enjoyment of the experience is perceived to be contingent on being surrounded by many people, as is the case for certain entertainment events (Kim et al., 2016). The present study compares three different tourist settings that involve activities that could easily be considered satisfactory even when a large number of people are present. The aim is to compare possible differences based on whether it is a recreational setting, such as a nature park or theme park, or an urban setting, for which studies of crowding have grown in importance in recent years.

2.3. The importance of crowding in urban tourism

Recently, different studies have analyzed crowding in urban tourist contexts. Growing concerns about the rise in tourism in certain cities and the possible adverse effects that this might have on the quality of the experience or on residents have led to more research into the conditions and factors that influence perceived crowding. When describing situations in tourist destinations where both residents and visitors perceive that there are too many people present and that this leads to an unacceptable deterioration in locals' quality of life or in tourists' experience, the term overtourism is used (Martín-Martín, Guaita-Martínez, & Salinas-Fernández, 2018; Milano, 2018). This term is clearly linked to the previously described concept of crowding, as it is understood that a large number of tourists are not required for a setting to be considered overly full, but rather it is residents' and tourists' subjective perception that leads to this sense of discomfort. This relationship was recently shown in the study by Koens, Postma, and Papp (2018) conducted in 13 European cities with different levels of tourist development.

Other examples can be seen in the work by Neuts and Nijkamp (2011; 2012) and by Bryon and Neuts (2008), who studied crowding in the cities of Amsterdam and Bruges. These authors propose a model with three factors that influence crowding (situational, social, and personal) and use regression analyses and structural models in their comparisons. Their results show that crowding is not inherently negative, and that perceived discomfort can largely be explained by individual preferences. In this vein, Jacobsen et al. (2019) developed a model capturing antecedents of place attractiveness in tourism hotspot crowding contexts. Their model includes three density dimensions: one destination image variable and two avoidance versus approach reactions that influence assessments of crowding attitude and destination appraisals. Following their model, tourists could have approach or avoidance reactions towards crowding that influence their appraisal of tourism hotspots. Rasoolimanesh, Jaafar, Marzuki, and Abdullah (2017) explored the effect of socio-demographic characteristics and socio-behavioral tendencies on tourists' perceived crowding, defined as interactions with the local community and satisfaction with accommodation.

2.4. Hypotheses development

Although previous studies have included different personal, social, and physical variables in the study of crowding in various tourist settings, none of the above studies simultaneously integrated all the variables originally posited by Baum and Paulus (1987), such as privacy, perceived control over one's context or social stimulation. Crowding is usually measured with a single score from zero to nine that rates the degree to which the participant considers that the people present provoke discomfort (Heberlein & Vaske, 1977; Neuts & Nijkamp, 2012; Tarrant, Cordell, & Kibler, 1997); however, this does not allow to determine whether what provokes the discomfort is the number of people present, their behavior, the fact that an activity has to be shared, or the perceived invasion of privacy.

The present study attempts to test, concurrently, the effect of all these variables on crowding in a range of recreational contexts, with the aim of validating the comprehensive model proposed by Baum and Paulus and to establish the weighting of each factor in the crowding and in the degree of satisfaction with tourist settings. Fig. 1 shows the theoretical model to be tested, based on the model proposed by Baum and Paulus (1987). Although general objective is to test the relationships between all the variables simultaneously in the same direction as that posed by the authors, some different partial hypotheses are outlined.

According to this model, people in a social situation such as a tourist experience will be impacted by the lack of privacy, social overstimulation, behavioral constraints, and the threat to personal control. According to Altman (1975), a lower-than-desired degree of privacy leads to crowding and as such, this measure should be included when studying how to reduce the impact of social density in public contexts.

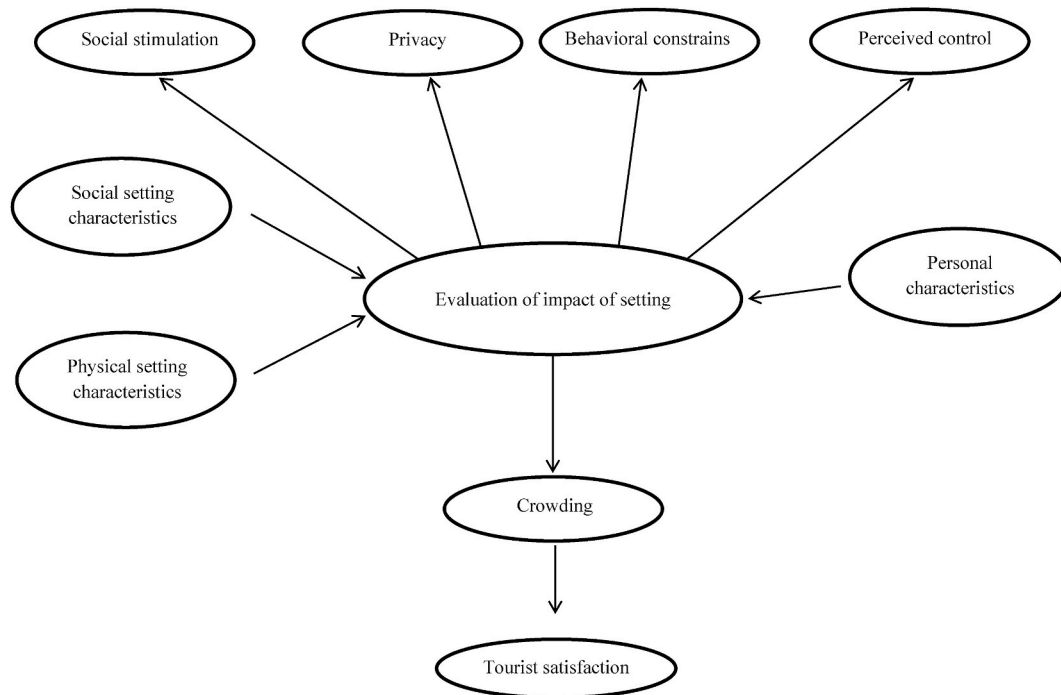


Fig. 1. Representation of theoretical model.

The current tourism boom makes it virtually impossible for experiences to be enjoyed with any degree of privacy, and this limits tourist satisfaction and the desire to repeat visits (Alegre & Garau, 2010; Luque-Gil et al., 2018). In addition to privacy, the importance of perceived control over one's context, the amount and rate of social stimulation, and social interference must also be considered, as they have been shown to add explanatory value to the crowding experienced in recreational settings (Lee & Graefe, 2003). Therefore, a first hypothesis is proposed:

H1. Evaluation of impact of setting is composed for indicators of social stimulation, privacy level, behavioral constraints and perceived control.

On the other hand, and according to the model, both the social and physical setting characteristics and certain personal variables can affect the final degree of crowding experienced, decreasing or increasing the initial evaluation of impact. It has been found that the behavior of other tourists can decrease or increase the perception of crowding and tourist satisfaction (Papathanassis, 2012; Vaske & Donnelly, 2002), as can some physical setting characteristics such as ease of orientation, order or distribution of the elements (Alsolami et al., 2017; Mehta, 2013). Similarly, some studies have demonstrated the effect of personal characteristics, such as coping strategies, on crowding in different tourist contexts (Sanoubar et al., 2018; Sun & Budruk, 2015). This study has included all three factors: social setting characteristics, physical setting characteristics, and personal variables related to the response to situations of crowding. The following hypothesis is proposed:

H2. The more negative the assessment of the social, physical and personal characteristics, the higher the evaluation of impact of setting.

As understood in the theoretical model, the final impact level will be the one that determines whether a person experiences more or less crowding. The present study includes a global measure of crowding similar to those collected in previous studies (Nagar & Paulus, 1997; Neuts & Nijkamp, 2012; Tarrant et al., 1997). The following hypothesis is proposed:

H3. The evaluation of impact of setting will have a positive effect on the assessment of crowding.

The findings may prove useful not only as confirmation of the

theoretical model but also in the design of tourist settings. In this sense, the ability to identify which specific aspects increase or decrease the perception of crowding will facilitate the design and management of tourist areas, thus improving tourist experience satisfaction and quality. Based on other studies in different contexts (Song & Noone, 2017; Zehrer & Raich, 2016), the following was hypothesized:

H4. The assessment of crowding will have a negative effect on tourist satisfaction.

In addition, comparing natural or built recreational settings and cities in the same study may allow for a better understanding of the importance of the physical and social elements present in tourist experiences and judgments thereof (Kirillova, Fu, Lehto, & Cai, 2014). To the extent that the physical aspects that characterize nature areas are closer to those that have been positively valued in previous studies (Alsolami et al., 2017) and that produce more satisfaction, for example urban green areas (Kuldna, Poltimäe, & Tuhkanen, 2020), the following hypothesis is proposed:

H5. The mean of evaluation of impact of setting and crowding will be lower in natural settings than in the other two settings, while tourist satisfaction will be higher.

3. Materials and methods

3.1. Participants

There were 486 participants, 32 of whom were discarded for having filled out the survey in under 6 min or over 50 min, or for having submitted responses with very low variability. Of the remaining participants, 230 were male and 224 were female. As for the age ranges represented, 24.4% of the sample were aged between 16 and 24, 43.2% were aged between 25 and 44, 30.4% were aged between 45 and 64, and 2% were over 65 years old. A total of 55.1% of participants were employed, 24.9% were university students, and 19.6% were homemakers, unemployed, or retired. In terms of educational level, 44.1% had completed postsecondary studies, 53% had completed secondary schooling, and 2.9% had either primary schooling only or no formal

education. All participants were residents of the Canary Islands (Spain).

3.2. Materials

This study used three scales: one for assessing crowding-related variables, one for assessment of crowding, and one for assessing satisfaction with the tourist experience.

3.2.1. Crowding-related variables assessment scale

Using the models proposed by Baum and Paulus (1987) and Westover (1989), as well as instruments that include some of the dimensions proposed in these models (Kim et al., 2016; Machleit, Kellaris, & Eroglu, 1994; Sun & Budruk, 2015), a scale with 29 items was developed following a procedure of discussion and consensus between raters. The raters were five psychologists: three experts in social psychology, one methodologist, and one expert in tourist satisfaction study design. The developed scale assesses Evaluation of impact of setting, based on the evaluation of social stimulation, privacy level, behavioral constraints, and perceived control over one's context, and the factors which these models consider to influence this impact: Social and Physical setting characteristics, and Personal characteristics (see Table 1).

Taking into account the positive results of the use of 11-point scales (Bisquerra Alzina & Pérez Escoda, 2015; Leung, 2011), all items were rated on an 11-point agree/disagree scale (0–10).

3.2.2. Assessment of crowding

One item asks participants to estimate the degree to which they were bothered by the number of people present in the setting in question, in line with previous studies that use a nine-point scale to measure crowding (Heberlein & Vaske, 1977; Neuts & Nijkamp, 2012; Tarrant et al., 1997) (Table 1).

3.2.3. Tourist satisfaction scale

To assess emotional response to the tourist setting visited, the Spanish translation of the tourist satisfaction measure proposed by Ma, Scott, Gao, and Ding was used (2016), which consists of four items (Table 1). Participants were asked to indicate the degree to which they agreed with the statements (0 = fully disagree; 10 = fully agree).

3.3. Procedure

Data was collected using an online application (Snapsurveys). In other areas of research, studies have been conducted comparing data collection through online or paper-pencil surveys that show that there are no differences between the two procedures (e.g. Alvares, Lucindo, Salloume, Jordani, & Maroco, 2011; Chang, 2005; Herrero, 2015; Ramo, Hall, & Prochaska, 2011). The sample was obtained on a university campus and through online consulting, following a procedure of ranges and quotas based on sex and age. Participants were asked to report on the space available at and their experience with a tourist setting. For this, they were asked to recall and indicate the last tourist attraction they had visited (e.g. a theme park or nature park) and then respond to the questions based on their recollections of this visit. University participants could be contacted later to monitor their responses. Likewise, a random check of responses was carried out on the sample obtained through online consulting. The survey was anonymous and took about 15–25 min to complete. Participation was voluntary and informed consent was obtained.

3.4. Data analysis

R-Studio was used with the ULLRToolbox libraries (Hernández-Cabrera, 2011). First, the reliability of each scale was tested using hierarchical omega. Second, the scales were refined using Item Response Theory, allowing to obtain the discrimination capacity of each item and eliminate those that did not function properly (Hidalgo-Montesinos &

Table 1

Items included in the Crowding-related variables and Tourist Satisfaction Scales.

Item	Dimension
1. There were more visitors than the setting could hold.	Social Stimulation
2. The number of visitors in the setting prevented me from enjoying the experience.	Social Stimulation
3. Visits to this setting should be restricted so that you are not surrounded by so many people at once.	Social Stimulation
4. The visitors were too close to one another during the visit.	Privacy level
5. I felt like everything I was doing was being watched by the other visitors.	Privacy level
6. I would have liked to visit this setting with just the members of my group.	Privacy level
7. I was able to move away from the other visitors to enjoy the setting alone or with the other members of my group.	Privacy level
8. The number of people present in this setting interfered with my ability to do what I had expected.	Behavioral constraints
9. The resources available in the setting allowed me to do what I had expected to do there despite the large number of people present.	Behavioral constraints
10. The activities I carried out during the visit were as expected.	Behavioral constraints
11. The number of people present prevented me from deciding the speed at which I could conduct my visit.	Perceived control
12. I was able to go wherever I wanted in this setting.	Perceived control
13. I felt free to organize my time as I wished with the various activities.	Perceived control
14. The other visitors were not following the rules, which meant I couldn't enjoy the experience.	Social setting characteristics
15. The other visitors were not being respectful, which meant I couldn't enjoy the experience.	Social setting characteristics
16. The noise produced by the other visitors was annoying.	Social setting characteristics
17. Most of the people who visit this setting share my interests.	Social setting characteristics
18. The people who were on the visit at the same time as I was contributed to my enjoyment of the experience.	Social setting characteristics
19. The other visitors' behavior interfered with my ability to enjoy the experience.	Social setting characteristics
20. The contact I had with other visitors during the visit was enjoyable.	Social setting characteristics
21. The weather conditions during my visit contributed to my enjoyment of the experience.	Physical setting characteristics
22. I think the cleanliness and orderliness of the setting were appropriate.	Physical setting characteristics
23. The spaces visited were enjoyable/as expected.	Physical setting characteristics
24. The information offered about the setting was enough to help me find my way around during the visit.	Physical setting characteristics
25. The setting seemed spacious.	Physical setting characteristics
26. My experience in this setting was in line with my expectations.	Personal characteristics
27. I am uncomfortable sharing spaces with strangers	Personal characteristics
28. I adapt well to situations where there a lot of people.	Personal characteristics
29. Before I purchased this visit, I was informed of how it was to transpire.	Personal characteristics
30. To what degree were you bothered by the number of people present in the setting.	Assessment of Crowding
31. The experience was satisfying to me.	Tourist Satisfaction
32. I am happy with the experience.	Tourist Satisfaction
33. The experience was as good as I expected.	Tourist Satisfaction
34. I felt comfortable with the experience.	Tourist Satisfaction

French, 2016). Third, confirmatory factor analysis for Crowding-related variables assessment Scale was applied. Fourth, the different measurement models were tested for each of the variables measured: Evaluation of impact of setting, Evaluation of the social and physical setting characteristics, and Tourist Satisfaction, using the revised scales. Finally, the complete structural model was tested and its fit analyzed, as well as the differences between the three settings studied.

4. Results

4.1. Descriptive statistics and preliminary analyses

The tourist settings recalled by participants were placed into one of three categories: Tourist cities, Nature parks or Theme parks. A total of 20.48% used a tourist city such as Barcelona, Paris, Rome, or Lisbon as the basis for their responses to the questionnaire; 38.33% based their replies on a past visit to a nature park or nature area such as the Pyrenees, Timanfaya Park, or Mount Teide; and 41.19% referred to a visit to a theme park such as Siam Park, Parque Warner, or Port Aventura.

First, internal consistency of the scales was tested using Hierarchical Omega. After eliminating one of the items from the scale Social setting characteristics and another item from the scale Physical setting characteristics, the results were satisfactory, as scores above 0.70 are considered adequate for Omega (0.76 for Evaluation of impact of setting; 0.77 for Social setting characteristics; 0.72 for Physical setting characteristics; and 0.95 for Tourist Satisfaction).

Although these internal consistency levels were optimal, each scale was refined to ensure that the items were sufficiently discriminatory since, apart from the Tourist Satisfaction measure, all of the scales had been developed ad hoc. Item Response Theory (IRT) provided invariant estimates of the psychometric properties of the items. Leaving only the items with a discrimination index over 1.39, indicating a 'high' function (Baker, 2001), six items were selected from the Evaluation of impact of setting scale (3 from social stimulation, 1 from privacy level, 1 from behavioral constraints, and 1 from perceived control over one's context); 4 items from the Social setting characteristics scale; and 3 items from the Physical setting characteristics scale. Table 2 shows the means and standard deviations as well as the skewness, kurtosis, and standard error of the items finally selected.

4.1.1. Confirmatory factor analysis for the crowding-related variables scale

Before testing the complete structural equation model, a confirmatory factor analysis was carried out with the previously selected items to assess the latent factor structure of the crowding-related variables scale, testing the relationship between Evaluation of impact of setting, Social characteristics, Physical characteristics, and Personal characteristics. Since the selection of items did not make it possible to keep the factors of social stimulation, privacy level, behavioral constraints, and perceived control over one's context separately, the six selected items were considered as indicators directly from the Evaluation of impact of setting factor. To overcome the low sensitivity to abnormality of the observable variables that overcome the difficulties of χ^2 , the following fit indexes were used (Bentler, 1990): the comparative fit index (CFI), the normed fit index (NFI), the non-normed fit index (NNFI), the Root-Mean-Square error of approximation (RMSEA), and its corresponding confidence interval. These fit indexes make it possible to measure the improvement of the estimated model in comparison with the base model. It is considered that there is a good fit between the postulated model and the observed data when values equal to or greater than 0.9 are generated for the incremental indexes. In addition, following Hu and Bentler (1999), an acceptable model should produce RMSEA values less than or equal to 0.07. The fit indexes obtained showed appropriate goodness of fit (normed $\chi^2 = (169.05/72) < 3$; NFI = 0.945; NNFI = 0.959; CFI = 0.967; RMSEA = 0.055 (CI = .044–0.065)).

Convergent validity was evaluated by checking the values of estimated loadings of each item on the underlying construct (if $r > 0.40$ and significant); composite reliability (if > 0.70) and average variance extracted (AVE) (if > 0.50), in line with the work of Chang, Li, and Vincent (2020). Table 3 shows all these results. Standardized factor loadings for the 14-item scale were all substantial and significant (> 0.40); constructed reliability scores of the three factors ranging between 0.72 and 0.87 (see Omegas), indicating sufficient internal consistency within each dimension, and the lowest AVE value was 0.47,

Table 2
Descriptive statistics of items.

Reversed Item	Item	Mean	SD	Skewness	Kurtosis	S. error	Empirical dimension
SE1	There were more visitors than the setting could hold.	2.9	3	0.8	-0.5	0.1	Social Stimulation
SE2	The number of visitors in the setting prevented me from enjoying the experience.	3	3	0.8	-0.6	0.1	Social Stimulation
SE3	Visits to this setting should be restricted so that you are not surrounded by so many people at once.	4.1	3,2	0.3	-1.1	0.2	Social Stimulation
PL1	The visitors were too close to one another during the visit.	4.3	3	0.2	-1	0.1	Privacy level
BC3	The number of people present in this setting interfered with my ability to do what I had expected.	3.3	3,1	0.7	-0.8	0.1	Behavioral constraints
PC2	The number of people present prevented me from deciding the speed at which I could conduct my visit.	3.3	3	0.7	-0.6	0.1	Personal control
SSC1	The other visitors were not following the rules, which meant I couldn't enjoy the experience.	2.2	2.6	1.3	0.8	0.1	Social setting characteristics
SSC3	The other visitors were not being respectful, which meant I couldn't enjoy the experience.	2.3	2.6	1.3	1	0.1	Social setting characteristics
SSC4	The noise produced by the other visitors was annoying.	3	2.8	0.7	-0.5	0.1	Social setting characteristics
SSC7	The other visitors' behavior interfered with my ability to enjoy the experience.	2.7	2.7	0.9	-0.1	0.1	Social setting characteristics
PSC2	Reversed I think the cleanliness and orderliness of the setting were appropriate.	7.9	2.2	-1.4	1.9	0.1	Physical setting characteristics
PSC3	Reversed The spaces visited were enjoyable/as expected.	7.8	2.1	-1.1	1.2	0.1	Physical setting characteristics
PSC4	Reversed The information offered about the setting was enough to help me find my way around during the visit.	7.7	2.2	-1	0.9	0.1	Physical setting characteristics
PCH2	I am uncomfortable sharing spaces with strangers	3.1	2.9	0.6	-0.7	0.1	Personal characteristics
OAC	To what degree were you bothered by the number of people present in the setting.	2.9	2.8	0.7	-0.6	0.1	Crowding
SAT1	The experience was satisfying to me.	8.6	1.8	-1.7	3.5	0.1	Tourist Satisfaction
SAT2	I am happy with the experience.	8.7	1.8	-1.8	3.9	0.1	Tourist Satisfaction
SAT3	The experience was as good as I expected.	8.2	2	-1.5	2.3	0.1	Tourist Satisfaction
SAT4	I felt comfortable with the experience.	8.5	1.8	-1.5	2.7	0.1	Tourist Satisfaction

Table 3
Confirmatory factor analysis loadings.

LATENT VARIABLES				
	Estimate	z	Std.	Eta ²
Evaluation of impact of setting (EIS) Omega = .87				
SE1	1.000		0.711	0.505
SE2	1.156	16.161***	0.807	0.651
SE3	1.054	14.018***	0.697	0.485
PL1	0.832	11.791***	0.584	0.342
PC2	1.105	15.449***	0.770	0.593
BC3	1.148	15.763***	0.786	0.618
Social Setting Characteristics (SSC) Omega = .86				
SSC1	1.000		0.754	0.569
SSC3	1.075	17.582***	0.819	0.671
SSC4	1.059	15.954***	0.749	0.561
SSC7	1.116	17.186***	0.802	0.643
Physical Setting Characteristics (PSC) Omega = .72				
PSC2	1.000		0.714	0.510
PSC3	0.806	9.945***	0.607	0.368
PSC4	1.013	10.580***	0.723	0.523
Personal Characteristics (PCH)				
PCH2	1.000			1.000
COVARIANCES				
	Estimate	z	Std.(R ²)	AVE
EIS with				
SSC	3.606	10.130***	0.862(0.74)	.532
PSC	1.180	5.324***	0.348(0.12)	
PCH	3.549	9.235***	0.581(0.33)	
SSC with				
PSC	1.555	6.938***	0.493(0.24)	.609
PCH	3.228	9.269***	0.568(0.32)	
PSC with				
PCH	1.335	4.947***	0.289(0.08)	.470

***p < .001.

almost 0.50. So convergent validity of the scale was confirmed.

Discriminant validity refers to the distinctiveness of each factor from other factors. To carry out this check, the variance that a construct shares with its indicators has to be greater than the variance that can be shared with other constructs included in the model (Barclay, Higgins, & Thompson, 1995). Table 3 shows the average variances (AVE) of each factor and the squared correlations with the other factors (R²). AVE values were greater than the squared correlation coefficients except for two factors: Evaluation of impact of setting and Social setting. The squared correlation between the Evaluation of impact of setting and Social setting characteristics factors is 0.74, greater than the average variance for Evaluation of impact of setting (0.532) and for Social setting characteristics (0.609) indicating these two factor may be measuring very close concepts. However, in applied research, an oft-used cut-off criterion for problematic discriminant validity is a correlation between factors equal to or greater than 0.85 (Cohen, Cohen, West, & Aiken, 2003; Tabachnick & Fidell, 2001), and several authors consider that it is also important to pay attention to the underlying theoretical model and content validity, despite a high correlation (García & Caro, 2009). Correlation between Evaluation of impact of setting and Social setting characteristics is at that limit (0.86), so, having obtained a good fit of the model, the two factors are kept separate as proposed by the theoretical model.

This confirmatory analysis allows to confirm H1: Evaluation of impact of setting is composed for indicators of social stimulation, privacy level, behavioral constraints and perceives control.

4.2. Structural equation model

Next, the complete structural equation model was tested to confirm whether the theoretical model of crowding had an empirical base. Specifically, the aim of the model was to test which dimensions of the assessment of the setting are related to crowding in a tourist experience and how these dimensions influence satisfaction with the tourist

experience. Table 4 shows correlations between the dimensions analyzed.

Based on Bentler (1990), the fit indexes obtained for the crowding model showed a good fit (normal $\chi^2 = 320.30/146 < 3$; NFI = 0.944; NNFI = 0.963; CFI = 0.969; RMSEA = 0.051 (CI = .044–0.059)). Fig. 2 shows the structure resulting from this model. The resulting model explains 63% of the total variance and 83% of the variance of the tourist satisfaction variable.

4.3. Invariance model analysis

The structural model estimated was used in the second step with multigroup estimation to check whether the proposed model was the same for the three settings evaluated. First, a Configural Model (three groups without any constraints) was estimated. Although the fit indexes were now smaller, they were still adequate: normal $\chi^2 = 653.90/438 < 2$; NFI = 0.894; NNFI = 0.955; CFI = 0.962; RMSEA = 0.057 [CI = 0.048–0.066]. Then, a model with constrained factor loadings (Measured Model) for three groups was estimated, showing no decrease in fit. The difference in the chi-square for both nested models (Configural vs. Measured models constraints) was non-significant ($\chi^2 = 27.573$, df = 26, p > .05). After measurement model invariance was established, structural differences were examined (Structural Model). The previous model was compared with a new one with loading and regression parameters constrained to be equal, and now the difference in the chi-square in the multiple-group models was significant ($\chi^2 = 16.714$, df = 8, p < .05). The only structural parameter with significant differences between the three settings was Evaluation of impact of setting over Crowding, which was higher for Theme parks (0.86) than for the other two settings, in which it was equal (0.72) (see Fig. 2). The differences between this last Structural Model and the Configural Model were non-significant after releasing this structural parameter ($\chi^2 = 5.4615$, df = 6, p > .05). The model is therefore applicable to any context in which one wishes to determine the effect of the variables included on the evaluation of the impact of the setting, and the effect that this has in turn on perceived crowding and tourist satisfaction.

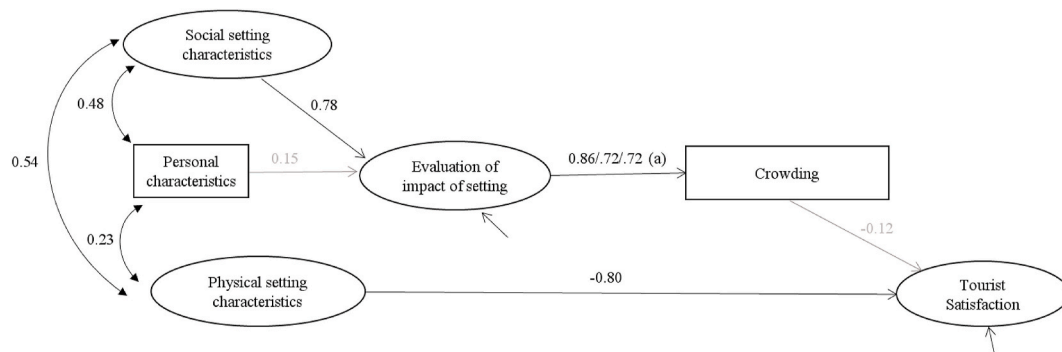
As shown in Fig. 2, as expected, evaluation of impact of setting receives considerable weighting from the social setting characteristics ($\beta = .78$) and a weak effect from the personal variable included in the model, but however not from the physical setting characteristics, although both the physical setting characteristics and the personal characteristics are related to the evaluation of the social setting characteristics. So, Hypothesis 2 is only partially confirmed, because Evaluation of impact of setting is explained by social setting characteristics and personal characteristics, but not by physical characteristics. Keeping constant all other variables, crowding is explained by the evaluation of the impact ($\beta = .79$, for the complete sample, in Fig. 2 β for each context is presented). Hypothesis 3 is confirmed. Contrary to expectations, it cannot be concluded that crowding has a significant effect on satisfaction with the tourist experience, as a $\beta = -.12$ was obtained; however, a negative rating of the physical setting characteristics was found to be closely related ($\beta = -.80$) to tourist satisfaction. Hypothesis 4 is not

Table 4
Correlations between analyzed dimensions.

	1	2	3	4	5	6
1 EIS	–					
2 SSC	.92	–				
3 PSC	.46	.55	–			
4 PCH	.62	.60	.30	–		
5 TS	-.36	-.43	-.89	-.22	–	
6 CR	.83	.74	.40	.49	-.35	–

(EIS: evaluation of impact of setting; SSC: social setting characteristics; PSC: physical setting characteristics; PCH: personal characteristics; TS: tourist satisfaction; CR: crowding).

All correlations are significance with p < .001.



(a) Weights for Theme Parks/Natural Parks/Tourist Cities

Number of observations used: 454, normal $\chi^2=320.30/146<3$; RMSEA=.051 (rmsea.ci.lower = .044, rmsea.ci.upper = .059); NFI = .944; NNFI = .963; CFI = .969.

Fig. 2. Representation of structural equation model.

confirmed.

4.4. Means comparison between groups

Finally, a multigroup SEM moment analysis (means comparison between groups) allowed to compare group means differences in every latent variable. By setting the mean in the group of Theme parks to zero (reference group), the significance of the distance from the other two settings in the different variables of the model was checked, and found to be significant for Evaluation of impact of setting, with a lower mean in Nature parks (difference = -0.723 , $z = -4.65$, $p < .001$) and Tourist cities (difference = -0.357 , $z = -2.12$, $p = .03$), and for Tourist satisfaction, with a higher mean in Nature parks (difference = 0.515 , $z = 3.75$, $p < .001$). Comparing Tourist cities and Nature parks, the only difference is in Evaluation of impact of setting (difference = -0.452 , $z = -2.59$, $p = .01$). Hypothesis 5 is confirmed: the mean of evaluation of impact of setting and crowding will be lower in natural settings than in the other two settings, while tourist satisfaction will be higher.

5. Discussion

Tourist settings face falling victim to their own success, given the impact of overtourism on the tourist experience (Koens et al., 2018). The aim of this study was to examine which variables are related to general perceived crowding and to tourist satisfaction. The results allow to draw several relevant theoretical and practical conclusions.

5.1. Theoretical implications

First, the model of crowding posited by Baum and Paulus (1987) is partially confirmed. Specifically, the results show that the negative assessments that individuals make of their setting produce an impact that they interpret as crowding. This negative assessment includes aspects observed in previous studies that may be linked, at a fundamental level, to high social stimulation (Knowles, 1978; Worchel, 1978) and, to a lesser extent, to a lack of privacy (Altman, 1975), perceived behavioral constraints, and perceived control (Stokols, 1972), but also to one of the contextual variables posited by Baum and Paulus: the perception that the social setting characteristics are not appropriate (Nagar & Paulus, 1997). The high correlation between evaluation of impact of setting and the social setting characteristics factor found in the CFA may indicate that these two measures are very similar, but it was considered important to keep both factors in the scale. Items included in the evaluation of impact measurement may not be adequately discriminating the other

dimensions (privacy, behavioral constraints, and perceived control), and it would be appropriate to test new items in the future. But it is also possible that the best explanation for the evaluation of impact of setting can be found in both, high social stimulation and the behavior of others, and that the other causal explanations included in the comprehensive model of Baum and Paulus are not so relevant. Social overstimulation, together with the perception that the behavior of others is inappropriate, may be enough to measure the perceived crowding in situations where the activity being carried out is what is important, as tourist contexts (Budruk et al., 2008; Luque-Gil et al., 2018; Tarrant et al., 1997).

The physical setting characteristics and one's personal tendency to perceive crowding do not directly influence the evaluation of the impact, meaning that, according to this findings, even when the physical conditions may be appropriate, the behavior and presence of others may be what determines discomfort in social situations. However, both the assessment of the physical characteristics and the tendency to perceive crowding are related to the assessment of the social characteristics; in other words, the perception that the setting does not offer the appropriate physical conditions or the fact that an individual does not cope well with crowding in any situation may lead to a more negative rating of the social behaviors manifested by other people in the setting, and this rating may lead to a more negative evaluation of the impact of that setting. Future research could be carried out in an experimental setting by manipulating the physical conditions and checking the interpretation of the behavior. Some studies have shown that the activation of stereotyped beliefs may be related to the physical setting characteristics in which others are evaluated (Rodríguez-Pérez, Delgado-Rodríguez, Betancor-Rodríguez, & Ariño-Mateo, 2012).

The factor of evaluation of impact of setting has a relevant weight in the crowding. This relationship allows to engage in study and intervention to reduce the factors that make up evaluation of impact, given the strong association that they have with the crowding.

However, in the settings studied, crowding and satisfaction with the tourist experience were not related: the reported satisfaction with visits to the settings studied was independent of the degree of crowding experienced while there. Previous research has obtained similar results in the relationship between crowding and tourist satisfaction (i.e. Kalisch & Klaphake, 2007; Li, Zhang, & Honglei, 2017). For this reason, it is considered that the relationship between tourist satisfaction and crowding in tourist settings requires further empirical clarification. The disparity of results obtained so far may indicate that there are mediating variables between the perception of crowding and tourist satisfaction that have not yet been sufficiently explored. Besides, levels of satisfaction with the tourist experience were extremely high, which could

influence the absence of a relationship between these two concepts.

5.2. Practical implications

As shown in previous studies on crowding in recreational settings, people tend to visit such settings with specific expectations about what they want to do or the type of activity that is carried out there, and the behavior of the other visitors present at that moment may diminish one's satisfaction and produce discomfort (Budruk et al., 2008; Kuentzel & Heberlein, 1992; Luque-Gil et al., 2018; Westover, 1989). Studies of overtourism have found that the presence of too many people can be detrimental to local residents' quality of life or the quality of the tourist experience (Martín-Martín et al., 2018; Milano, 2018). The findings demonstrate the importance of social behavior in tourist areas to avoid a negative evaluation of impact of setting and crowding. In this sense, include measures such as the regulation of social behavior in tourist spaces (for example, keeping silence or making little noise) or favoring that the space is shared by groups with similar interests (for example, by age ranges or groups travel) could be good strategies. While these variables may sometimes be only marginally relevant for tourist satisfaction, they may affect coexistence with residents. Future studies should examine how relations between these two groups might reduce the negative impact.

Satisfaction with tourist settings depends largely, however, on the settings' physical characteristics, and in the present study this satisfaction was not found to be reduced as a result of experienced crowding. As other studies have shown (Bryon & Neuts, 2008; Jacobsen, 2002; Kim et al., 2016; Popp, 2012), it is possible that in some cases the very nature of the tourist experience leads to the belief that high population density is necessary for or even inherent to the experience, and as a result any perceived crowding does not diminish the value of the experience. However, the physical setting characteristics do form part of the expectations surrounding the enjoyment of a setting. In such contexts, crowding can be rated independently of the physical setting characteristics and tourist satisfaction. As a matter of fact, the model was confirmed for the three settings analyzed: theme parks, tourist cities, and nature parks, although the negative effect of evaluation of impact of setting on crowding was greater for theme parks, where it is likely that behavior of other visitors is more important, since the space and the attractions must be shared.

These results indicate the need to be cautious with the physical characteristics of tourist spaces. Keeping spaces orderly, clean and spacious are measures that influence tourist satisfaction. It is also useful to offer the visitor adequate information about the layout of the space, allowing them to orient themselves and choose their route. Besides, it is important that the characteristics of the place coincide with those that have been shown in the advertising, so that the visitor's expectations are met.

A possible explanation is that tourists distinguish between and rate the two dimensions independently: one dimension focuses more on the setting's external conditions and the degree to which the setting produces satisfaction, and the other considers the social experience in that setting, which may lead to perceived crowding when this experience is found to be excessive or inappropriate, while not actually modifying the tourist's satisfaction with the experience of the setting. In fact, the average satisfaction is higher in nature parks, where the physical conditions are clearly better than in theme parks. The distinction between social crowding and physical crowding that has been reflected in some recent studies may also form the basis of the results obtained here (Alsolami et al., 2017; Lee, Kim, & Li, 2011). Understanding these differences can help influence physical or social variables in different tourist settings to promote satisfaction or reduce the negative impact of crowding, depending on the public authorities' aims.

5.3. Limitations

The present study has certain limitations that mean the results should be interpreted with caution. First, the study asked participants to recall an experience in a tourist setting. It is possible that there was a bias in recall that led them to think back on a particularly positive experience that was greatly desired, as reflected in the high average score in the items measuring satisfaction. Also, perhaps due to the same recall bias, participants tended to think of settings where they did not feel any discomfort as a result of the large number of people present. Further studies must therefore be conducted that explore possible differences arising from the point in time (present or past) when data are collected.

The data were collected through an online survey. Although the use of such tools has become extensive in social science research, it is possible that the validity of the collected responses was affected by variables that are beyond the control of the present research. Contrasting these results with those obtained with face-to-face procedures could help validate the results. Also, more research is needed to verify that these findings can be replicated with similar samples and can be considered generalizable. Likewise, as mentioned above, experimental studies where physical and social conditions can be manipulated would help replicate the usefulness of the model and its relationship with satisfaction.

Author contributions

All authors participated and contributed equally to this article in conceptualization and methodology. Data analysis and interpretation was undertaken solely by Cristina Ruiz.

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Declaration of competing interest

No potential conflict of interest was reported by the authors.

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