A Chronological Review on Perceptions of Crowding in Tourism and Recreation

This study presents a chronological review of methodological and empirical issues of the perceived crowding literature in the contexts of tourism and recreation. A content analysis was performed on 178 empirical articles gathered from online databases and published during the period of 2000-2019. The findings are presented in three sections—specifically, research scope, research methodology, and empirical issues consisting of antecedents and consequences of perceived crowding. The integrative review demonstrates that perceived crowding research is methodologically characterised by (1) a dominance of single-country setting studies mostly sampling visitors as opposed to other units of analysis and (2) an overwhelming number of quantitative studies with high response rates but a lack of sampling method reporting. Regarding the empirical issues, personal factors, external factors, and site-related factors are highly examined as antecedents of perceived crowding. In terms of crowding consequences, satisfaction-related consequences, and behavioural and affective responses constitute the main consequences discussed in the literature. The two substantial contributions of this article to the existing literature are as follows: (a) filling the gap in the relevant body of research with a comprehensive review of empirical articles on the subject and (b) providing theoretical and methodological guidelines for future research.

Keywords: Perceived crowding; Tourism; Recreation; Literature review; Chronological analysis

Introduction

In recent years, social carrying capacity has been exceeded in popular tourism destinations in Europe as a result of tremendous increase in tourist arrivals. As one of the key perceptions examined in carrying capacity, perceived crowding stems from the excessive use of tourism areas and is expected to result in a change in tourist behaviour (Gonzalez et al., 2018). Although crowding has been predominantly accepted as a source of negative traveller reactions in many studies (Kim & Park, 2008; Kuentzel &

Heberlein, 1992; Yeh et al., 2012), it has been perceived as positive by visitors in certain contexts, such as festivals and events (e.g., Mowen et al., 2003). Perceived crowding is an important issue that needs to be addressed in recreation and tourism management due to its effects on visitor satisfaction and experience quality. In addition to other fields such as retail marketing, urban planning and management, and healthcare management, the number of studies related to crowding in the tourism and recreation area has continued to increase, providing a great number of studies on the subject.

Although perceived crowding has been mainly discussed in terms of the social aspect of sustainability in the tourism and recreation management literature, it has also been associated with economic and environmental consequences. The exceeding of social carrying capacity in destinations leads to problems such as environmental degradation, cultural destruction, traffic congestion, and decrease in locals' quality of life (Wang et al., 2020). Buckley (2020) summarized different sets of criteria that categorize recreation capacity into three main approaches conceptually: (1) environmental approaches based on measures of environmental change due to tourism development, (2) social approaches based on the reactions of tourists to other tourists, and (3) economic approaches based on changes in net revenue. Therefore, sustaining the social and biophysical conditions that are desired or appropriate in a tourism area has been the focus of concern for destination managers and tourism planners, beyond concentrating only on how many people a destination can sustain (McCool & Lime, 2001).

Prior research has extensively discussed the crowding phenomenon on both theoretical and empirical bases in tourism and recreation literature. Theoretical studies have discussed perceived crowding as an evaluative dimension of the tourist experience, which determines social carrying capacity (Heywood, 1996; Shelby & Heberlein, 1984).

In addition, a majority of empirical studies have examined the relationship between crowding and some variables such as use levels, visitor characteristics, coping behaviour, satisfaction, and group behaviour (Manning, 1999). Notwithstanding this abundant empirical research on crowding, a limited number of scholars have previously reviewed the perceived crowding literature in the recreation and tourism field (Arnberger & Mann, 2008; Manning, 1999; Shelby & Vaske, 2007; Vaske & Donnelly, 2002). Moreover, despite these earlier attempts to offer useful insights for researchers, the coverage of these review studies has been confined to specific geographical areas, measurements, scope, and theoretical bases. Thus, a research gap emerges with regard to expanding the knowledge on perceived crowding in the contexts of tourism and recreation through a chronological investigation of the empirical studies from a wider perspective.

In order to fill this research gap, this study aims to conduct a chronological review of the existing tourism and recreation literature on perceived crowding over the past two decades. This study has four main objectives: (a) to investigate the scope of research adopted by empirical articles on the subject; (b) to present specific research methodologies adopted by scholars; (c) to analyse the antecedents and consequences of perceived crowding addressed within the tourism and recreation context; and (d) to suggest future research directions in light of the findings. This study is expected to contribute to the tourism and recreation literature from several angles. Firstly, it expands present knowledge on perceived crowding in the tourism and recreation field through a chronological analysis. Secondly, it presents an integrative analysis of research scopes and methodologies adopted in the pertinent literature. Thirdly, it provides a chronological analysis of antecedents and consequences of perceived crowding, examining the variables studied in the related literature. Finally, it sheds light

on knowledge gaps by giving a snapshot of the domain and identifying future research areas for scholars who plan to conduct further studies in this area.

Palmatier et al. (2017) suggested that review papers should offer some main benefits: (1) providing an integrated and synthesized overview of the current state of the literature; (2) identifying inconsistencies in prior results and potential explanations; and (3) describing existing gaps and offering future research directions. Perceived crowding portrays one of the most contemporary topics in the tourism and recreation field, especially during the past decade, and it seems that this domain will probably continue to receive scholarly attention in the future due to the aforementioned reasons. Therefore, it is necessary to improve the knowledge on perceived crowding in this area through a comprehensive review. The rest of this study is organised into four sections. The next section provides a literature background of the perceived crowding concept within the domains of tourism and recreation. The following section explains the steps of the investigation method undertaken by the author while carrying out this review. The research findings and discussions are organized into two main sections: (1) methodological findings, including research scope and research methodology, and (2) empirical issues, involving the analysis of antecedents and consequences of perceived crowding. The final section presents conclusions and limitations of the study.

Background

Following the classic studies of Calhoun (1962) on crowding effects in animals, the first experimental studies concerned with the effects of crowding on human behaviour were performed in various contexts (e.g., prison, navy, nursery, high school), rooted in the field of environmental psychology (Dean et al., 1978; Freedman et al., 1971; Mcgrew, 1970; Paulus et al., 1978). In the recreation and tourism field, most early research on

crowding primarily focused on outdoor recreation in wilderness areas and used the common crowding model relating density and satisfaction (Shelby, 1980). Moreover, many previous scholars in the field of recreation supported the notion that crowding is a complex phenomenon related to many variables such as personal characteristics, norms, motivations, and preferences, in addition to the numbers of people encountered (Moyle & Croy, 2007).

Several social-psychological paradigms are predominantly used to explain personal differences in perceptions of crowding. According to psychological reactance theory, a person will exhibit resistance whenever freedom of choice is restricted (Brehm & Brehm, 1981). Based on psychological reactance theory, Hui and Bateson (1990) suggested a behavioural constraint model, which suggests that if one's desired actions, are limited or eliminated due to the presence of other people, this amount of people will be evaluated as overabundant. Along with these explanations, the theory of stimulus overload suggests that people feel crowded when they are overwhelmed by the attendance of other visitors (Schmidt & Keating, 1979). The model of Stokols (1972) indicates that density is a necessary determinant for perceived crowding and regards crowding as a psychological experience characterised by stress. On the other hand, Altman's comprehensive model of crowding involves several antecedents such as personal and interpersonal characteristics and situational and environmental factors, as well as various coping mechanisms to attain a desired level of interaction (Altman, 1975, cited in Edney, 1977). Overall, these models of perceived crowding include the underlying assumptions that people feel overcrowded and show stress reactions as density levels increase and their freedom of action is restricted in a specific area.

Shelby and Heberlein (1984) defined perceived crowding as one's negative assessment

of density levels within a certain physical environment. This assessment resulted from a comparison of the number of people in the area with the acceptable limits and standards of individuals. Similarly, Vaske and Donnelly (2002) argued that 'perceived crowding combines descriptive information (i.e., the density or encounter level experienced by the individual) with evaluative information (i.e., the individual's negative evaluation of that density or encounter level)' (p. 256). Thus, crowding is explained based on affective density involving the appraisal of certain conditions as unfavourable with the influence of some other physical and social variables rather than lack of space.

Since perceived crowding is a psychological construct that exists in the minds of individuals, self-reporting techniques have been used for measurement (Vaske & Shelby, 2008). Heberlein and Vaske (1977) were the researchers to develop a quite simple scale to measure crowding perceptions. This one question scale has dominated the crowding literature in the tourism and recreation area. The original or short formats of this single-item measure have been widely used to a great extent (e.g., Fleishman et al., 2007; Smith et al., 2013). In addition, recent crowding literature has heavily adopted photo elicitation methods coupled with survey methods to measure crowding perceptions of visitors participating in various recreational activities such as hiking, diving, and snorkelling (Zhang & Chung, 2015; Kim & Shelby, 2011; Schults & Svajda, 2017).

Previous studies on perceived crowding mainly focused on outdoor recreational settings until the early 2000s (Andereck & Becker, 1993; Manning & Valliere, 2001; Shelby et al., 1988), whereas crowding in urban tourism has been highly ignored in the literature except for a few studies (e.g., Lee & Graefe, 2003; Petruzzi et al., 1996). It is obvious that crowding has been one of the most largely investigated issues of recreation and

tourism, and it is expected to be of higher importance for both managers and researchers in the future due to the current population growth rates (Vaske & Shelby, 2008) and trends towards limiting uses of areas due to ecological impacts, along with increasing societal demands for outdoor recreation (Arnberger & Mann, 2008). Accordingly, this study aims to identify gaps in the existing literature and provide implications and directions for improvement while presenting a current picture of the literature's evolution in terms of methodological or empirical aspects.

Investigation Method

This review focuses on the literature studying perceived crowding in tourism and recreation activities. The investigation covers the empirical articles published in English between 2000-2019, since Manning (1999) has already presented a review of antecedents and consequences of perceived crowding in the recreation context. The studies in this review were selected on the basis of four major criteria: (a) they analysed perceived crowding in the tourism or recreation context; (b) they were published in refereed academic journals in the tourism and recreation field; (c) they were empirical in nature, reporting first-hand data analysis; and (d) they were published in the English language.

The articles to be examined in this review were identified using a systematic process. First, an electronic search was carried out on the title, abstract and keyword fields with the keywords "perceived crowding", "perception of crowding" or "crowding perceptions" in combination with "recreation", "tourism", or "tourist" to detect the relevant articles. The articles were collected in April 2020 from the Scopus database. As one of the largest databases of peer-reviewed literature across a wide range of academic fields, Scopus includes more than 24,600 active titles from over 75 million records

(Elsevier, 2019). To ensure that all relevant articles were included, a second search was also performed by scanning the reference lists of identified studies manually. As a result, 247 articles were identified and 69 articles were excluded due to misleading keywords, coverage or lack of empirical design.

In total, 178 empirical studies published in 64 different academic journals were identified. Perceived crowding articles within the recreation and tourism context have intensified in the stream of research in hospitality, leisure, sports and tourism (68.5%), environmental sciences (20.2%) and geography and sustainability (7.3%). The top five journals that served as publication outlets for this body of research are *Environmental Management* (23), *Journal of Leisure Research* (12), *Journal of Outdoor Recreation and Tourism* (10), *Tourism Management* (9), and *Asia Pacific Journal of Tourism Research* (7) (see the Appendix for a full list of the publication platforms and Figure 1 for the number of articles published each year). The articles were categorised into two time periods: 2000-2009 (59 articles) and 2010-2019 (119 articles), with the aim of showing trends in the literature on the basis of decades. While solely descriptive analysis is useful as a starting point for review papers, the examination of trends provides a deeper understanding of the domain (Palmatier et al., 2017).

[Figure 1 here]

In the process of extracting the data, all articles were subjected to a content analysis, which is defined as 'a method for the subjective interpretation of the content of the text data through a classification process of coding and identifying themes or patterns' (Hsieh and Shannon, 2005, p. 1278). The coding frame for the research scope and methodology was adopted from Aykol et al. (2013) and organized along with two major dimensions: (a) research scope – countries involved, geographic focus, unit of analysis,

sub-sectors covered, setting, and activity type; and (b) research methodology – time emphasis, methodology type, visualization, sampling design, sample size, data collection, response rate, and analytical approach. In the data analysis step, each identified article was entered in an Excel spreadsheet to establish a data set recording attributes such as year of publication, authors, title, journal, key sentences providing information on study aims, antecedents, methodology and consequences. The concepts related to antecedents and consequences of perceived crowding were first codified into categories and sub-categories adapted from Westover's (1989) perceived crowding model. Data extracted from the coding frame were then analysed through SPSS, and crosstabs were used to present percentage frequencies for each dimension investigated. For the empirical issues, new coding frames were developed based on a review of all articles gathered and concepts identified.

A list of 34 different antecedent sub-categories was extracted under five main categories: personal factors, external factors, site-related factors, trip characteristics, and situational factors. The consequences of perceived crowding were summarized into 31 sub-categories classified under nine main categories: satisfaction-related consequences, behavioural responses, affective responses, post-experience behaviour, environmental consequences, marketing-related consequences, cognitive responses, management-related consequences and miscellaneous. This content analysis provides a summary of key themes and shows trends within different dimensions by mapping and assessing the relevant body of knowledge on perceived crowding in the contexts of tourism and recreation.

Research Findings and Discussion

In this part, the findings of the study are presented along with the coding frame in three

main sections: Research scope, research methodology, and empirical issues including antecedents and consequences of perceived crowding.

Research Scope

With respect to research scope (Table 1), nearly all of the empirical studies have been conducted in a single country setting, with the exception of a few articles (2.2%) that concentrated on multiple countries for data collection to enable cross-country comparison (e.g. Brown et al., 2013; Sayan et al., 2013). The most popular geographical regions focused on by the studies were North America (41%), Asia (22.5%) and Europe (21.3%). It is, however, interesting to note that the researchers' interest in North America (mainly the USA) has considerably decreased over time, while Asia and Europe have become highly investigated regions in the last decade. This is in line with the growing level of tourism scholarship production on Asian countries, especially China (Sun et al., 2017). In addition, Latin America (e.g., Mexico, Costa Rica) and the Middle East (e.g., Jordan, Israel, Egypt) started to receive scholarly attention on the perceived crowding topic in the recreation and tourism field during the period of 2010-2019. The increasing inclination toward covering Asia, Latin America and the Middle East in the last decade may be explained by the fact that these regions are developing economies and also emerging markets for international tourist arrivals (United Nations World Tourism Organization [UNWTO], 2019). Although geographical focus has been more diversified in the last decade, the predominance of empirical studies examining a single country shows a notable research gap, which needs to be filled with more studies applying cross-cultural or cross-national analysis in order to provide comparable information about perceived crowding.

[Table 1 here]

A vast majority of the examined articles (83.1%) sampled visitors exclusively, while 7.3% focused on residents and 6.2% concentrated on both visitors and industry representatives. A limited number of studies (3.3%) sampled both residents and visitors (e.g., Arnberger & Brandenburg, 2007; Needham & Szuster, 2011) or only industry representatives (e.g., Buckley, 2002). This finding illustrates that visitor-level investigation dominates the pertinent literature. It also demonstrates a research gap that needs to be filled with future studies recruiting industry representatives and residents as units of analysis. Regarding sub-sectors covered by the articles reviewed, nearly three fifths (58.4%) of the articles concentrated on the recreation field, while another 35.4% focused on leisure activities such as city tours, museum visits and festival attendance. Despite a significant increase in the number of studies focusing on other sub-sectors in the past decade (e.g., Kim & Park, 2008; Noone & Mattila, 2009; Teye et al., 2002), the trend in perceived crowding literature was to explore recreationists.

The articles were analysed in terms of research setting and divided into two categories, backcountry and frontcountry, using terms from the literature (Lei & Zhang, 2011; Kim & Shelby, 2011; Shi et al., 2017). While backcountry refers to wilderness, low-use recreation and rural areas, frontcountry implies developed, high-use urban areas (Lee & Graefe, 2003; Manning et al., 1996). The analysis shows that the empirical studies were more or less equally divided between those which were conducted in backcountry settings and those that examined perceived crowding in frontcountry settings. However, while the number of backcountry-setting studies has been decreasing over time, the number of frontcountry-setting studies has increased. In line with these findings, the population investigated ranged from recreationists such as hikers (16.9%), divers/snorkellers (6.7%), and boaters (3.9%) to leisure tourists such as park visitors (11.2%), urban tourists (9.6%), heritage site visitors (5.1%), and festival attendees

(3.9%). Other investigated samples include users such as restaurant customers (e.g., Hwang et al., 2012), cruise tourists (e.g., Hyun & Kim, 2015), sports fans (e.g., Sarstedt et al., 2014), off-road vehicle users (e.g., Hallo et al., 2009), and theme park visitors (e.g., Wang & Li, 2019). This integrative analysis shows that the proportion of frontcountry-setting studies increased over time, since previous studies emphasized the need for more studies to facilitate the understanding of visitors' perceptions in frontcountry situations (Vaske & Donnelly, 2002). Despite huge variation in activity types studied in this body of research, the main focus of perceived crowding research has been recreationists. With the aim of revealing the changes in perceived crowding over contextual differences and setting types, future research should probe other activity groups, such as museum visitors, urban tourists, and other diversified niche markets engaging in tourism activities.

Research Methodology

Table 2 summarizes the methodological characteristics of the tourism and recreation literature concentrating on perceived crowding. With respect to time emphasis, the overwhelming majority (87.6%) of articles were cross-sectional in nature, whereas a limited number of articles adopted a longitudinal approach. Longitudinal studies primarily utilized panel data with various aims such as demonstrating displacement trends as a response to perceived crowding (Riley et al., 2015), changes in crowding norms over time (Kuentzel et al., 2008; Kuentzel & Heberlein, 2003), and variations in use levels and their effects on visitor experience (Fredman et al., 2007). This chronological review shows that the proportion of longitudinal studies on the subject has been decreasing over time, whereas cross-sectional studies dominated the relevant literature in the past decade. Although longitudinal designs minimize the biasing effect

297 of common occasion factors and enable controlling the influence of unmeasured
298 variables in the studies (Bradley & Sparks, 2012), they come with some practical
299 challenges, such as a high demand for time commitment and dedication, intense labour
300 requirement, high costs, and the possibility of attrition in the sample (Ritchie, 2005). In
301 the related literature on perceived crowding, the high prevalence of cross-sectional
302 studies was likely due to the practical ease of conducting such studies. This finding
303 highlights an important research gap to be bridged by future studies with longitudinal
304 designs.

305 [Table 2 here]

306 Regarding research methodology, the empirical articles mainly (79.8%) employed a
307 quantitative approach with the exception of a limited number of studies (e.g., Popp,
308 2012; Sorice et al., 2006; Trachsel & Backhaus, 2011) which adopted a qualitative
309 research design. Only 12.9% of the articles employed a mixed-method approach
310 integrating both quantitative and qualitative data collection (e.g., Bell et al., 2011; Jin et
311 al., 2016; Johnson & Dawson, 2004). Moreover, 21.3% of the perceived crowding
312 articles adopted visualization methods incorporating qualitative and quantitative
313 research designs in order to elicit feelings of crowdedness in participants and
314 understand their encounter norms (e.g., Cribbs et al., 2019; Schultz & Svajda, 2017).
315 Whereas a limited number of articles used real pictures (e.g. Aikoh et al., in press), the
316 majority of researchers utilized manipulated versions of the original photographs using
317 software programs to depict different levels of crowding (e.g. Kim & Shelby, 2011;
318 Zhang, Qiu & Chung, 2015). Additionally, Hwang et al. (2012) used interactive virtual
319 reality (VR) technology to manipulate crowding levels in a VR restaurant with an
320 experimental design.

One explanation for the predominance of quantitative research designs in the pertinent literature may be the dominance of the positivist paradigm in social science inquiry. While positivism considers reality to be objective and tangible and pursues statistical generalization, qualitative research has been disparaged for lacking rigour and validity among scholars in tourism research for decades (Decrop, 1999). Another explanation may be the increasing requirement from high-ranking tourism journals for more studies that include testing of hypotheses until the end of the 2000s (Wilson et al., 2020). Although structured surveys and quantification provide the benefit of objectivity, closed-response surveys limit researchers' ability to gain a deeper understanding of the meanings of people's choices (Riley, 1996). Despite a slight increase in mixed studies in recent years, there is still an important research gap to be filled by future scholars, who should collect data with qualitative methods instead of structured surveys in order to better understand the perceived crowding phenomenon, which requires in-depth analysis.

With respect to the sampling design, articles were nearly evenly separated between those employing a non-probabilistic method (37.6%) and those using a probabilistic sampling method (34.8%). However, while the proportion of the former has shown an increasing trend, the number of studies employing the latter decreased in the past decade. The employment of whole-population sampling methods was found in only 5.1% of the studies and was more apparent in studies examining tourist arrival numbers (e.g., Thomas et al., 2005), analysing geotagged data (e.g., Shi et al., 2017) or using case study approaches (e.g., Musa, 2002). More than one fifth of the empirical studies (22.5%) did not specify the sampling method adopted, despite a decrease in the proportion of studies lacking sampling design information over time. Notwithstanding the high proportion of probabilistic sampling methods, the findings revealed a great lack

of sample size determination using known and accepted theoretical practices, especially in the last decade. This highlights a need for empirical studies adopting more random sampling techniques, which are required for building research validity and reliability (Baker et al., 1994).

In terms of sample size, two fifths of the articles (40.8%) had a sample exceeding 500 units (e.g., Doorne, 2000; Kuentzel et al., 2008; Zhao et al., 2018), although research adopting smaller sample sizes showed a slight rising tendency from 2009 to 2019, in line with the increase in mixed-method approaches. Moreover, the analysis shows that the majority of the studies (37.6%) did not report response rates, a questionable choice that has seemed to increase in the last decade. Another 38.5% of the articles reported a response rate above 70%, while only a few studies (e.g., Avila-Foucat et al., 2017; Breen & Breen, 2008; Neuts, 2016) reported a response rate below 40%, which might be explained by the nature of the data collection method or sampling design.

The dominant data collection methods were personal surveys and interviews (73%), which were mainly used to obtain data just before or after the tourism or recreational activity performed by respondents. Mail surveys were used to a lesser extent (11.8%), mainly in the form of follow-up questionnaires sent after the first data collection wave was completed (e.g., Needham et al., 2014) or in situations where it is difficult to conduct on-site surveys for reasons such as weather conditions (e.g., Fix et al., 2013). Nevertheless, employment of mail surveys as a data collection approach decreased in the second time period, while the proportion of electronic data collection methods increased. This may be attributed to the efficient and convenient nature of electronic means, which help researchers to integrate highly utilized photo elicitation methods or video simulations into their surveys. Other data collection tools such as telephone and

drop-in questionnaires were rarely used in either time period. Regarding analytical approach, the review shows that diversified analytical approaches were employed by empirical studies. More than one third (33.7%) of the articles used uni- or bivariate methods such as correlation, crosstabs, and one-way ANOVA test for data analysis. Moreover, 27% of the studies conducted descriptive analyses (e.g., frequencies) while another 21.9% performed multivariate analyses (e.g., multiple regression). The proportion of structural equation modelling has considerably increased in recent years compared to the first time period.

Empirical Issues

This section of this chronological review study presents antecedents and consequences of perceived crowding in the contexts of tourism and recreation and their variation over the past two decades. Figure 2 shows an integrated framework, including antecedents, consequences, mediators, and moderators of perceived crowding in the tourism and recreation literature.

[Figure 2 here]

Antecedents of Perceived Crowding

Regarding antecedents of perceived crowding, 566 different constructs were identified for the two time periods included in the analysis (Table 3). Identified constructs were grouped into five main categories: (1) personal factors, (2) external factors, (3) site-related factors, (4) situational factors, and (5) trip characteristics. This review showed that scholars studied mostly personal factors (40.3%), external factors (25.6%), and site-related factors (19.4%), while trip characteristics (7.4%) and situational factors (7.2%) received relatively less scholarly attention in the perceived crowding literature.

393 [Table 3 here]

394 *Personal factors* as influencers of perceived crowding were categorised into 11 sub-
395 categories: Socio-demographic variables, country of origin, norms, past on-site
396 experience, motivations, tolerance levels, past activity experience, preferences,
397 expectations, place attachment and time orientation. Socio-economic variables such as
398 gender, age, income, residential area and education are highly investigated as
399 influencers of perceived crowding in the pertinent literature. Contrary to some empirical
400 support for a significant correlation between socio-demographic variables and perceived
401 crowding (e.g., Fleishman et al., 2004; Rasoolimanesh et al., 2016), many scholars did
402 not find any significant influence of visitors' socio-demographic characteristics on their
403 crowding perceptions (Gonson et al., 2018; Moyle & Croy, 2007; Sim et al., 2018). In
404 perceived crowding literature, nationality and country of origin were highly studied
405 either as moderators of the relationship between use levels and crowding perception in
406 cross-cultural studies (e.g., Sayan et al., 2013) or as factors directly affecting perceived
407 crowding. For example, Jin et al. (2016) found that Asians (Chinese and Japanese) and
408 Westerners (Europeans and North Americans) differ in crowding perceptions, and they
409 grounded this result on the collectivism/individualism factor of culture.

410 Norms referring to visitor standards that individuals use for evaluating the setting
411 density (Vaske & Donnelly, 2002) were widely studied in the related literature based on
412 normative theory (e.g., Jin & Pearce, 2011; Needham et al., 2005). When reported
413 encounters exceed visitors' encounter norms or levels of acceptability, perceived
414 crowding increases (Ziegler et al., 2016). Furthermore, tolerance levels for crowding
415 (e.g., Jin & Pearce, 2011; Popp, 2012) were found to be significant determinants of
416 perceived crowding, in conjunction with preferences referring to level of user density

417 that visitors would prefer during their stay (Kalisch & Klaphake, 2007). Regarding
418 expectations, Lee and Graefe (2003) found that crowding perceptions of festival
419 attendees were significantly related to estimated density before the visit. Similarly, Eder
420 and Arnberger (2012) confirmed the positive relationship between crowding
421 expectations and crowding perceptions of visitors, who expect Sundays to be more
422 crowded than workdays. Nevertheless, there is also contradictory empirical evidence
423 against their findings (Neuts & Nijkamp, 2012).

424 In relation to past on-site experience, some researchers confirmed that visitors with the
425 most past experience of the area reported the highest crowding evaluations (e.g.,
426 Arnberger & Brandenburg, 2007). In contrast, however, many studies did not find any
427 empirical evidence for a significant effect of the number of past visits on crowding
428 perceptions (e.g., Budruk et al., 2002; Hall & Shelby, 2000; Morgan & Lok, 2000).
429 Additionally, the relationship between past activity experience (e.g., specialization,
430 skills) and perceived crowding has been confirmed to a great extent in the pertinent
431 literature. As the level of specialization in the activity increases, the tolerance for
432 crowding decreases (Bentz et al., 2015). Correspondingly, Leujak and Ormond (2007)
433 who tested the influence of both knowledge on coral reefs and the amount of past
434 experience in marine environment on crowding perceptions found that snorkellers who
435 have more knowledge of marine life and better snorkelling skills are significantly more
436 susceptible to crowding.

437 Among other personal factors, motivations received relatively high scholarly attention
438 among researchers in the perceived crowding literature. Jin et al. (2016) found that self-
439 development/novelty motives had a stronger effect than other motives on perceived
440 crowding. Also, Kainzinger et al. (2016) suggested that recreationists who focus more

441 on the activity itself are less concerned about crowded situations. Despite these
442 supportive results regarding the impact of motivations, some studies did not find any
443 relationship between visiting motives and perceived crowding (e.g., Arnberger &
444 Haider, 2007a). With respect to the influence of place attachment (place identity and
445 place dependence) on perceived crowding, researchers have produced inconsistent
446 findings. Although place attachment was found to be a strong predictor of crowding, the
447 impact was different across frontcountry and backcountry setting types. For example, as
448 place attachment of visitors increases, crowding perception increases during a
449 recreational activity (Kyle et al., 2004), whereas higher levels of place attachment
450 resulted in more positive evaluations of high crowding levels in a festival setting
451 (Wickham & Kerstetter, 2000). Only one study examined the role of time orientation
452 (Mattila & Hanks, 2012), concluding that people who possess economic time
453 orientation and think that "time is money" reported less satisfaction when they wait in
454 crowded conditions. Although personal factors are highly studied as antecedents of
455 perceived crowding, no research to date has studied the impact of personality traits and
456 locus of control on perceived crowding in the tourism and recreation context, despite
457 earlier calls for such research (Zhang & Chung, 2015). Future research should examine
458 how personality differences influence visitors' perceptions of crowding and experience
459 evaluations.

460 Another stream of research related to determinants of perceived crowding has focused
461 on *external factors*, including use levels, behaviour of others, encounter levels, number
462 of vehicles, similarity between groups and distance between users. Under this category,
463 the highest interest was devoted to use levels in both time periods. Direct impact of
464 actual use levels on perceived use levels was confirmed in numerous studies (e.g., Jin &
465 Pearce, 2011; Klanjšček et al., 2018). As mentioned previously, visitors' perceived use

levels were predominantly derived from the actual number of visitors depicted through the visualization methods. In addition to actual number of visitors, encounter levels were found to be among the most influential antecedents of perceived crowding. Qiu et al. (2016) confirmed that a visitor's impression of a destination's crowdedness worsens as the number of tourists that he or she encounters during the trip increases. Also, significant relationships between number of vehicles on site and crowding perceptions were also revealed by many studies. For example, Ziegler et al. (2016) contended that the number of boats in a shark-viewing area was an important factor influencing user's perceived crowding.

As the second most studied external factor, behaviour of others, including depreciative visitor behaviour (Eder & Arnberger, 2012), consumption behaviour (Sim et al., 2018), disturbing behaviours (Neuts & Nijkamp, 2012), and impoliteness (Alazaizeh et al., 2019), was found to be a major contributor to crowding perceptions. Moreover, similarity levels between visitors and distance between users as antecedents of perceived crowding were investigated by scholars to a limited degree. Empirical evidence has suggested that dissimilarity between in- and out-groups is a significant predictor of crowding perceptions (Smith et al., 2013). Although many researchers have claimed that proximity is an explanatory factor of perceived crowding (e.g., Rathnayake & Gunawardena, 2012), the number of visitors was found to be more influential than the distance between visitors (Zhang & Chung; 2015). This review analysis indicated that social factors as determinants of perceived crowding were relatively neglected in the pertinent literature, although crowding was previously accepted as a social phenomenon (Baum et al., 1979).

Site-related factors were also crucial to perceived crowding, including site facilities,

resource/setting type, environmental conditions on site, resource availability/accessibility, distance of site, management strategies, popularity of attraction and price of service. Empirical studies showed that the presence and/or quality of facilities such as accommodation units, restaurants, transportation vehicles, and parking spots were significantly correlated with crowding perceptions of visitors (Kim et al., 2014; Rasoolimanesh et al., 2017; Sim et al., 2018). In addition to site facilities, resource or setting type was the other most-emphasized determinant of perceived crowding in the pertinent literature. Comparative studies proved that backcountry samples showed less tolerance to higher encounters than frontcountry visitors (Kuentzel et al., 2008). Moreover, Randall and Rollins (2013) measured crowding perceptions of visitors of marine (kayaks on water) and terrestrial (campsites) environments and found significant differences between visitors of two area typologies. Past studies also found that individuals perceived higher crowding in natural areas than human-made areas, since encounter norms are higher in built settings (Lee & Graefe, 2003; Vaske & Donnelly, 2002). In relation to environmental conditions, quality of the environment (Schroeder & Fulton, 2010), littering and pollution levels (Sever et al., 2018), presence of animals or pets (Arnberger et al., 2018), and soundscape including noise of people and traffic (Sever et al., 2018) were all found to influence perceived crowding.

Of the site-related factors, resource availability/accessibility was another common antecedent of perceived crowding, which, in turn, affects visitors' overall experience quality. Visitors who wait for facilities such as parking or recreational services or encounter queueing during their experience feel more crowdedness compared to those who do not (Morgan & Lok, 2000; Li, 2019). This integrative analysis showed that distance between the source and destination is influential in evaluations of site

515 crowdedness. More long-distance travellers who have already booked their hotels and
516 are unable to adjust their schedules easily are less negatively impacted by the crowds
517 when compared to short-distance or local visitors (Qiu et al., 2016). In contrast to these
518 findings, however, Fix et al. (2013) suggested that the remoteness of the site does not
519 influence the crowding perceptions, despite increasing encounters in less remote zones.
520 These findings show that there is a need to further explore the relationship between
521 perceived crowding and resource accessibility as a potential influencer of visitors'
522 crowding evaluations.

523 Another line of research concentrated on managerial strategies as indirect influencers of
524 perceived crowding. For example, Jordan and Vogt (2017) examined residents'
525 perceptions of stress related to cruise tourism and found that crowding and congestion-
526 related stress was attributed to operational decisions of site management. Furthermore,
527 information about wait times provided by the management has been considered as a tool
528 to mitigate crowding perceptions of visitors, especially in theme park settings (Brown et
529 al., 2013; Zhang et al., 2017). Among other site-related factors, popularity of the
530 attraction and price of the service attracted relatively less attention in both time periods.
531 Reputation of the attraction, which is a result of the tourist flow, also reflects a reason
532 given by tourists for visiting a particular destination and increases the probability of
533 crowding (Jin et al., 2016; Shi et al, 2017). The limited number of scholars who
534 examined the effect of price on perceived crowding found that the crowding perceptions
535 of visitors who pay substantially higher prices are lower (Perdue, 2002). Moreover,
536 some cultural differences were revealed in the attribution of the congestion at the site to
537 the price of the service (Kim et al., 2010).

538 The fourth category of antecedents is *trip characteristics* (7.4%), including length of

trip, travel companions, activity type, travel organization type, frequency of travel, and travel mode, which received high interest during the period of 2010-2019. In the reviewed literature, length of stay was found to significantly impact the crowding perceptions of visitors in a positive direction (e.g., Neuts & Nijkamp, 2012; Pierce & Manning, 2015). In a similar vein, Jurado et al. (2013) claimed that tourist segments characterized by medium and long holidays perceived contact with residents more negatively than did short-stay visitors. The presence of a travel companion and the type and size of travel party were also examined as determinants of perceived crowding. However, the results related to travel party were inconsistent. Even though an insignificant effect of travel company (alone vs. in a couple/with others) was found in some studies (Yagi & Pearce, 2007), the empirical evidence also suggested that visitors travelling with family reported higher crowding perceptions (Sim et al., 2018). Regarding activity type, an overwhelming body of evidence suggested that samples involving different activities have different tolerance levels for high numbers of encounters (Kainzinger et al., 2016; Needham et al., 2018), despite a few contradictory results (e.g., Pietilä & Fagerholm, 2016). Moreover, relatively little attention was devoted to travel organization type (individual/group), frequency of travel and travel mode (car or public transport) as influencers of perceived crowding (Cságoly et al., 2017; Sim et al., 2018; Zehrer & Raich, 2016). This review indicates that more research is needed to better understand the role of trip characteristics on perceived crowding better.

The final category under perceived crowding antecedents is *situational factors*, including time of visit, place of contact, and weather conditions. Empirical studies illustrated that time-related factors, such as time of day, peak and off-season periods, and length of time during which visitors are exposed to encounters, are associated with

visitors' perceptions of crowding (e.g., Doorne, 2000; Moyle & Croy, 2007). In relation to place of contact, Jin and Pearce (2011) found that visitors are prepared to tolerate high number of visitors at the entrance of the site, whereas their crowding perceptions are higher in exhibition rooms in a historic site context. In relation to weather conditions, some insignificant relationships were revealed between weather conditions and perceived crowding in pertinent literature (Arnberger & Haider, 2007a). However, climate or weather conditions were often found to be variables influencing crowding perceptions of tourists during their trips (Usher and Gómez, 2017). For instance, Fleishman et al. (2004) suggested that more comfortable temperature conditions contribute to greater tolerance to crowding in a recreational setting. The effect of diversified situational factors on crowding perceptions should be studied with more experimental designs in the future.

In addition to the studies which examined direct relationships between antecedents and perceived crowding in the relevant literature, seven moderating variables and one mediating variable were identified in six studies. A majority of the studies examined the moderating role of demographic variables and/or country of origin on the relationship between use levels and perceived crowding. Jacobsen et al. (2019) found a significant moderating effect of age and travel organization type on the link between use levels and perceived crowding, whereas a non-significant moderation effect of gender was found. Older visitors and self-organized (individual) tourists are more tolerant of use levels. Consistently, Luque-Gil et al. (2018) claimed that age and employment status negatively moderate the association between motivation and perceived crowding. Additionally, Sun and Budruk (2017) found a significant moderating effect of nationality on most of the antecedent variables, such as use levels, increased waiting time, behaviour of others, and preferences. Moreover, Shi et al., (2017) suggested that

589 visitor origin is also a mediating variable which affects the relationship between use
590 levels and perceived crowding. Related to place attachment variables, a significant
591 moderating effect of place identity was found on the link between past on-site
592 experience and expected crowding, while the moderation role of place dependence was
593 not statistically supported (Budruk et al., 2008).

594 *Consequences of Perceived Crowding*

595 This integrative analysis showed that the influence of perceived crowding on various
596 consequences was examined in the pertinent literature. Accordingly, 345 constructs
597 were detected in empirical articles published in the past two decades (Table 4).
598 Identified constructs were classified into nine main categories: (1) satisfaction-related
599 consequences, (2) behavioural responses, (3) affective responses, (4) post-experience
600 behaviour, (5) environmental consequences, (6) marketing-related consequences, (7)
601 cognitive responses, (8) management-related consequences and (9) miscellaneous.
602 Satisfaction-related consequences (31.3%), behavioural responses (21.2%), affective
603 responses (10.7%), and post experience behaviour (10.3%) have been more studied in
604 the related literature than environmental consequences (9.3%), marketing-related
605 consequences (8.4%), cognitive responses (4.1%), and management-related
606 consequences (3.8%). Miscellaneous (0.9%) includes other consequences that are barely
607 investigated in the pertinent literature.

608 [Table 4 here]

609 *Satisfaction-related consequences* of perceived crowding encompass overall
610 satisfaction, experience quality, enjoyment, and pleasure, showing a proportional
611 decrease in the past ten years. While many studies have pointed to a negative correlation

between perceived crowding and overall satisfaction (Klanjšček et al., 2018), an overwhelming majority of the studies suggested that overcrowding does not necessarily produce dissatisfaction (Luque-Gil et al., 2018; Ziegler et al., 2016). However, Yeh et al. (2012) claimed that tourists' satisfaction is influenced by crowding levels unless they do not use displacement strategies to cope with negative emotions. Also, past studies confirmed that crowding perceptions lead to a deterioration in the quality of tourist experiences, especially in recreational areas (Hall & Shelby, 2000, Li et al., 2017). Nevertheless, Shi et al. (2017) suggested that crowding might occasionally serve as a factor enhancing travel experience in event and festival settings. In a similar vein, crowding does not decrease the enjoyment in an event (Mowen et al., 2003) or pleasure in a restaurant (Hwang et al., 2012). However, enjoyment might be influenced negatively in a natural setting where visitors seek solitude (Ryan & Cessford, 2003).

Behavioural responses to perceived crowding was the second highest examined category, involving spatial displacement, temporal displacement, willingness to spend more, change in behaviour, and mobility constraints. Perceived crowding resulted in spatial displacement as a coping strategy, in the form of either intrasite displacement (changing location in the area) or intersite displacement (leaving a destination or shifting to another area) in tourism and recreation settings (Arnberger & Haider, 2007b; Fleishman et al., 2007). In the case of temporal displacement, visitors adopt various strategies such as shifting use to off-season instead of peak periods, preferring weekdays instead of weekends, choosing to stay longer, and shifting use to earlier and/or later hours of the day to avoid crowds (Kirchgessner & Sewall, 2015; Manning & Valliere, 2001). Crowding also has a negative effect on behavioural responses such as tourists' willingness to spend more time and money during their visit (Noone & Mattila, 2009). As an example of instantaneous behavioural effects of crowding, visitors might

prefer to walk slowly and enjoy the facilities without physically touching and queueing with other visitors (Wahyuningputri, 2012). Popp (2012) also found that visitors to Florence felt exhausted because of tourist crowding and were unable to move freely during their visit.

The third category of perceived crowding consequences was *affective responses*, including negative/positive emotions, feelings of disturbance, comfort levels, and concerns for safety. Research on perceived crowding built a strong correlation between high encounter levels and negative emotions such as regret with the choice of the service provider, unhappiness after visit, stress, and feeling dominated (Hwang et al., 2012; Mattila & Hanks, 2012; Palau-Saumell et al., 2016). Further, empirical studies reported that visitors who are experiencing higher crowding levels reported higher disturbance levels (Klanjšček et al., 2018). Empirical evidence of a negative relationship between perceived crowding and comfort levels was also found in many studies (e.g., Morgan & Lok, 2000; Zehrer & Raich, 2016). Tourists feel uncomfortable when certain density levels are exceeded. Moreover, crowded situations might increase visitors' concerns about safety (Bajada & Titheridge, 2017). Contrary to these negative results, however, human crowding induces positive emotions (happy, energetic, excited, and relaxed) in festival settings (Kim et al., 2016). Although the studies on affective responses to crowding nearly doubled from 2008 to 2018, there is still a need for more integrative examination of emotional responses. Further, developing a valid and reliable emotions scale to assess tourists' emotional responses to crowdedness would potentially make major theoretical and practical contributions to knowledge on perceived crowding.

A substantial amount of research focused on *post-experience behaviour* as a response to

crowding, which involves intention to revisit, intention to recommend, loyalty/affiliation, and intention to complain. Regarding post-experience behaviour, intention to revisit and intention to recommend are behavioural intentions that were generally studied together in the pertinent literature (e.g., Li, 2018; Díaz-Sauceda et al., 2015). Studies found that crowding significantly and reversely affects the intention to recommend and the intention to revisit (Li, 2018; Arnberger & Brandenburg, 2007). The relationship between crowding and loyalty was also explained with some intervening variables such as emotions and satisfaction (Yeh et al., 2012). Apart from these consequences, only two studies revealed that visitors intend to complain about negative crowding due to a decrease in their experience quality (Shi et al., 2017; Sun & Budruk, 2017).

Environmental consequences of crowding in tourism and recreation were classified into three sub-categories—namely, macro-environmental, socio-environmental, and micro-environmental consequences—showing a similar pattern during the two time periods (9.1% vs 9.3%). Related to macro-environmental consequences, crowding was broadly seen as a reason for wider environmental degradation, including biological impacts, damage to resources, and effects on marine life and biodiversity in the area (Jin et al., 2016; Jurado et al., 2013; Ziegler et al., 2019). Moreover, empirical studies on perceived crowding revealed some effects on social environment, such as stress on the community (Jordan et al., 2019), damage to the cultural environment of the destination (Buckley, 2002), and conflict among visitors or between visitors and residents (Emang et al., in press). In terms of micro-environmental results, crowding has accounted for high levels of litter pollution, water quality in marine environments and noise in the area, which lead to a decrease in overall experience quality (Jurado et al., 2013; Ziegler et al., 2019).

In the empirical research, *marketing-related consequences* was the sixth category of perceived crowding consequences, showing an increasing tendency from 2008 to 2019 (4.5% vs. 9.7%). This category mostly involves consequences related to destination marketing, which include destination attractiveness, destination accessibility, place utility, destination image and brand value. With respect to destination perceptions, empirical evidence found that higher crowding diminishes the attractiveness and appeal of a destination in the eyes of visitors (Santana-Jiménez & Hernández, 2011; Thomas et al., 2005). However, Kim et al. (2014) revealed that most visitors who encounter large numbers of people at a destination perceive the place to be more developed. Studies also indicated that visitors view crowding as a reason for long waiting times, which, in turn, affect the accessibility of the destination or activity (Zhang et al., 2017). Moreover, empirical evidence also shows that visitors or users who encounter higher crowding levels during the activity experience more disutility of place due to the decrease in resources (Kohlhardt et al., 2018; Schuhman et al., 2013). Further, crowding has some negative influences on the image of destinations or attractions in visitors' minds (Jang et al., 2015; Trinh & Ryan, 2017). Finally, only one study on cruise tourists proved that crowding is negatively related to luxury brand value, because visitors' perceptions of exclusiveness and uniqueness are negatively affected due to the feeling of being cramped in the cruise travel space (Hyun & Kim, 2015).

In contrast to the high interest in behavioural responses, *cognitive responses* to crowding attracted relatively less scholarly interest in perceived crowding literature over the past two decades. Researchers largely considered cognitive responses in light of dissonance reduction theory, which involves four coping strategies: (1) to seek new and consistent information, (2) to decrease the importance of a cognition, (3) to change one's attitudes, or (4) to change one's situation (Festinger, 1957, cited in Kuentzel &

711 Heberlein, 1992). In line with this theory, product shift refers to altering the experiential
712 definition of an activity to maintain satisfaction with trip experience. Empirical studies
713 supported the notion that product shift is the cognitive coping mechanism most used by
714 visitors in crowded situations (Johnson & Dawson, 2004). However, rationalization,
715 which refers to evaluating experience highly regardless of actual conditions so as to
716 reduce internal conflict stemming from crowding, is rarely adopted by visitors
717 (Manning & Valliere, 2001). Further, visitors also change their preferences about the
718 landscape and infrastructure or their motives to cope with crowding (Arnberger et al.,
719 2018; Popp, 2012; Tverijonaite et al., 2018).

720 Furthermore, research on *managerial consequences* of perceived crowding nearly
721 doubled from 2008 to 2019 (2.3% vs. 4.3%). This category involves visitors' support
722 for management strategies and their attitudes towards tourism development. Bell et al.
723 (2011), who studied the relationship between crowding perceptions of divers on
724 Molokini island and their support for management strategies, found that visitors who
725 feel more crowded are more supportive of restrictive management strategies such as
726 limiting the number of boats or visitors and even closure of the site to any recreation
727 and tourism activities. Likewise, Wang (2016) claimed that as residents' perception of
728 tourism crowding increases, their support for tourism development decreases due to
729 perceived environmental impacts. This review indicated that more research should be
730 devoted to environmental consequences and managerial consequences of crowding, due
731 to the notion that crowding is a critical issue threatening favourable social, economic
732 and environmental conditions in destinations and affects visitors' and residents' support
733 for destination management strategies (Buckley, 2002).

734 Eventually, *miscellaneous* consequences of crowding include both positive and negative

735 outcomes: (a) an increase in prices of services at the attraction (Fonner & Berrens,
736 2014); (b) residents' rising costs of living (McCartney & Weng In, 2016); and (c) short-
737 term economic benefits (Jin et al., 2016). However, despite their significance, these
738 consequences did not receive much scholarly interest in the pertinent literature. In terms
739 of the consequences of perceived crowding, this review shows that satisfaction-related
740 consequences and behavioural responses had nearly reached a saturation point.
741 However, more research must be done on the cognitive responses to crowding and how
742 crowding affects visitors' perceptions of the destination and attitudes towards tourism
743 development and managerial decisions about crowding.

744 In terms of indirect associations, nine empirical studies examined the impact of 10
745 moderating variables and one mediating variable on associations between perceived
746 crowding and its consequences. In the empirical studies, the link between perceived
747 crowding and satisfaction was moderated by expectations (Díaz-Sauceda et al., 2015),
748 motivations/level of involvement (Noone & Mattila, 2009; Palau-Saumell et al., 2014),
749 and culture (Kim & Park, 2008). Yeh et al. (2012) investigated the role of scarcity of
750 space in the relationship between crowding and emotions and the role of emotions in the
751 link between perceived crowding and coping behaviour. Moreover, a moderating role of
752 nationality in the relationship between perceived crowding and coping behaviour is also
753 evident; for example, Taiwanese visitors are more likely to adopt temporal displacement
754 in crowded situations than are Chinese visitors and foreigners (Sun & Budruk, 2017).
755 Also, several studies investigated the moderating effects on the link between perceived
756 crowding and post-experience behaviour (behavioural intentions). For example, Wang
757 and Li (2019) reported the moderating effects of destination image and positive and
758 negative emotions on the link between crowding and behavioural intentions. Further,
759 Yeh et al. (2012) confirmed the moderating effect of expectations on the relationship

between perceived crowding and behavioural intentions; the sample of cross-border tourists with low expectations was more significantly influenced in terms of intention to recommend and intention to revisit when exposed to crowding. Finally, Hwang et al. (2012) confirmed the mediating role of emotions and the moderating role of desired privacy in the relationships between crowding and approach-avoidance responses, including willingness to spend more, word of mouth, and loyalty.

Conclusions

The overall purpose of this study was to conduct a chronological review of methodological and empirical issues of the present literature on perceived crowding in tourism and recreation. Based on a content analysis of 178 articles, this review has presented methodological and empirical trends in perceived crowding research over the past two decades. In terms of the methodological issues, this integrative review exhibits the research scope and the research methodology adopted by the empirical studies. Furthermore, it presents antecedents, consequences and moderating and mediating variables affecting the studied relationships.

Theoretical contributions

This paper presents a thorough review of the antecedents and consequences of perceived crowding with an integrative framework. Several future research areas associated with these methodological and empirical issues are also discussed along with the findings. The study offers avenues for further study of perceived crowding in tourism and recreation context. Enriching the knowledge on the subject, the findings could be considered by researchers who aim to further the understanding of perceived crowding and fill the research gaps.

In terms of scope, the related research is predominantly characterized by cross-sectional studies concentrated on single country setting. This indicates a research gap, which needs to be filled with more longitudinal studies and cross-cultural studies in comparative perspective. Most of the examined articles have sampled only visitors in recreational areas which path the future research to recruit industry representatives and residents as other units of analysis and to examine varied groups engaging in tourism activities. Methodologically, the empirical articles have primarily employed quantitative approaches except a few studies, which adopted either qualitative or mixed-method designs. Despite a slight increase in the number of qualitative studies, future researchers should design new studies employing qualitative data collection to have an in-depth understanding of perceived crowding phenomenon.

Empirically, the review process revealed the antecedents and consequences of perceived crowding. While personal factors, external factors and site-related factors have been widely studied as determinants of crowding perceptions, trip characteristics and situational factors are highly neglected in the pertinent literature. Future scholars might probe the latent antecedents of perceived crowding and diversify sub-categories under these categories to have a better understanding of perceived crowding. In relation to consequences of perceived crowding, satisfaction-related consequences, behavioural and affective responses, and post-experience behaviour almost reached saturation point. However, environmental consequences, marketing-related consequences, cognitive responses, and management-related consequences should be further investigated to fill research gaps in the literature. Overall, this paper contributes to the fields of tourism and recreation by both integrating a wide body of research on a significant social sustainability topic and by suggesting broad avenues for further research.

Practical contributions

Some suggestions and direct managerial implications can be extracted from this review paper. This study concludes that the perceived crowding of individuals engaging in tourism and recreational activities is impacted mostly by personal, external and site-related factors. For site managers, as well as for other decision-makers in the sector, this highlights the need to manage external factors including the use and encounter levels and site-related factors such as site facilities, setting type, environmental conditions and resource availability. Since perceived crowding leads to a decrease in visitor satisfaction and post-experience behavioural intentions such as intention to recommend and to revisit, it is significant and recommended for managers to be aware of the antecedents of perceived crowding and to eliminate the crowding perceptions by controlling those antecedents as much as possible during tourism and recreational activity. Furthermore, industry representatives might benefit from the results of this study by taking into consideration the crowding as a factor while evaluating the impact of their management and marketing strategies.

Limitations

This systematic review has some limitations. This study focuses on research on perceived crowding in only recreation and tourism contexts, which limits the concept's clarification in other fields. Other potentially relevant papers may address different key points by analysing the concept in leisure and hospitality contexts. Moreover, although the electronic search with specific keywords through the Scopus database was notably comprehensive, only journal articles were subjected to content analysis in this review. Other types of publications, such as book chapters and conference papers, may also provide helpful knowledge on the topic. Furthermore, this study only includes empirical studies written in the English language. It is likely that different results may be obtained from articles published in other languages and other academic systems.

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References

Aikoh, T., Shoji, Y., Tsuge, T., Shibasaki, S., & Yamamoto, K. (2018). Application of the double-bounded dichotomous choice model to the estimation of crowding acceptability in natural recreation areas. *Journal of Outdoor Recreation and Tourism.*

Alazaizeh, M.M., Hallo, J.C., Backman, S.J., Norman, W.C., & Vogel, M.A. (2019). Giving voice to heritage tourists: indicators of quality for a sustainable heritage experience at Petra, Jordan. *Journal of Tourism and Cultural Change, 17*(3), 269-284.

Arnberger, A., & Brandenburg, C. (2007). Past on-site experience, crowding perceptions, and use displacement of visitor groups to a peri-urban national park. *Environmental management, 40*(1), 34.

Arnberger, A., & Haider, W. (2007a). A comparison of global and actual measures of perceived crowding of urban forest visitors. *Journal of Leisure Research, 39*(4), 668-685.

Arnberger, A. & Haider, W. (2007b). Would You Displace? It Depends! A Multivariate Visual Approach to Intended Displacement from an Urban Forest Trail. *Leisure Research, 39*(2), 345-365.

Arnberger, A., & Mann, C. (2008). Crowding in European forests: A review of recent research and implications for forest management and policy. *Forestry, 81*(4), 559-571.

Arnberger, A., Ebenberger, M., Schneider, I. E., Cottrell, S., Schlueter, A. C., von Ruschkowski, E., Venette, R. C., Snyder, S. A. & Gobster, P. H. (2018). Visitor preferences for visual changes in bark beetle-impacted forest recreation settings in the United States and Germany. *Environmental management, 61*(2), 209-223.

Andereck, K. L., & Becker, R. H. (1993). Perceptions of carry-over crowding in recreation environments. *Leisure Sciences, 15*(1), 25-35.

Avila-Foucat, V. S., Gendron, D., Revollo-Fernandez, D., Popoca, E. I., & Ramírez, A. (2017). Determinants of the potential demand for whale watching in Loreto Bay National Park. *Marine policy, 81*, 37-44.

Aykol, B., Palihawadana, D., & Leonidou, L. C. (2013). Research on the import activities of firms 1960–2010. *Management International Review, 53*(2), 215–250.

Bajada, T. & Titheridge, H. (2017). The attitudes of tourists towards a bus service: Implications for policy from a Maltese case study. *Transportation Research Procedia, 25*, 4110-4129.

Baker, K. G., Hozier Jr, G. C., & Rogers, R. D. (1994). Marketing research theory and methodology and the tourism industry: A nontechnical discussion. *Journal of Travel Research, 32*(3), 3-7.

874 Baum, A., Shapiro, A., Murray, D., & Wideman, M. V. (1979). Interpersonal mediation
875 of perceived crowding and control in residential dyads and triads. *Journal of*
876 *Applied Social Psychology, 9*(6), 491-504.

877 Bell, C. M., Needham, M. D., Szuster, B. W. (2011). Congruence among encounters,
878 norms, crowding, and management in a marine protected area. *Environmental*
879 *Management, 48*, 499–513.

880 Bentz, J., Rodrigues, A., Dearden, P., Calado, H., & Lopes, F. (2015). Crowding in
881 marine environments: Divers and whale watchers in the Azores. *Ocean and*
882 *Coastal Management, 109*, 77-85.

883 Bradley, G. L. & Sparks, B. A. (2012). Antecedents and consequences of consumer
884 value: a longitudinal study of timeshare owners. *Journal of Travel Research,*
885 *51*(2), 191–204.

886 Breen, B. B., & Breen, D. (2008). Quantifying community perceptions of marine
887 environments for marine protected area planning: When is the reef too crowded?
888 *Tourism in Marine Environments, 5*(2-3), 101-109.

889 Brehm, S. S. & Brehm, J. W. (1981). *Psychological reactance: A theory of freedom and*
890 *control* (2nd ed). Academic Press.

891 Brown, A., Kappes, J., & Marks, J. (2013). Mitigating theme park crowding with
892 incentives and information on mobile devices. *Journal of Travel Research,*
893 *52*(4), 426-436.

Budruk, M., Schneider, I. E., Andreck, K. L., & Virden, R. J. (2002). Crowding and satisfaction among visitors to a built desert attraction. *Journal of Park and Recreation Administration, 20*(13), 1-17.

Budruk, M., Stanis, S. A. W., Schneider, I. E., & Heisey, J. J. (2008). Crowding and experience-use history: A study of the moderating effect of place attachment among water-based recreationists. *Environmental Management, 41*(4), 528-537.

Buckley, R. (2002). Surf tourism and sustainable development in Indo-pacific islands. II. recreational capacity management and case study. *Journal of Sustainable Tourism, 10*(5), 425-442.

Calhoun, J. B. (1962). Population density and social pathology. *Scientific American, 206*(2), 139-149.

Cribbs, T. W., Sharp, R. L., & Brownlee, M. T. J. (2019). Evaluating the influence of photo order on park visitors' perceptions of crowding at Buffalo National River. *Leisure Sciences*, 1-19.

Cságoly, Z., Sæþórsdóttir, A.D., & Ólafsdóttir, R. (2017). Tourism changing the edge of the wild. *Journal of Outdoor Recreation and Tourism, 17*, 1-8.

Dean, L. M., Pugh, W. M., & Gunderson, E. E. (1978). The behavioural effects of crowding: Definitions and methods. *Environment and Behaviour, 10*(3), 419-431.

Decrop, A. (1999). Triangulation in qualitative tourism research. *Tourism management, 20*(1), 157-161.

915 Díaz-Sauceda, J., Palau-Saumell, R., Forgas-Coll, S., & Sánchez-García, J. (2015).
916 Cross-border tourists' behavioral intentions: The Green Line of Nicosia, Cyprus.
917 *Tourism Geographies, 17*(5), 758-779.

918 Doorne, S. (2000). Caves, cultures and crowds: carrying capacity meets consumer
919 sovereignty. *Journal of Sustainable Tourism, 8*(2), 116-130.

920 Eder, R., & Arnberger, A. (2012). The influence of place attachment and experience use
921 history on perceived depreciative visitor behaviour and crowding in an urban
922 national park. *Environmental management, 50*(4), 566-580.

923 Edney, J. J. (1977). Theories of human crowding: a review. *Environment and Planning*
924 *A, 9*, 1211-1232.

925 Elsevier (2019, June 18). *Scopus Global Research Factsheet 2019*.
926 https://www.elsevier.com/research-intelligence/resource-library/scopus-fact-
927 sheet.

928 Emang, D., Lundhede, T. H., & Thorsen, B. J. (in press). The role of divers' experience
929 for their valuation of diving site conservation: The case of Sipadan, Borneo.
930 *Journal of Outdoor Recreation and Tourism*, 100237.

931 Fix, P. J., Carroll, J., & Harrington, A. M. (2013). Visitor experiences across recreation
932 settings: A management or measurement issue? *Journal of Outdoor Recreation*
933 *and Tourism,* 3-4, 28–35.

934 Fleishman, L., Feitelson, E., & Salomon, I. (2004). The role of cultural and
935 demographic diversity in crowding perception: Evidence from nature reserves in
936 Israel. *Tourism Analysis, 9*(1-2), 23-40.

937 Fleishman, L., Feitelson, E., & Salomon, I. (2007). Behavioural adaptations to crowding
938 disturbance: evidence from nature reserves in Israel. *Leisure Sciences, 29*(1), 37-
939 52.

940 Fonner, R. C., & Berrens, R. P. (2014). A hedonic pricing model of lift tickets for US
941 alpine ski areas: examining the influence of crowding. *Tourism Economics,*
942 *20*(6), 1215-1233.

943 Fredman, P., Friberg, L. H., & Emmelin, L. (2007) Increased visitation from national
944 park designation. *Current Issues in Tourism, 10*(1), 87-95.

945 Freedman, J. L., Klevansky, S., & Ehrlich, P. R. (1971). The effect of crowding on
946 human task performance 1. *Journal of Applied Social Psychology, 1*(1), 7-25.

947 Gonson, C., Pelletier, D., & Alban, F. (2018). Social carrying capacity assessment from
948 questionnaire and counts survey: Insights for recreational settings management
949 in coastal areas. *Marine Policy, 98*, 146-157.

950 Gonzalez, V. M., Coromina, L., & Galí, N. (2018). Overtourism: residents' perceptions
951 of tourism impact as an indicator of resident social carrying capacity-case study
952 of a Spanish heritage town. *Tourism Review, 73*(3), 277-296.

953 Hall, T., & Shelby, B. (2000). Temporal and spatial displacement: Evidence from a
954 high-use reservoir and alternate sites. *Journal of Leisure Research, 32*(4), 435-
955 456.

956 Hallo, J. C., Manning, R. E., & Stokowski, P. A. (2009). Understanding and managing
957 the off-road vehicle experience: indicators of quality. *Managing Leisure, 14*,
958 195–209.

Heberlein, T. A., & Vaske, J. J. (1977). *Crowding and visitor conflict on the Bois Brule River* (Rep. No. WISC WRC 77-04). Madison, WI: University of Wisconsin Water Resources Center.

Heywood, J. L. (1996). Social regularities in outdoor recreation. *Leisure sciences, 18*(1), 23-37.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277-1288.

Hui, M. K., & Bateson, J. E. (1990). *Testing a theory of crowding in the service environment*. In M. E. Goldberg, G. G., & R. W. Pollay (Eds.), NA - Advances in Consumer Research (Vol 17, pp. 866-873). Provo, UT: Association for Consumer Research.

Hwang, J., Yoon, S., & Bendle, L. (2012). Desired privacy and the impact of crowding on customer emotions and approach-avoidance responses. *International Journal of Contemporary Hospitality Management, 24*(2), 224-250.

Hyun, S. S. & Kim, M. G. (2015) Negative effects of perceived crowding on travelers' identification with cruise brand. *Journal of Travel & Tourism Marketing, 32*(3), 241-259.

Jacobsen, J. K. S., Iversen, N. M., & Hem, L. E. (2019). Hotspot crowding and over-tourism: Antecedents of destination attractiveness. *Annals of Tourism Research, 76*, 53-66.

Jang, Y., Ro, H., & Kim, T. H. (2015). Social servicescape: The impact of social factors on restaurant image and behavioral intentions. *International Journal of Hospitality & Tourism Administration, 16*(3), 290-309.

Jin, Q., Hu, H., & Kavan, P. (2016). Factors influencing perceived crowding of tourists and sustainable tourism destination management. *Sustainability, 8*(10), 976.

Jin, Q., & Pearce, P. (2011). Tourist perception of crowding and management approaches at tourism sites in Xi'an. *Asia Pacific Journal of Tourism Research, 16*(3), 325-338.

Johnson, A. K., & Dawson, C. P. (2004). An exploratory study of the complexities of coping behaviour in Adirondack wilderness. *Leisure Sciences, 26*(3), 281-293.

Jordan, E. J. & Vogt, C. A. (2017). Residents' perceptions of stress related to cruise tourism development. *Tourism Planning and Development, 14*(4), 527-547.

Jordan, E. J., Spencer, D. M., & Prayag, G. (2019). Tourism impacts, emotions and stress. *Annals of Tourism Research, 75*, 213-226.

Jurado, E. N., Damian, I. M., & Fernández-Morales, A. (2013). Carrying capacity model applied in coastal destinations. *Annals of Tourism Research, 43*, 1-19.

Kainzinger, S., Arnberger, A. & Burns, R. C. (2016). Setting preferences of high and low use river recreationists: How different are they? *Environmental Management, 58*, 767–779.

Kalisch, D. & Klaphake, A. (2007). Visitors' satisfaction and perception of crowding in a German National Park: A case study on the island of Hallig Hooge. *Forest Snow and Landscape Research, 81*(1-2), 109-122.

1001 Kim, D., Lee, C., & Sirgy, M. J. (2016). Examining the differential impact of human
1002 crowding versus spatial crowding on visitor satisfaction at a festival. *Journal of*
1003 *Travel & Tourism Marketing, 33*(3), 293-312.

1004 Kim, D. Y., & Park, S. (2008). Customers' responses to crowded restaurant
1005 environments: Cross-cultural differences between American and Chinese.
1006 *Journal of Hospitality & Leisure Marketing, 16*(1-2), 137-157.

1007 Kim, D. Y., Wen, L., & Doh, K. (2010). Does cultural difference affect customer's
1008 response in a crowded restaurant environment? A comparison of American
1009 versus Chinese customers. *Journal of Hospitality & Tourism Research, 34*(1),
1010 103-123

1011 Kim, S. O., & Shelby, B. (2011). Effects of information on perceived crowding and
1012 encounter norms. *Environmental Management, 47*(5), 876-884.

1013 Kim, S. O., Shelby, B. & Needham, M. D. (2014). Effects of facility developments and
1014 encounter levels on perceptions of settings, crowding, and norms in a Korean
1015 Park. *Environmental Management, 53*, 441–453.

1016 Kirchgessner, M. L. & Sewall, B. J. (2015). The impact of environmental, social, and
1017 animal factors on visitor stay times at big cat exhibits. *Visitor Studies, 18*(2),
1018 150–167.

1019 Klanjšček, J., Geček, S., Marn, N., Legović, T., & Klanjšček, T. (2018). Predicting
1020 perceived level of disturbance of visitors due to crowding in protected areas.
1021 *PLoS ONE, 13*(6), 1-16.

Kohlhardt, R., Honey-Rosés, J., Fernandez Lozada, S., Haider, W., & Stevens, M. (2018). Is this trail too crowded? A choice experiment to evaluate tradeoffs and preferences of park visitors in Garibaldi Park, British Columbia. *Journal of Environmental Planning and Management, 61*(1), 1-24.

Kuentzel, W. F., & Heberlein, T. A. (1992). Cognitive and behavioural adaptations to perceived crowding: A panel study of coping and displacement. *Journal of Leisure Research, 24*(4), 377-393.

Kuentzel, W. F. & Heberlein, T. A. (2003). More visitors, less crowding: change and stability of norms over time at the Apostle Islands. *Journal of Leisure Research, 35*(4), 349-371.

Kuentzel, W. F., Laven, D., Manning, R. E. & Valliere, W. A. (2008). When do normative standards matter most? understanding the role of norm strength at multiple national park settings. *Leisure Sciences, 30*(2), 127-142.

Kyle, G., Graefe, A., Manning, R. & Bacon, J. (2004). Effect of activity involvement and place attachment on recreationists' perceptions of setting density. *Journal of Leisure Research, 36*(2), 209-231.

Lee, H., & Graefe, A. R. (2003). Crowding at an arts festival: Extending crowding models to the frontcountry. *Tourism Management, 24*(1), 1-11.

Lei, S. L., & Zhang, H. (2011). Application of social carrying capacity to sustainable environment planning: A case study of coastal community in Taiwan. *Applied Mechanics and Materials, 71*, 1925-1928.

1043 Leujak, W. & Ormond, R. F. G. (2007). Visitor perceptions and the shifting social
1044 carrying capacity of South Sinai's coral reefs. *Environmental Management, 39*(4), 472-489.

1046 Li, C. L. (2018). Outdoor recreation in a Taiwanese national park: A Hakka ethnic
1047 group study. *Journal of Outdoor Recreation and Tourism, 22*, 37-45.

1048 Li, L., Zhang, J., Nian, S., & Zhang, H. (2017). Tourists' perceptions of crowding,
1049 attractiveness, and satisfaction: A second-order structural model. *Asia Pacific*
1050 *Journal of Tourism Research, 22*(12), 1250-1260.

1051 Li, N. (2019). Mainland Chinese cruise passengers' onshore experience. *Tourism*
1052 *Recreation Research, 44*(2), 217-231.

1053 Luque-Gil, A. M., Gómez-Moreno, M. L., & Peláez-Fernández, M. A. (2018). Starting
1054 to enjoy nature in Mediterranean mountains: Crowding perception and
1055 satisfaction. *Tourism management perspectives, 25*, 93-103.

1056 Manning, R. E. (1999). *Studies in Outdoor Recreation: Search and Research for*
1057 *Satisfaction* (2nd ed.). Oregon State University Press.

1058 Manning, R. E., Freimund, W. A., Lime, D. W., & Pitt, D. G. (1996). Crowding norms
1059 at frontcountry sites: A visual approach to setting standards of quality. *Leisure*
1060 *Sciences*, *18*(1), 39–59.

1061 Manning, R. E., & Valliere, W. A. (2001). Coping in outdoor recreation: Causes and
1062 consequences of crowding and conflict among community residents. *Journal of*
1063 *Leisure Research*, *33*(4), 410-426.

Mattila, A. S. & Hanks, L. (2012). Time styles and waiting in crowded service environments. *Journal of Travel & Tourism Marketing, 29*(4), 327-334.

McCartney, G., & Weng In, W. L. (2016). House of cards—An analysis of Macao's resident support for tourism and casino development. *Tourism and Hospitality Research, 16*(2), 144-157.

McCool, S. F. & Lime, D. W. (2001). Tourism Carrying Capacity: Tempting Fantasy or Useful Reality? *Journal of Sustainable Tourism*, *9*(5), 372-388.

Mcgrew, P. L. (1970). Social and spatial density effects on spacing behaviour in preschool children. *Journal of Child Psychology and Psychiatry, 11*(3), 197-205.

Morgan, D. J. & Lok, L. (2000). Assessment of a comfort indicator for natural tourist attractions: The case of visitors to Hanging Rock, Victoria. *Journal of Sustainable Tourism*, *8*(5), 393-409.

Moyle, B., & Croy, G. (2007). Crowding and visitor satisfaction during the off-season: Port Campbell National Park. *Annals of Leisure Research, 10*(3-4), 518-531.

Mowen, A. J., Vogelsong, H. G., & Graefe, A. R. (2003). Perceived crowding and its relationship to crowd management practices at park and recreation events. *Event Management, 8*(2), 63-72.

Musa, G. (2002). Sipadan: a SCUBA-diving paradise: an analysis of tourism impact, diver satisfaction and tourism management. *Tourism Geographies, 4*(2), 195-209.

Needham, M. D., & Szuster, B. W. (2011). Situational influences on normative evaluations of coastal tourism and recreation management strategies in Hawai'i. *Tourism Management, 32*(4), 732-740.

Needham, M. D., Rollins, R. B., & Vaske, J. J. (2005). Skill level and normative evaluations among summer recreationists at alpine ski areas. *Leisure/Loisir, 29*(1), 71-94.

Needham, M. D., Szuster, B. W., Lesar, L., Mora, C., & Knecht, D. P. (2018). Snorkeling and scuba diving with manta rays: encounters, norms, crowding, satisfaction, and displacement. *Human Dimensions of Wildlife, 23*(5), 461-473.

Needham, M. D., Vaske, J. J., Whittaker, D., & Donnelly, M. P. (2014). Extending the encounter–norm–crowding generalization to angler evaluations of other social and resource indicators. *Human Dimensions of Wildlife, 19*(3), 288–299.

Neuts, B. (2016). An econometric approach to crowding in touristic city centres: Evaluating the utility effect on local residents. *Tourism Economics, 22*(5), 1055-1074.

Neuts, B., & Nijkamp, P. (2012). Tourist crowding perception and acceptability in cities: An applied modelling study on Bruges. *Annals of Tourism Research, 39*(4), 2133-2153.

Noone, B. M., & Mattila, A. S. (2009). Consumer reaction to crowding for extended service encounters. *Managing Service Quality: An International Journal, 19*(1), 31-41.

Palau-Saumell, R., Forgas-Coll, S., & Sánchez-García, J. (2016). The role of emotions in a model of behavioral intentions of visitors to the Gaudí Historic House Museums in Barcelona, Spain. *Visitor Studies, 19*(2), 156-177.

Palmatier, R.W., Houston, M. B., & Hulland, J. (2017). Review articles: Purpose, process, and structure. *Journal of the Academy of Marketing Science, 46*(1), 1–5.

Paulus, P. B., McCain, G., & Cox, V. C. (1978). Death rates, psychiatric commitments, blood pressure, and perceived crowding as a function of institutional crowding. *Environmental Psychology and Nonverbal Behaviour, 3*(2), 107-116.

Perdue, R. R. (2002). Perishability, yield management, and cross-product elasticity: A case study of deep discount season passes in the Colorado ski industry. *Journal of Travel Research, 41*, 15-22.

Petruzzi, J. P., Vaske, J. J., & Donnelly, M. P. (1996). Country of origin, encounter norms, and crowding in a frontcountry setting. *Leisure Sciences, 18*(2), 161-176.

Pierce, W. V. & Manning, R. E. (2015). Day and overnight visitors to the Olympic Wilderness. *Journal of Outdoor Recreation and Tourism, 12,* 14-24.

Pietilä, M., & Fagerholm, N. (2016). Visitors' place-based evaluations of unacceptable tourism impacts in Oulanka National Park, Finland. *Tourism Geographies, 18*(3), 258-279.

Popp, M. (2012). Positive and negative urban tourist crowding: Florence, Italy. *Tourism Geographies*, *14*(1), 50-72.

Qui, R., Xu, W., & Li, S. (2016). Agent-based modeling of the spatial diffusion of tourist flow—A case study of Sichuan, China. *Journal of China Tourism Research, 12*(1), 85–107.

Randall, C. & Rollins, R. B. (2013). Perceived crowding and encounter norms of kayakers in Pacific rim national Park Reserve, Canada. *Tourism in Marine Environments, 9*(1-2), 35-51.

Rasoolimanesh, S. M., Jaafar, M., Marzuki, A. & Abdullah, S. (2017). Tourist's perceptions of crowding at recreational sites: the case of the Perhentian Islands. *Anatolia: An International Journal of Tourism and Hospitality Research, 28*, 41-51.

Rasoolimanesh, S. M., Jaafar, M., Marzuki, A. & Mohamad, D. (2016). How visitor and environmental characteristics influence perceived crowding. *Asia Pacific Journal of Tourism Research, 21*(9), 952-967.

Rathnayake, R.M.W. & Gunawardena, U.A.D.P. (2012). Social carrying capacity of the Horton plains national park, Sri Lanka. *Sri Lanka Journal of Social Sciences, 35-36*(1-2), 29-36.

Riley C. J., Pierskalla, C. D., Burns, R. C., Maumbe, K. C., Graefe, A. R., Smaldone, D. A., & Williams, S. (2015). Examining OHV user displacement at the Oregon Dunes National Recreation Area and Sand Lake: A 10-year trend study. *Journal of Outdoor Recreation and Tourism, 9,* 44-52.

Riley, R. W. (1996). Revealing socially constructed knowledge through quasi-structured interviews and grounded theory analysis. *Journal of Travel & Tourism Marketing, 5*(1-2), 21-40.

1148 Ritchie, J. R. B. (2005). *Longitudinal Research Methods*. In B. W. Ritchie, P. M. Burns,
1149 & C. A. Palmer (Eds.), Tourism research methods: Integrating theory with
1150 practice (pp.131-141). Cambridge: Cabi.

1151 Ryan, C. & Cessford, G. (2003). Developing a visitor satisfaction monitoring
1152 methodology: quality gaps, crowding and some results. *Current Issues in*
1153 *Tourism, 6*(6), 457-507.

1154 Santana-Jiménez, Y. & Hernández, J. M. (2011). Estimating the effect of overcrowding
1155 on tourist attraction: The case of Canary Islands. *Tourism Management, 32*(2),
1156 415-425.

1157 Sarstedt, M., Ringle, C. M., Raithel, S. & Gudergan, S. (2014). In pursuit of
1158 understanding what drives fan satisfaction. *Journal of Leisure Research, 46*(4),
1159 419-447.

1160 Sayan, S., Krymkowski, D. H., Manning, R. E., Valliere, W. A., & Rovelstad, E. L.
1161 (2013). Cultural influence on crowding norms in outdoor recreation: a
1162 comparative analysis of visitors to national parks in Turkey and the United
1163 States. *Environmental management, 52*(2), 493-502.

1164 Schmidt, D. E., & Keating, J. P. (1979). Human crowding and personal control: An
1165 integration of the research. *Psychological Bulletin*, *86*(4), 680-700.

1166 Schroeder, S. A. & Fulton, D. C. (2010). Land of 10,000 lakes and 2.3 million anglers:
1167 Problems and coping response among Minnesota anglers. *Journal of Leisure*
1168 *Research, 42*(2), 291-315.

1169 Schultz, J., & Svajda, J. (2017). Examining crowding among winter recreationists in
1170 Rocky Mountain National Park. *Tourism Recreation Research, 42*(1), 84-95.

1171 Schuhmann, P. W., Cazabon-Mannette, M., Gill, D., Casey, J. F., & Hailey, A. (2013).
1172 Willingness to pay to avoid high encounter levels at dive sites in the Caribbean.
1173 *Tourism in Marine Environments, 9*(1-2), 81-94.

1174 Sever, I., Verbič, M. & Marušić, Z. (2018). Measuring trail users' perception of
1175 crowding in a peri-urban nature park: A best-worst scaling experiment. *Urban*
1176 *Forestry & Urban Greening, 35*, 202-210.

1177 Shelby, B. (1980). Crowding models for backcountry recreation. *Land Economics,*
1178 *56*(1), 43-55.

1179 Shelby, B., Bregenzer, N. S., & Johnson, R. (1988). Displacement and product shift:
1180 Empirical evidence from Oregon Rivers. *Journal of Leisure Research, 20*(4),
1181 274-288.

1182 Shelby, B., & Heberlein, T. A. (1984). A conceptual framework for carrying capacity
1183 determination. *Leisure Sciences, 6*(4), 433-451.

1184 Shelby, B., & Vaske, J. J. (2007). Perceived crowding among hunters and anglers: a
1185 meta-analysis. *Human Dimensions of Wildlife, 12*(4), 241-261.

1186 Shi, B., Zhao, J., & Chen, P. J. (2017). Exploring urban tourism crowding in Shanghai
1187 via crowdsourcing geospatial data. *Current Issues in Tourism, 20*(11), 1186-
1188 1209.

1189 Sim, K. W., Koo, C. D., Koo, T. T., & Lee, H. S. (2018). An analysis on perceived
1190 crowding level reported by domestic visitors of South Korean National Parks: a

multilevel ordered logit approach. *Asia Pacific Journal of Tourism Research, 23*(3), 281-296.

Smith, J.W., Moore, R.L., & Sommerville, M. (2013). Non-sovereign visitor satisfaction: a case study of military training on the Appalachian Trail. *Managing Leisure, 18*(3), 239-251.

Sorice, M. G., Shafer, C. S., & Ditton, R. B. (2006). Managing endangered species within the use–preservation paradox: the Florida manatee (Trichechus manatus latirostris) as a tourism attraction. *Environmental Management, 37*(1), 69-83.

Stokols, D. (1972). On the distinction between density and crowding: Some implications for future research. *Psychological review, 79*(3), 275-277.

Sun, Y., Wei, Y. & Zhang, L. (2017). International academic impact of Chinese tourism research: A review based on the analysis of SSCI tourism articles from 2001 to 2012. *Tourism Management, 58*, 245-252.

Sun, Y. Y., & Budruk, M. (2017). The moderating effect of nationality on crowding perception, its antecedents, and coping behaviours: A study of an urban heritage site in Taiwan. *Current Issues in Tourism, 20*(12), 1246-1264.

Teye, V., Sirakaya, E., & Sönmez, S. F. (2002). Residents' attitudes toward tourism development. *Annals of tourism research, 29*(3), 668-688.

Thomas, R. N., Pigozzi, B. W., & Sambrook, R. A. (2005). Tourist carrying capacity measures: crowding syndrome in the Caribbean. *The Professional Geographer, 57*(1), 13–20.

Trachsel, A., & Backhaus, N. (2011). Perception and needs of older visitors in the Swiss National Park–a qualitative study of hiking tourists over 55. *Journal on Protected Mountain Areas Research and Management, 3*, 47-50.

Trinh, T. T., & Ryan, C. (2017). Visitors to heritage sites: motives and involvement—A model and textual analysis. *Journal of Travel Research, 56*(1), 67-80.

Tverijonaite, E., Ólafsdóttir, R., & Thorsteinsson, T. (2018). Accessibility of protected areas and visitor behaviour: A case study from Iceland. *Journal of Outdoor Recreation and Tourism, 24*, 1-10.

United Nations World Tourism Organization. (2019*). International Tourism Highlights, 2019 Edition*. UNWTO, Madrid. https://www.e-unwto.org/doi/pdf/10.18111/9789284421152.

Usher, L. E. & Gómez, E. (2017). Managing stoke: Crowding, conflicts, and coping among Virginia Beach surfers. *Journal of Park and Recreation Administration, 35*(2), 9–24.

Vaske, J. J., & Donnelly, M. P. (2002). Generalizing the encounter--norm--crowding relationship. *Leisure Sciences, 24*(3-4), 255-269.

Vaske, J. J., & Shelby, L. B. (2008). Crowding as a descriptive indicator and an evaluative standard: Results from 30 years of research. *Leisure Sciences, 30*(2), 111-126.

Wahyuningputri, R. A. (2012). Ancol Jakarta Bay City as a sustainable destination park: assessing crowd based on tourism carrying capacity. *WIT Transactions on Ecology and the Environment, 161*, 217-229.

Wang, J., Huang, X., Gong, Z., & Cao, K. (2020). Dynamic assessment of tourism carrying capacity and its impacts on tourism economic growth in urban tourism destinations in China. *Journal of Destination Marketing and Management, 15, 100383*.

Wang, Y. & Li, X. (2019). Procrastination of travel: the effect of crowdedness. *Journal of Hospitality & Tourism Research, 43*(3), 447–460.

Wang, Y. P. (2016). A study on Kinmen resident's perception of tourism development and culture heritage impact. *Eurasia Journal of Mathematics, Science & Technology Education, 12*(12), 2909-2920.

Westover, T. N. (1989). Perceived crowding in recreational settings: An environment-behavior model. *Environment and Behavior, 21*(3), 258-276.

Wickham, T. D. & Kerstetter, D. L. (2000). The relationship between place attachment and crowding in an event setting. *Event Management, 6*(3), 167-174.

Wilson, E., Mura, P., Sharif, S. P., & Wijesinghe, S. N. R. (2020). Beyond the third moment? Mapping the state of qualitative tourism research. *Current Issues in Tourism, 23*(7), 795-810.

Yagi, C. & Pearce, P. L. (2007). The Influence of appearance and the number of people viewed on tourists' preferences for seeing other tourists. *Journal of Sustainable Tourism, 15*(1), 28-43.

Yeh, S. S., Wai Aliana, L. M., & Zhang, F. Y. (2012). *Visitors' perception of theme park crowding and behavioural consequences*. In J. S. Chen (Ed.), Advances in Hospitality and Leisure (Vol.8, pp. 63-83). Emerald Group Publishing Limited.

Zehrer, A., & Raich, F. (2016). The impact of perceived crowding on customer satisfaction. *Journal of Hospitality and Tourism Management, 29*, 88-98.

Ziegler, J. A., Araujo, G., Labaja, J., Legaspi, C., Snow, S., Ponzo, A., Rollins, R., & Dearden, P. (2019). Measuring perceived crowding in the marine environment: perspectives from a mass tourism. *Tourism in Marine Environments, 14*(4), 211-230.

Ziegler, J. A., Dearden, P., & Rollins, R. (2016). Participant crowding and physical contact rates of whale shark tours on Isla Holbox, Mexico. *Journal of Sustainable Tourism, 24*(4), 616-636.

Zhang, L. Y., Qiu, J. W., & Chung, S. S. (2015). Assessing perceived crowding of diving sites in Hong Kong. *Ocean & Coastal management, 116*, 177-184.

Zhang, L., & Chung, S. (2015). Assessing the social carrying capacity of diving sites in Mabul Island, Malaysia. *Environmental management, 56*(6), 1467-1477.

Zhang, Y., Li, X. R., Su, Q., & Hu, X. (2017). Exploring a theme park's tourism carrying capacity: A demand-side analysis. *Tourism Management, 59*, 564-578.

Zhao, G., Deng, Z., Shen, J., Ryan, C., & Gong, J. (2018). Carrying capacity and its implications in a Chinese ancient village: The case of Hongcun. *Asia Pacific Journal of Tourism Research, 23*(3), 260-280.