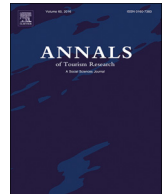


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## Annals of Tourism Research

journal homepage: [www.elsevier.com/locate/annals](http://www.elsevier.com/locate/annals)The senses in tourism design: A bibliometric review<sup>☆</sup>

Dora Agapito

Research Centre for Tourism, Sustainability and Well-being (CinTurs), University of Algarve, Faculty of Economics, Campus de Gambelas, 8005-139 Faro, Portugal



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## ABSTRACT

The importance of addressing multisensory aspects in the design of tourism experiences and places has become apparent in a recent strand of research. There has been a substantial growth of studies in the last decade across different countries and journals. This paper provides an up-to-date systematic overview of the evolution of research incorporating multisensory elements rather than individual sensory modalities. These studies can assist in the understanding and design of tourism experiences and inform future research. The lexical, temporal and co-citation networks of the 99 articles selected are described, as well as the methods they use. Findings indicate that opportunities for future research on tourism experience design around the senses are related to sustainability and technology.

## Introduction

The multidisciplinary nature of sensory-informed experiences, as well as their role in tourism design and destination development, has been acknowledged in a small number of recent studies (e.g. Agapito, Mendes, & Valle, 2013; Kim & Fesenmaier, 2017a). While still an emergent research strand in tourism, the role of the senses as a key dimension of the tourism experience, considered as integrated elements rather than individual stimuli, has increased in the last decade (Agapito, Pinto, & Mendes, 2017; Cohen & Cohen, 2019; Lv, Li, & McCabe, 2020).

Recent comprehensive action-oriented frameworks, such as *Design Science in Tourism*, provide “a logic for conducting research and designing places” (Fesenmaier & Xiang, 2017, p. 4). This framework, which involves a sustainable approach to tourism experiences and place design, embraces the senses as one of its foundational aspects. This rationale, which is rooted in the work developed by Gunn (1972) focused on designing tourist areas, follows a human-centred mind-set bridging design science and tourism in contemporary sociocultural and technological contexts (Fesenmaier & Xiang, 2017; Tussyadiah, 2014). Whereas experiences are personal, the process of designing tourism experiences is based on the notion that the planning of environments in a consistent and integrated manner can contribute to accrue perceived value and meaning for the encounter between tourists and places (Fesenmaier & Xiang, 2017; Tung & Ritchie, 2011).

There are concerns that a strict process of staging may limit the tourism experience (Edensor, 2000). Nevertheless, recent research contends that the planning of specific stimuli is not, by itself, prescriptive. The provision and staging of key external stimuli, such as sensory inputs, both directly and virtually, only shapes particular emotional responses and prompts more authentic experiences and sustainable on-site behaviours by focusing on local identities and resources (e.g. Agapito et al., 2013; Agapito & Chan, 2019; Kim & Fesenmaier, 2017a; Tussyadiah, 2014). However, Rickly and McCabe (2017) assert that if this aspect is not planned in an appropriate

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E-mail address: [dlagapito@ualg.pt](mailto:dlagapito@ualg.pt).

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manner, disparate elements within the external environment will still be part of the individual experience, which can impact on meaningful performances, mind-sets and psychological engagement. This premise is supported by congruity theory, which highlights that individuals are more likely to develop positive attitudes towards products when the elements composing the consumption environment are perceived as consistent (Osgood & Tannenbaum, 1955). Specifically, sensory studies show that when the arousal qualities of at least two sensory modalities are congruent, approach behaviours are improved (Krishna, 2012).

Against this background, the design approach to tourism places (from small to large settings), “and by extension the experiences which are co-produced”, should be embedded with consistency in the surrounding environments (Fesenmaier & Xiang, 2017, p. 7). Accordingly, this approach is informed by research revealing linkages between “environmental stimuli, sensation, emotions and decision making and the nature of the tourism experiences” (p. 6). For example, recent research expanded tourist loyalty theory by showing that post-travel multisensory impressions have more power than abstract imagery elements in stimulating tourists’ intentions to re-experience destinations (Lv et al., 2020). Moreover, the process of planning visual and non-visual sensory stimuli within the experience of places can result in more positive tourism experiences for all (Pan & Ryan, 2009; Richards, Pritchard, & Morgan, 2010; Small, Darcy, & Packer, 2012).

Yet, while extensive literature reviews on specific sensory modalities (e.g. sounds; Schwarz, 2013) have been conducted, an up-to-date systematic overview of research incorporating the sensory component of the tourism experience in an integrated fashion, rather than focusing on individual sensory modalities, is still absent. This paper is timely by conducting a bibliometric analysis of articles that can assist in the understanding and design of tourism experiences around the senses and inform future research. Moreover, research areas and methods employed in the review dataset are synthesised and research opportunities are outlined. The analysis is framed by concepts and theories that have shaped the research on the sensory dimension of tourism experiences and links between different disciplinary approaches to the senses are discussed.

### Approaches to sensory experiences in tourism: a review

Many academic disciplines have devoted attention to the human senses. This is a consequence of the multidisciplinary nature of the object of study (Agapito et al., 2013). As a result, senses are deemed the foundation of how individuals interact with their surroundings, mediating the process of deriving meaning from these interactions (Goldstein, 2010; Rodaway, 1994). In this context, the senses have gained significance in the conceptualisation of the tourism experience. In the context of tourism experience design, this conceptualisation comprises the sequence of events that occur to an individual outside the ‘usual environment’, involving cognitive processes of sensation, perception, and memory (Volo, 2009). Research contributing to the understanding of sensory-informed tourism experiences within the consumption of places has typically been informed by marketing and management approaches, or human-geographical and socio-anthropologic views (Agapito et al., 2013; Kim & Fesenmaier, 2017b; Pan & Ryan, 2009; Vannini, Waskul, & Gottschalk, 2012).

Advances in psychophysiological studies of perception have been particularly critical for the approach underpinned by marketing and management works (Agapito et al., 2013). Specifically, cognitive psychology and neuroscience show that senses are used to generate human cognitive activity (Krishna, 2012). Perceptual psychology, in particular, supports that sensations (e.g. colours, sounds, odours, textures) are responsible for initiating individuals’ experiences to stimuli (e.g. light, vibration, pressure) in the environment via perceptual processes and impacting behaviours (Gardner & Martin, 2000; Goldstein, 2010). Stimuli have been defined as what is “out there” in the environment, i.e. the external cues that stimulate the sensory receptors, which in turn are responsible for transmitting sensory information to the brain via electric signals and generating sensations. Apart from this bottom-up approach, top-down processing plays also a role in perception via previous knowledge, memory and anticipation, which individuals bring to the situation (Goldstein, 2010).

Psychological aspects related to the external environment have been furthered by environmental psychology, which is concerned with the relationship between human behaviour and the physical environment (Crouch, Perdue, Timmermans, & Uysal, 2004). While Gibson (1966) proposes that people have exteroceptive (external) and internal senses, there is little consensus in literature on the number and categorisation of the senses (Vannini et al., 2012). Nevertheless, apart from the conventional five senses – sight, hearing, smell, taste and touch – other senses have been set as key for signalling information pertaining to body awareness, such as the sense of movement and position of the body (proprioceptive sense), the sense of temperature and pain (Kim & Fesenmaier, 2017b).

The managerial approach to the senses in tourism is more concerned with aspects related to the planning, management and marketing of the tourism experience and destinations (Agapito et al., 2013; Pan & Ryan, 2009). This approach is informed by seminal works such as the ones from Holbrook and Hirschman (1982) stating that the consumption experience results from the inter-relationships between individuals, environment, thought, emotion, activity and value, while emphasising the role of multisensory stimuli within these processes. Informed by the experience economy paradigm, Pine and Gilmore (1999) highlight the role of multisensory information in tangibilising and facilitating the emergence of positive and enhanced experiences. As a result, the experience economy paradigm has highlighted the role of the senses within experience design. The importance of sensory stimuli in the context of consumption experiences is also documented in experiential marketing literature. Specifically, Schmitt (1999) advocates that consumption experiences are composed of strategic experiential and inter-dependent modules that should comprise “sensory, emotional, cognitive, behavioural, and relational values that replace functional values” (p. 57). Brakus, Schmitt, and Zarantonello (2009) extended this multidimensional approach to brand experiences, which has been adapted to tourism contexts (Barnes, Mattsson, & Sørensen, 2014). Moreover, the development of sensory marketing (Krishna, 2012) has strengthened the role of the senses within the marketing and management of consumer experiences in tourism (Agapito et al., 2013).

Human-geographical and socio-anthropologic approaches are focused on the premise that senses are active rather passive

(Rodaway, 1994; Vannini et al., 2012). The construct *sensescape*, which was proposed by Porteous (1985) within human geography, is ingrained in the idea that senses mediate individuals' encounters with places and can be spatially ordered (Rodaway, 1994). Accordingly, apart from the visual gaze, current literature argues that tourism experiences can be explored via non-visual experiences, such as smellscape, soundscape, tastescapes and haptiscapes (Urry, 2002). Indeed, criticism to the process of staging tourism based on the tourist gaze (Edensor, 2000) – a concept initially approached in sociology as being visually-centred by Urry (1990) – has led to a shift to a multisensory approach to the tourism experience (Urry, 2002).

Works focused on a performance turn in tourism studies are thus informed by the idea of *embodiment*, which is of multisensorial nature (Crouch, 2000; Edensor, 2000). This approach in tourism studies recognises that ocular-centric views are limited in the process of tackling the complexity of a more embodied postmodern activity. Moreover, a multisensory approach to embodied tourism experiences has been proposed as having a more inclusive nature (Small et al., 2012). Foundations for an anthropology of the senses consider that sensory perception generated in this relationship between body, mind and the world is holistic and embedded in cultural significance (Classen, 1997). Indeed, sensory studies assert that the consumption of places is “sensuous, somatic, and yet highly-cultural achievement” (Schwarz, 2013, p. 399). Thus, senses are culturally embodied and can contribute to the sense of place and place-making (Agapito et al., 2013; Agapito & Chan, 2019; Rickly-Boyd, 2009; Vannini et al., 2012; Veijola & Jokinen, 1994). As a result, the “embodied practices of tourists and their corporeal capacity to generate meaning provide a valuable dimension to the analysis of new consumptive patterns in tourism”, such as the ones related to gastronomic experiences (Everett, 2008, p. 347). As a result, a growing line of research is focused on local gastronomy as playing an increasingly important role in the way tourists experience destinations, which involves distinctive cultural and multisensory aspects (Kivela & Crofts, 2006).

In light of the above, an integrated approach to the senses has been proffered in some tourism studies as a key component in tourism and experience design, which should be articulated with other dimensions both personal and external to the individual (Agapito et al., 2013; Kim & Fesenmaier, 2017a). The argument of the multisensory approach is that the process of planning multisensory elements can be beneficial both for visitors and communities. This rationale can aid the sustainable design of tourism in contemporary cultural and technological environments (Agapito & Chan, 2019; Fesenmaier & Xiang, 2017; Tussyadiah, 2014). In this light, Rickly and McCabe (2017) argue that, if not managed, opportunities for enhancing tourism experiences and valuing places and communities by designing around sustainable distinctiveness risk being overlooked.

### Study methods

A review of research incorporating an integrated approach to the senses which can assist in the understanding and design of tourism experiences, was conducted based on a search of journal articles. Bibliometric methods were used as they are a useful aid in literature reviews aiming to improve the knowledge of a certain domain by guiding the researcher through relevant works in a research field and mapping it. Moreover, the use of search criteria contributes to mitigating researchers' subjective bias in selecting publications for analysis (Sinkovics, 2016; Zupic & Čater, 2015). In general, techniques used in bibliometric reviews can be categorised as relational or evaluative (Benckendorff & Zehrer, 2013). This paper used predominantly relational techniques, which explore relationships within research, such as keywords co-occurrence and co-citation networks. An evaluative approach was used to assess the evolution of publications temporally as well as across different journals and countries, through descriptive analyses. In addition, research methods adopted in our database were described. As recommended in literature, bibliometric networks were combined with manual analyses (Heersmink, van den Hoven, van Eck, & van den Berg, 2011; Sinkovics, 2016). This process is detailed below.

The compilation of publications started with the development of a search protocol. Considering the focus on the senses as a component of the tourism experience rather than individual sensory modalities, the search protocol utilised was “(“senses” or “sensory” or “multisensory” or “multi-sensory”) not “sense” and (“tourism” or “tourist”)”. These criteria were used to search for publications in the peer-reviewed scientific database Scopus. This database was selected as it is considered to have a larger coverage of tourism journals than the ISI Web of Science, thus appropriate to generate a sample of publications for analysis (Benckendorff & Zehrer, 2013; Wijesinghe, Mura, & Bouchon, 2019). Following the recommendation that “bibliometric studies should not focus only on leading journals” in the field (Koseoglu, Rahimi, Okumus, & Liu, 2016), we did not filter specific journals. In addition, no filter was utilised to limit the date of publication. The search was finalised on September 16, 2019. As a result of this automated-generated search, 275 documents in English were identified.

In a second stage, only journal articles were selected. This decision was mostly dictated by resource limitation and took into consideration that scholarly work published in journal articles has been deemed representative of tourism knowledge, in addition to the fact that researchers often use different platforms in a complementary fashion (Benckendorff & Zehrer, 2013; Wijesinghe et al., 2019). This phase narrowed down the results to 196 articles. Next, titles, abstracts and authors' keywords were screened by one researcher. In this phase, duplicates, articles with no full text available and papers not matching the selected criteria were excluded manually (Wijesinghe et al., 2019). Only articles that included the search keywords/criteria in the title, abstract and/or authors' keywords were retained for further analysis.

As recommend practice to enhance data reliability, the final articles were selected based on two questions related to content (Koseoglu et al., 2016): (a) does the article address at least two sensory modalities (e.g. sound and visual stimuli as in Flavián, Ibáñez-Sánchez, & Orús, 2019) or the multisensory nature of the tourist experience (e.g. Rahman, Khalifah, & Ismail, 2017); and (b) does the research contribute to the understanding of tourism experience and place design? These questions were discussed with two experts in the area. Regarding the first question, publications focused on one sensory modality only were discarded in the context of the present analysis. As a result of the second question, if the article both focused on one specific context (e.g. one accommodation) and no link to

tourism experiences and the process of making of destinations was offered, this was excluded. A final list of 99 articles was selected and the results were combined into one new database in Excel.

Some inconsistencies in the dataset were addressed, such as misspelt names or different uses of first and second names (“P. Pearce” and P.L. “Pearce”). Amends were only made when “there was no doubt that there was an inconsistency which would affect the outcome of the analysis” (Benckendorff & Zehrer, 2013, p. 129). Next, descriptive analyses were used to examine the evolution of articles published per year, and the distribution per journal and country (considering the institution of affiliation). In addition, a preliminary content analysis was undertaken to help to organise and synthesize the full articles into main themes and topics as developed by Wijesinghe et al. (2019) and detailed in Table 1. This analysis was conducted by one researcher against literature and independently from the lexical network (authors' keywords co-occurrence) generated by VOSViewer. These themes (main focus areas) and topics were discussed with two experts. As such, this preliminary stage served to complement network analysis and contributed to guarantee the reliability of the co-occurrence network (Heersmink et al., 2011; Sinkovics, 2016; Van Eck & Waltman, 2014). In turn, bibliometric analyses (co-occurrences in our case) were used as a contribution to confirm more “subjectively derived categories” by researchers (Zupic & Čater, 2015, p. 457).

Subsequently, the database was imported to the software VOSViewer (version 1.6.13), which is a freely available tool for constructing and visualising bibliometrics networks based on a similarity matrix (e.g. keywords co-occurrence and co-citations). The latter is calculated using association strength measures. Van Eck and Waltman (2010, 2014) provide a detailed discussion of the technique and the steps for the analysis. Also, an extensive list of research applications of VOSViewer ranging from information science to policy sciences, marketing, management, psychology and health, can be found on <https://www.vosviewer.com/publications>.

In this analysis, three visual maps were created – one co-citation map and two maps based on the authors' keywords co-occurrence (lexical and temporal). The co-citation map is related to pairs of units (in our case, authors) that appear together in reference lists (i.e. are co-cited), and thus “are likely to have something in common” (Benckendorff & Zehrer, 2013, p. 127). Co-occurrence refers to the number of times one author's keyword appears in close relation with another within the publications in the dataset. This lexical analysis based on co-occurrences generates a “network of themes and their relations that represent the conceptual space of a field” (Koseoglu et al., 2016, p.183). In VOSViewer, both co-occurrences and co-citations are grouped in coloured clusters of close-related terms and showcased in 2D network maps.

We followed the recommendation to explore and adjust the threshold for occurrences according to the size of the dataset, as well as the relevance of results considering the research objective and researchers' expertise (Van Eck & Waltman, 2014). Whereas by default ten occurrences are excluded in VOSViewer, previous studies have used minimum thresholds lower as two occurrences to increase the level of detail of mapping a research field (Sinkovics, 2016). In our case, a threshold of three was considered adequate to map the authors' keywords co-occurrence, considering the relatively small size of the dataset (each article has up to six keywords) and relevance of results for interpretation against the theoretical background. The resolution parameter was left at its default of one, since adjusting this parameter would not result in relevant alternative solutions for grouping keywords. Using the same keyword network, a temporal network map was generated to explore the temporal dynamics of the field based on the average number of publications per year. For the co-citation map, a threshold of fifteen co-citations was considered adequate to highlight the main links between the authors/research who mostly informed the articles under analysis, and interpret the network. The resolution parameter used was 0.9 since it presented a stable solution of three groups of articles based on the authors' co-citations. The cluster size was also left at the default setting of a minimum of one term per cluster.

## Results

The final corpus of articles for analysis consisted of 99 documents indexed in Scopus. Fig. 1 shows that, although still an emergent area of research, studies following an integrated approach to the senses and aiding in the understanding tourism experiences design have visibly increased in the last decade, particularly 2013 onwards. It can be observed that whereas four articles were published in 2009, this number increased to 22 articles in 2019 (January–September).

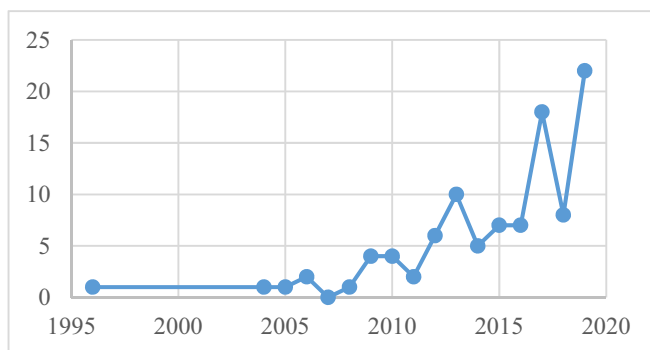


Fig. 1. Evolution of articles around the senses.

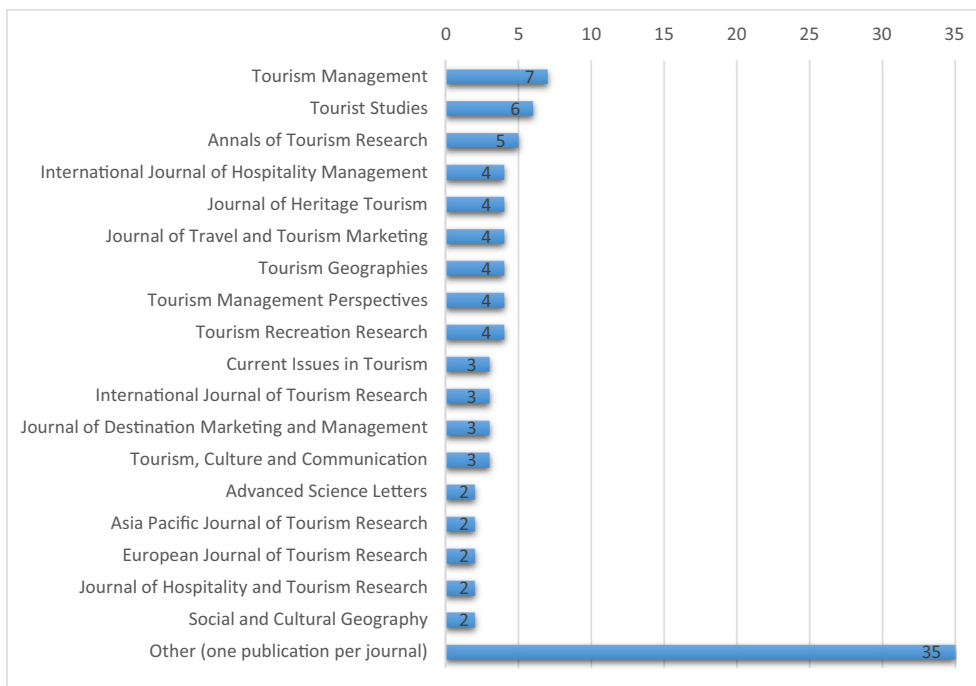


Fig. 2. Articles around the senses per journal.

#### Distribution of articles geographically and by journal

Fig. 2 indicates that although Tourism Management, Tourist Studies and Annals of Tourism Research are the journals where more articles in our study were published, research stressing the importance of the senses in the process of understanding tourism experiences design has been published across a variety of journals, which have diverse scopes. Although the research under review was published in English, the articles were developed in different geographical areas (according to the authors' institutional affiliations): UK (22), USA (18), Australia (16), Malaysia (10), Portugal (9), South Korea (6), Canada (5), Finland (5), Hong Kong (5), Taiwan (5), China (4), Denmark (4), Germany (4), Italy (4), Spain (3), France (2), India (2), New Zealand (2), Norway (2), and other countries (12). Some research is co-authored; thus, articles can be associated with more than one country.

#### Articles by theme

As a preliminary analysis, the articles were tentatively organised in four themes following literature review (Table 1) as follows: embodiment and place encounters (34.3%), senses in destination marketing (26.3%), sensory dimension in tourism experience planning and management (24.2%), and multisensory nature of gastronomic experiences (15.2%). Nonetheless, it is acknowledged that some articles do not exclusively fit one theme as often sensory studies contributing to the understanding and design of tourism experiences are informed by concepts and theories from different fields (Agapito et al., 2013; Cohen & Cohen, 2019; Fennell, 2009). Regardless, this analysis identifies the main focus areas and topics of these articles, and facilitates a perspective on future research directions.

**Embodiment and place encounters.** A research strand informed by the embodiment paradigm is visible. These studies place the body as central to the empirical research on tourism experiences and aim to understand tourists' consumption (e.g. heritage, massage and wellness), memory and place-making (e.g. Rickly-Boyd, 2009). Specifically, Hill, Curtin, and Gough (2014) propose a framework assisting in the understanding of tourists' encounters with nature-based settings. The understanding of how this process is bodily mediated can contribute to facilitating the connection between people with specific environments. Others are more concerned with the role of a multisensory approach to tourism experiences in the context of disability and accessibility, with an emphasis on non-visual senses (e.g. Henriques, Canales, García-Frank, & Gomez-Heras, 2019; Lauría, 2016). While acknowledging the importance of exploring multisensory components of the embodied experiences, which include accessibility aspects related to disability and reduced mobility, these articles stress the importance of further identification and integration of multisensory elements in the process of designing inclusive experiences in tourism places.

**Senses in destination marketing.** Another integrated approach to the senses focuses on aspects of destination marketing, such as *brand experience* (e.g. Barnes et al., 2014) and *destination imagery* (e.g. Jaworska, 2017), *theming* tourism experiences (e.g. Agapito, Valle, & Mendes, 2014) and *technological embodiment* (e.g. Flavián et al., 2019). These studies pinpoint predominant multisensory aspects that can be used to enhance the tourism experience. Moreover, the argument that multisensory information can be tangibilised by using



**Table 1**  
Themes around the senses in the dataset.

Themes	Topics	Articles in the dataset	% (n)
Embodiment and place encounters	Embodied experiences, memory, consumption/ construction of places Senses and disability	Agapito, Mendes, & Valle, 2012; Baptista, 2017; Bødker, 2016; Chhetri, Arrowsmith, & Jackson, 2004; Chronis, 2006; Edensor, 2013; Finlay, 2019; Gibson, 2010; Godfrey, Wearing, Schlenker, & Grabowski, 2019; Hays, 2012; Hill, Curtin, & Gough, 2014; Jaffe et al., 2019; Jensen, Scarles, & Cohen, 2015; Jiang & Yu, 2019; Kljenak, Kurdija, Polič, & Golobič, 2013; Larsen, 2019; Lea, 2006; Low, 2017; MacLeod, 2017; Matteucci, 2013; Osmond, Chen, & Pearce, 2015; Österlund-Pötzsch, 2010; Pearce, Wu, & Osmond, 2013; Pearce, Wu, De Carlo, & Rossi, 2013; Rakić & Chambers, 2012; Rickly-Boyd, 2009; Ryan, 2013; Su, 2010; Vannini & Vannini, 2018; Wilson & Hannam 2017 Dann & Dann, 2012; Henriques, Canales, García-Frank, & Gomez-Heras, 2019; Lauría, 2016; Small, Darcy, & Packer, 2012	34.3 (34)
Senses in destination marketing	Brand experience  Destination imagery Technology and sensory stimuli Theming	Ahn & Back, 2018; Ahn & Back, 2019; Ahn, Back, & Boger, 2019; Barnes, Mattsson, & Sørensen, 2014; Jiménez-Barreto, Sthapit, Rubio, & Campo, 2019; Kang, Manthiou, Sumarjan, & Tang, 2017; Manthiou, Kang, Sumarjan, & Tang, 2016; Rezaei, Mazaheri, & Azadavar, 2017; Tasci, Khalilzadeh, Pizam, & Wang, 2018; Wang, Kim, & Kang, 2019 Cherifi, Smith, Maitland, & Stevenson, 2018; Ghosh & Sarkar, 2016; Jaworska, 2017; Kim & Kerstetter, 2016; Lee, Gretzel, & Law, 2010; Pan & Ryan, 2009; Son & Pearce, 2005; Xiong, Hashim, & Murphy, 2015 Bogomazova & Stenyushkina, 2017; Carulli, Tosin, Previtali, Ferrise, & Bordegoni, 2019; Flavián, Ibáñez-Sánchez, & Orús, 2019; Isacson, 2011; Manghisi et al., 2017; Martins et al., 2017 Agapito et al., 2014; Åström, 2018 Agapito et al., 2017; Kim & Perdue, 2013	26.3 (26)
Sensory dimension in tourism experience planning and management	Decision-making Cruise experiences Event-based experiences Wildlife experiences Transformational experiences Review  Scale development	Gutberlet, 2019; Ioana-Daniela, Lee, Kim, Kang, & Hyun, 2018 Chen, Kung, Pei, & Shih, 2014; Lee & Kim, 2016; Mackellar & Derrett, 2015; Stricklin & Ellis, 2018 Ballantyne, Packer, & Sutherland, 2011 Country et al., 2017; Puhakka, Pitkänen, & Siikamäki, 2017; Tan, Noor, Rasoolimanesh, & Mustafa, 2019 Agapito et al., 2013; Agapito, Mendes, Pinto, & de Almeida, 2016; Buhalis et al., 2019; Cohen & Cohen, 2019; Fennell, 2009; Rahman, Khalifah, & Ismail, 2015; Rahman, Khalifah, & Ismail, 2017; Pearce & Fagence, 1996; Singh & Mehraj, 2018 Kim & Eves, 2012; Kim, Eves, & Scarles, 2013; Lee & Jan, 2019	24.2 (24)
Multisensory nature of gastronomic experiences	Food experiences  Wine experiences	Edensor & Falconer, 2015; Everett, 2008; Kim, Eves, & Scarles, 2009; Kim, Park, & Lamb, 2019; Lin & Mao, 2015; Mak, Lumbers, Eves, & Chang, 2013; Mak, Lumbers, Eves, & Chang, 2017; Son & Xu, 2013; Sthapit, 2019; Suntikul, Pratt, & Chong, 2019; Ting, Tan, & John, 2017; Walter, 2017; Wijaya, King, Morrison, & Nguyen, 2017; Yang, Lai, & Xiao, 2019 Brochado, Stoleriu, & Lupu, 2019	15.2 (15)
Total			100 (99)

technology to improve the tourism experience is recurrent. These works reveal opportunities to explore how multisensory stimuli can be combined with the new advances in technology from a marketing perspective both before and during the tourism experience.

*Sensory dimension in tourism experience planning and management.* Few empirical studies focus on the role of the senses in decision-making processes (e.g. Agapito et al., 2017). Some studies incorporate multisensory elements within the development of scales in the context of tourism experiences management (e.g. Lee & Jan, 2019). Multisensory aspects are also examined in the planning of specific forms of tourism experiences (e.g. cruise tourism, event tourism, wildlife tourism, transformational tourism). Articles focused on theoretical discussions place emphasis upon multisensory information in understanding and planning tourism experiences. By doing so, reviews indicate that opportunities for multidisciplinary research include areas such as technology (e.g. Agapito et al., 2013; Buhalis et al., 2019), disability/accessibility (Cohen & Cohen, 2019), consumer outcomes (Rahman, Khalifah, & Ismail, 2015), and pleasure, well-being and design (Fennell, 2009; Pearce & Fagence, 1996). While it is recognised in many of these articles that the involvement of different stakeholders is key to the sustainable planning of diverse forms of tourism experiences, it is also stressed that future empirical studies should further examine how different stakeholders can contribute to the planning of distinctive multisensory elements (e.g. Yang, Lai, & Xiao, 2019) in the design of enhanced and sustainable tourism experiences.

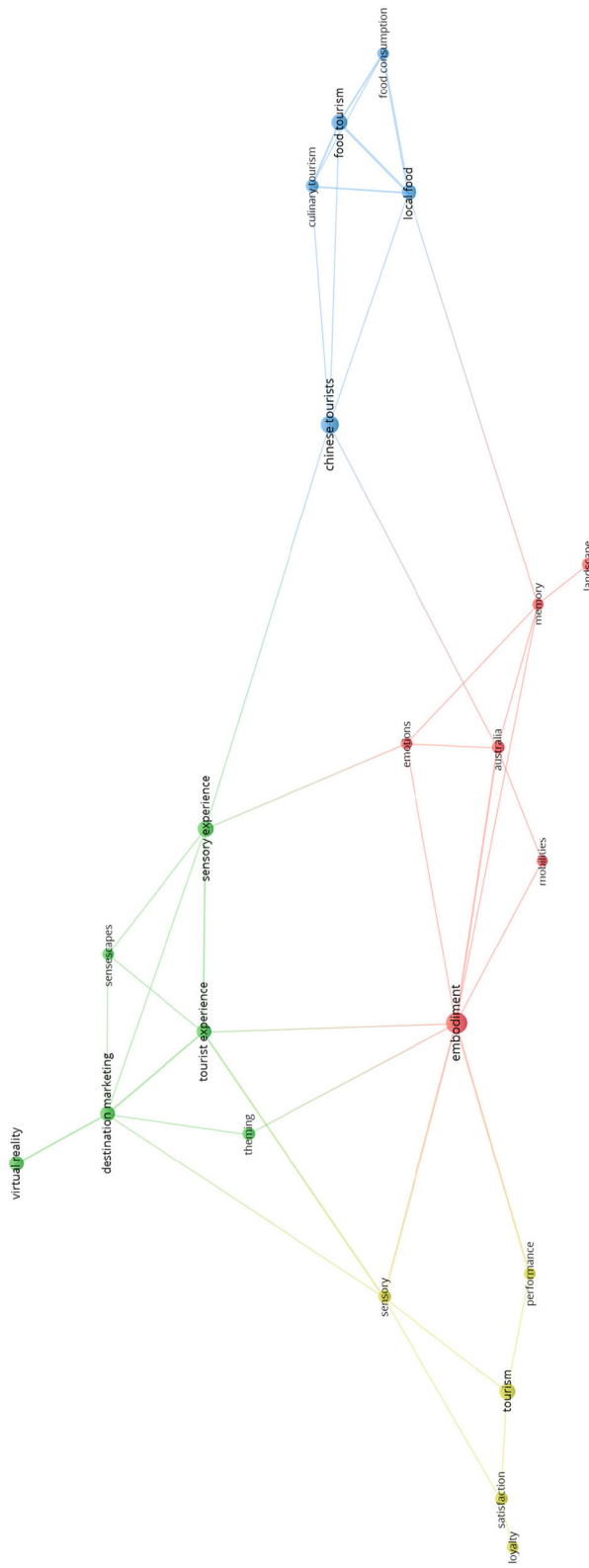


Fig. 3. Lexical network around the senses.

*Multisensory nature of gastronomic experience.* A group of articles have been focused on unique multisensory aspects of the gastronomic experience as a key component of the destination experience. These articles are related to *food* (e.g. [Everett, 2008](#)) and *wine tourism* ([Brochado, Stoleriu, & Lupu, 2019](#)). This line of research has related the multisensory nature of gastronomic experiences to destination identity, thus central to the design of distinctive and sustainable tourism experiences. Accordingly, [Everett \(2008\)](#) contends that in the context of a growing demand for experiences that are co-created between tourists and producers, food allows to immerse oneself in a myriad of sensory-informed experiences and is “able to characterize place and identity” (p. 352). Whereas some of these studies have been focused on the Asian markets (e.g. [Yang et al., 2019](#)), it is stressed that future research could explore how unique multisensory aspects of gastronomy could be incorporated in the design of destinations experiences by addressing diverse cultural contexts.

#### *Lexical network*

[Fig. 3](#) shows the map depicting the co-occurrence of authors' keywords used in the articles under research. Out of 411 possible keywords, co-occurrence analysis found 22 keywords that meet the threshold. The network of keywords is grouped into four coloured-clusters, as follows: (1) blue: words which are lexically related to the gastronomic destination experience (Chinese tourists [i.e., studies focused on the Chinese market], food tourism, local food, culinary tourism, food consumption); (2) red: keywords related to embodied experiences (embodiment, Australia [i.e. studies conducted in Australian settings], landscape, memory, emotions, mobilities), (3) green: terms related to tourism experience marketing (sensory experience, destination marketing, tourist experience, virtual reality, theming, sensescapes); and (4) yellow: words associated with tourism management and consumer outcomes (tourism, sensory, satisfaction, performance, loyalty). Core concepts are marked with larger circles based on the number of occurrences.

Some findings can be highlighted. First, the authors' keywords co-occurrence network generated by VOSViewer complements the organization of articles conducted previously by depicting four research themes in line with literature and discussed with experts ([Table 1](#) and [Section Articles per theme](#)). Inasmuch as visual mapping is focused on the links between keywords, it can be observed that the emerged groups of authors' keywords are well linked with each other, thus reinforcing that research themes should not be addressed as being mutually exclusive. On the other hand, the preliminary analysis organises the corpus of articles based on the main focus areas and facilitates a perspective on individual articles. Both analyses indicate that the articles address the senses around 1) embodiment and the experience of tourism places, 2) destination experience marketing, 3) tourism experience planning and management, and 4) gastronomic destination experiences.

#### *Temporal network*

[Fig. 4](#) portrays the temporal evolution with regards to the use of authors' keyword co-occurrence previously identified in [Fig. 3](#). It can be observed that topics around the rationale of embodiment (except for emotions), as well as around performance within tourism management, are more established ones, considering the authors' keywords used in the articles under analysis. Younger topics are related to theming sensory-informed experiences, incorporating technological aspects such as virtual reality, loyalty and the Chinese market within the context of the gastronomic experience. This analysis suggests an evolution in research regarding new topics of interest.

#### *Co-citation network*

[Fig. 5](#) depicts the co-citation network map (authors' co-citation in the reference lists with a threshold of 15). This map shows the authors/sources that most informed the body of articles under research and respective connections (62 authors meet the threshold). A three-resolution clustering is presented. The strength of the co-citation links is marked by larger circles.

Green cluster includes authors whose work has been related to phenomenological views of the tourism experience focused on embodiment, sociocultural aspects of the tourism experience, as well as the multisensory nature of individual encounters with geographical places. The contributions from John Urry are highlighted in this group. This is related to the author's early works concerning sociological views on the tourist gaze (1990), which is a concept that has been criticised for focusing on ocular aspects, but also to the revised approach to the construct by the same author which incorporates non-visual senses (2002). Visual mapping also shows that Erik Cohen (e.g. [Cohen, 1979](#)) is highly linked to this group, which is related to his contribution to the phenomenological understanding of the tourist experience. [Edensor \(2000\)](#) informs research around the senses in the context of his work embedded in the concept of embodiment and the related discussions around staging tourism. Co-citations network also shows that this cluster includes researchers addressing the multisensory nature of individual encounters with places, as well as its social and cultural significance. This is the case of contributions of authors such as [Crouch \(2000\)](#) and [Everett \(2008\)](#), and [Dann and Jacobsen \(2003\)](#), for example.

Red cluster groups authors whose research informs the articles under analysis by offering a managerial perspective and an experiential approach to consumption. It can be observed that [Schmitt \(1999\)](#) is a key reference in this group, considering his seminal work on the modules of the consumer experience in the context of experiential marketing. In addition, seminal tourism studies developed by [Gretzel & Fesenmaier, 2003, 2010](#) on the multisensory aspects of travel experiences and the recommended methodological procedures have been influential for the development of research on the sensory dimension of tourism experiences from a managerial perspective, such as the ones conducted by [Agapito et al. \(2013, 2014, 2017\)](#).

Blue cluster comprises researchers developing foundational aspects of the tourism experience by offering epistemological views and frameworks around this construct. Particularly, [Wang \(1999\)](#) is a key reference in the body of articles in our dataset in the context of his contributions around the authenticity of tourism experiences. Kivela is also one of the most co-cited authors in the context of the conceptualisation on how gastronomy influences the way tourists experience destinations. This author contributes to



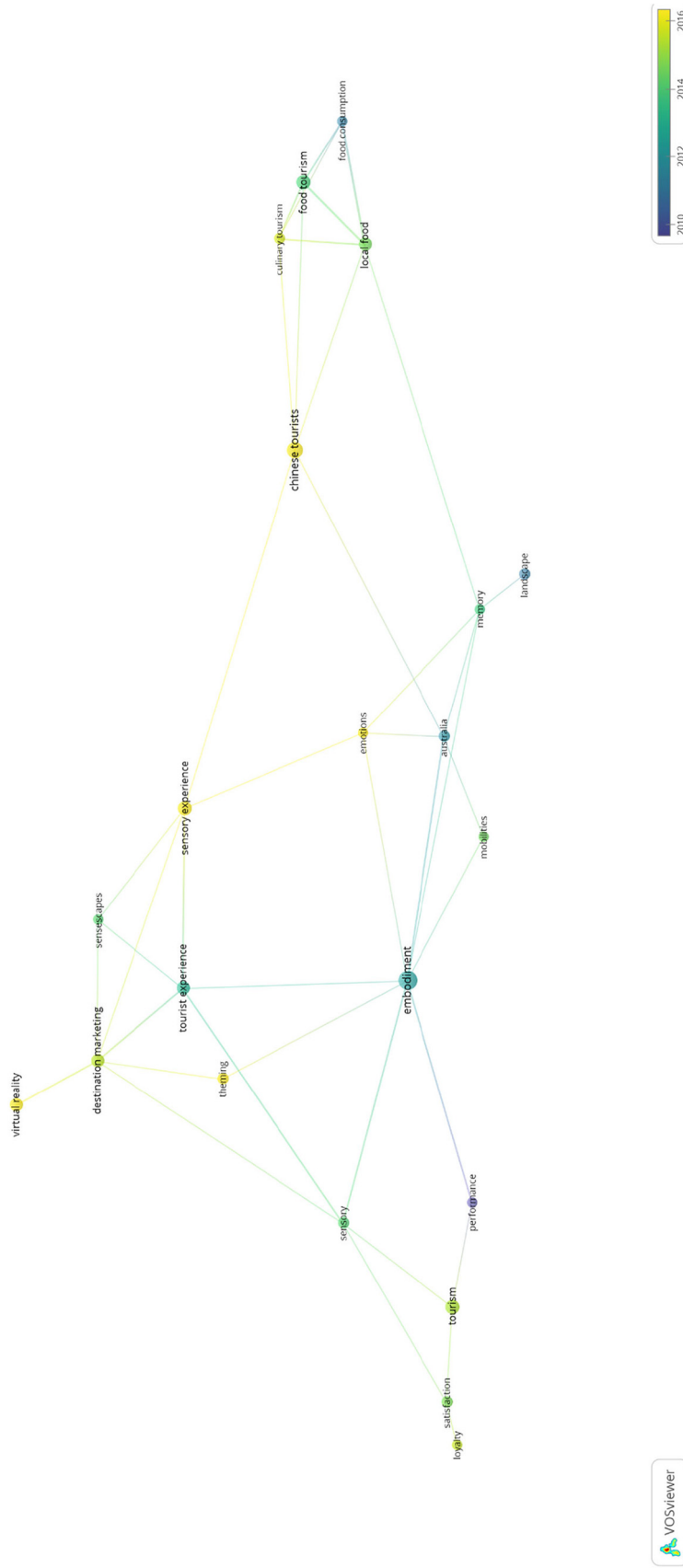


Fig. 4. Temporal network around the senses.





the articles under analysis by revealing that gastronomy plays a major role in the way tourists experience the destination, and by highlighting the multisensory dimension of this distinctive cultural resource (Kivela & Crotts, 2006).

#### *Methodological approaches*

In our dataset, empirical studies account for 90.9% (90 out of 99) articles, and 9 articles (9.1%) are literature reviews. Systematic literature reviews and bibliometric analyses are absent (Table 1). In terms of research approaches, while most studies adopt predominantly a quantitative or qualitative approach to examine multisensory information, some studies combine qualitative and quantitative methods.

The articles following qualitative methodological approaches conduct mostly interviews and focus groups as research methods, whereas observation and personal experiences are also indicated as critical in interpreting multisensory data (e.g. Dann & Dann, 2012; Small et al., 2012; Yang et al., 2019). Accordingly, discursive-informed methods are in general considered as the most appropriate to collect data on embodied experiences and their socio-cultural significances. These studies often adopt human-geographical and socio-anthropological views. While collecting data in different cultural contexts is considered important to the sensory dimension of different forms of tourism experiences and place transformation through tourism, single case studies are dominant (e.g. Everett, 2008; Yang et al., 2019).

Other studies follow a quantitative approach to capturing multisensory elements of the tourism experience. This is the case of research using questionnaires and following a marketing approach to the senses, such as the study of brand experience in tourism contexts. This makes possible the collection of larger samples and validation of scales to be used in different destinations and contexts. These studies are centred on structural relationships within consumer behaviour (e.g. Ahn, Back, & Boger, 2019; Barnes et al., 2014). Few studies have attempted experimental design as a vehicle to examine the sensory dimension of the tourism experience (Flavián et al., 2019; Kim & Kerstetter, 2016; Lee, Gretzel, & Law, 2010). For example, a laboratory experiment is conducted by Flavián et al. (2019) to compare how different embodied technologies contribute to generating immersive pre-experiences with a destination.

A strand of empirical research centred on a managerial approach takes into consideration the phenomenological nature of the tourism experience as a construct, while combining the advantages of both qualitative and quantitative data by using a two-stage process. First, qualitative data on sensory-informed experiences is extracted from sources such as travelogues (Pan & Ryan, 2009), social media platform reviews (Brochado et al., 2019) and open-ended questions (Agapito et al., 2014, 2017; Ballantyne, Packer, & Sutherland, 2011). After conducting content or thematic analysis and transforming qualitative into quantitative data, statistical analyses of emerged sensory categories are performed. This procedure permits the capture of sensory-informed themes and the examination of the relationship between constructs (Agapito et al., 2014).

Regardless of the variety of research methods used and multidisciplinary approaches (Agapito et al., 2013), it can be observed that the articles in our dataset are predominantly developed from the perspective of tourists. Moreover, in general, only one stage of the tourism experience (pre-visit, onsite or post-visit) is addressed. Few exceptions (Agapito et al., 2017; Ballantyne et al., 2011) perform follow-up research. Notwithstanding, it is acknowledged that future research seeking to inform more effective tourism experience design around the senses should analyse how sensory-informed experiences evolve across different stages of the tourism experience (Agapito et al., 2013; Sthapit, 2019) and involve different stakeholders (Tasci, Khalilzadeh, Pizam, & Wang, 2018; Yang et al., 2019). The potential of new technological tools in aiding the collection of sensory data and complementing more conventional forms of data collection is also highlighted in recent articles (Buhalis et al., 2019; Flavián et al., 2019).

#### **Conclusion**

This paper had provided a review of 99 journal articles addressing the sensory component of the tourism experience in an integrated manner rather focusing on individual senses. These articles assist in the understanding and design of tourism experiences. Considering our dataset, this research area has substantially grown in the last decade, particularly 2013 onwards. Also, it spread across a variety of countries and journals. This confirms the relevance of this emergent strand of research in the context of tourism design. The combination of a preliminary analysis and a network based on authors' keyword co-occurrence uncovered four research themes of past research that can contribute to the understanding and design of tourism experiences and places. These are related to (1) embodiment and the experience of tourism places, (2) destination experience marketing, (3) tourism experience planning and management, and (4) gastronomic destination experiences.

Visual mapping shows that authors' keywords co-occurrences are well linked with each other, which indicates that research themes and topics should not be addressed as being mutually exclusive but rather connected. This aspect is reinforced by the findings of the co-citations network. This map shows that while there is a cluster grouping authors with a body of work predominantly embedded in human-geographical and sociocultural views, and a different one clustering authors who are associated with research informed by a managerial approach, these groups are strongly connected. This empirical finding is supported by the literature background presented in this paper and reinforces the claim that the sensory dimension of tourism experiences is of multidisciplinary nature (Agapito et al., 2013). In this light, research aiming to contribute to theory and practice in tourism experience design around the senses should consider the multidisciplinary nature of sensory-informed experiences.

This paper provides some directions for future research. Findings suggest that research opportunities aiming to strengthen the understanding and design of tourism experience by addressing multisensory aspects are mostly related to sustainability and technology. First, many articles acknowledge the importance of planning and designing tourism experiences considering different aspects of sustainability. This is in line with the rationale that well-designed tourism can make a significant contribution to sustainable

development and well-being of both tourists and communities (Fesenmaier & Xiang, 2017; UN, 2016). Whereas it is recognised that the involvement of different stakeholders is key to the sustainable planning of tourism experiences, empirical research focused on this aspect are limited in our dataset. Empirical studies can contribute to theory and practice by exploring how different stakeholders can be involved in the planning of distinctive multisensory elements in the design of enhanced and sustainable tourism experiences. In addition, a group of articles indicated that there is scope to further examine the processes involved in identifying and incorporating multisensory stimuli in the design of inclusive and accessible tourism experiences. This is in accordance with the mind-set that the design of multisensory elements can be used in responsible tourism management (Agapito & Chan, 2019).

Moreover, this review suggests that there are opportunities to explore how unique multisensory aspects of gastronomy can be used in the design of destinations experiences by addressing different markets and cultural differences. In fact, a group of articles advocates that local gastronomy is linked to destination identity, and thus it can contribute to sustainable local development and destination distinctiveness. Furthermore, recent interest in the Chinese market linked to destination gastronomic experiences has been revealed in the co-occurrence and temporal networks. Also, future research can test theoretical works and expand theories by exploring the relationship between unique sensory stimuli and individuals' responses. Results from our authors' co-occurrence network show that both emotions and loyalty are still emergent concepts in research contributing to understanding and design tourism experiences around the senses. This recommendation is also supported by a recent study developed by Lv et al. (2020).

Second, a group of recent articles point out that multisensory elements can be tangibilised by technology to enhance tourism experiences in an inclusive manner and address contemporary technological developments (Buhalis et al., 2019; Flavián et al., 2019; Lauría, 2016). Yet, practical applications are still limited. Our findings reveal that the focus on virtual reality is an emergent topic that is gaining interest among a body of researchers. Also, a synthesis of the research methods employed in the articles under analysis shows that the collection of sensory data has been conducted mostly via questionnaires and interviews. These methods could be complemented by using physiological measurement devices and mobile devices to better understanding how senses interact with each other, and how different profiles of individuals react to different stimuli in diverse tourism contexts (Kim & Fesenmaier, 2017b). Technology can also aid the design of experimental research and longitudinal studies to examine the evolution of sensory-informed experiences across different stages of the tourism experience.

Finally, it is acknowledged that this review is limited to journal articles which are published in English and indexed in Scopus. The analysis is also limited to the search keywords used for generating the dataset for analysis. Notwithstanding, this review provides a systematic and up-date overview of past research and shows that the multisensory dimension of the tourism experience has a key role in tourism design. This paper has sought to identify and discuss useful theory, and provide understanding and guidelines for those interested in researching tourism experiences design around the senses.

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**Dora Agapito** ([dlagapito@ualg.pt](mailto:dlagapito@ualg.pt)) is an Assistant Professor at the University of Algarve (Faculty of Economics) and integrated researcher at the Research Centre for Tourism, Sustainability and Well-being (Cinturs), Portugal. Previously, she was a Senior Lecturer in Tourism and Events Management at the University of Lincoln, UK. She holds a PhD in Tourism and her research focuses on responsible tourism management, sensory-informed tourist experiences, experience design, destination management, consumer psychology and social marketing.