



Research Paper

Reading travel guidebooks: Readership typologies using eye-tracking technology



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ABSTRACT

The increasing popularity and capabilities of eye-tracking technology applied in a tourism setting have allowed for a deeper understanding of tourist behaviours and perceptions than ever before. Used in the context of travel guidebooks, this exploratory study combines eye-tracking technology with traditional survey and interview data to build an informed understanding of the variability in tourism guidebook reading behaviours. After a structured qualitative analysis with 22 participants tasked with planning a trip to Ottawa, Canada, the findings reveal four broad types of readers: holistic content examiners, visual passives, supplemental scanners, and visual dominants. Each group's characteristics and patterns are compared and contrasted in regard to time to first fixation, visit count, and total fixation duration in each of the 68 pages within the guide, revealing nuanced descriptions of how destination marketers may better design their travel guides to accommodate these various reader types. Practical implications are provided, as well as important implications for marketing researchers aiming to better understand how to use eye-tracking technology to organise their participants into meaningful segments.

1. Introduction

Travel guidebooks, also known as tourist guidebooks or visitor guides, have been considered an influential tool in shaping a tourist's intention to visit (Nolan, 1976; Wong & Liu, 2011) and remain an important source for destination information (Roberson, 2015). As Kotler and Gertner (2002) have observed, a marketer can rarely satisfy everyone at the same time and is often forced to segment customers by certain patterns. In this way, marketers are better able to identify and profile distinct groups – in this paper's context, by travel guidebook reading patterns – in order to cater to them more effectively. Despite the significant relationship between a destination's information source and a tourist's image of the destination (Molina, Gómez, & Martín-Consuegra, 2010), the question of how seemingly different reading patterns of these guidebooks may impact on that image has not been directly addressed.

One explanation for why segmentation patterns have not been adequately explored in the past is due to limitations in measuring these patterns without access to technology that is capable of rendering micro-level changes in a reader's eye-movements. With the increasing popularity of modern eye-tracking technology, this limitation is quickly disappearing. Indeed, much of what is lacking in the nascent literature

has been due in part to limitations in the technology itself, since it used to require numerous steps, including turning on illumination controls, adjusting chin rests, adjusting the camera's focus, and so on. Today, it is as simple as turning on the device, completing a brief calibration, and running the experiment (Duchowski, 2007).

This exploratory research therefore aims to explore the ways in which eye-tracking technology can be used to help uncover meaningful differences between readers of travel guidebooks in an effort to better inform destination marketers as to the design of their promotional materials, as well as to advance the knowledge of variability in reading behaviours. The study uses a conceptual approach that combines this technology with survey data and in-depth interviews. The proposed typologies outlined in this research may also support the design of tourism guides overall, as the more prevalent types help to support a greater consideration of overall guidebook 'flow'. Lastly, this research will seek to advance the existing destination image theory literature, as eye-tracking's real-time data on a tourist's cognitive processes are quite advantageous over traditional survey responses in which a participant's self-reports can often be recalled incorrectly and/or lead to misleading conclusions (Kormos & Gifford, 2014).

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Table 1
Eye-tracking studies in the tourism and hospitality context to date.

Sample Size	Participant pool	Methods	Authors
<i>Topic: Ads or photographs</i>			
25	University students (no demographic information)	<u>Non-linear stimuli</u> : Two A4 magazine ads <u>Eye-tracking and questionnaires</u> : Numbers of saccades, average fixation durations per advertisement, scan paths, heat maps, and self-reported liking scores for two ads were compared using a within-subjects ANOVA.	Scott, Green, and Fairley (2016)
30	Undergraduate students (15 Chinese and 15 Australians; 18 females and 12 males)	<u>Linear stimuli</u> : 16 tourism photos (12 s per image) <u>Eye-tracking and questionnaires</u> : Fixation counts, fixation durations, saccades, and self-reported liking scores analysed using mixed-design ANOVA.	Wang and Sparks (2016)
32	Chinese students (15 females and 17 males)	<u>Non-linear stimuli</u> : 24 tourism photographs under 4 experimental conditions <u>Eye-tracking and questionnaires</u> : Heat map and eye movement data (total viewing time and number of fixations) processed in EyeLink Data Viewer program. MANOVA for survey data analysis.	Li, Huang, and Christianson (2016)
30	Chinese students (15 females and 15 males)	<u>Linear stimuli</u> : Seven web advertisements (20 s per ad) <u>Eye-tracking and questionnaires</u> : Differences in fixation durations, fixation counts, saccade counts, and ad recall of seven web advertisements analysed using ANOVA. Impacts of gender, task and experience with online tourism websites on visual attention and memory tested.	Kong, Huang, Scott, Zhang, and Shen (2019)
32	Participants (19 females and 13 males)	<u>Non-linear stimuli</u> : Search and view of hotel website for a hypothetical trip <u>Eye-tracking and questionnaires</u> : Descriptive analysis of AOIs, fixation durations, and importance of information.	Noone and Robson (2014)
113 in two conditions	Adults without a student status (49 females and 64 males)	<u>Non-linear stimuli</u> : Nature-based or built-based servicescape with performance arts <u>Eye-tracking and questionnaires</u> : T-test used to compare fixation durations and fixation counts	Wang, Tsai, & Tang (2018)
<i>Topic: Menus</i>			
25	Undergraduates, graduates, and faculty (no demographic information)	<u>Non-linear stimuli</u> : Two wine lists and one dinner menu <u>Eye-tracking</u> : Fixation sequence and fixation durations recorded to compute standardised Levenshtein distances and conduct an optimal matching analysis.	Yang (2012)
95 in three conditions	University students (52 females and 43 males)	<u>Non-linear stimuli</u> : Three conditions of menu labelling <u>Eye-tracking</u> : Fixation durations and fixation counts analysed using ANOVA.	Kim, Tang, Meusel, and Gupta (2018)
80	Undergraduate and graduate students (40 females and 40 males)	<u>Non-linear stimuli</u> : Color-coding and calories menus <u>Eye-tracking and questionnaires</u> : Visit durations, visit counts, and percentage of menu item selections compared. Impacts of gender, hunger level, dining frequency, calorie consciousness, and calorie estimate accuracy analysed using T-test.	Schwebler, Harrington, and Ottenbacher (2018)
<i>Topic: Webpages</i>			
60	Adults and potential users (30 females and 30 males)	<u>Linear stimuli</u> : Three eTourism 2.0 tools (90 s per page) and viewed banner designs in six experimental conditions. <u>Eye-tracking and questionnaires</u> : Fixation durations and number of fixations compared within-group using T-test. Fixation durations and times to first fixation and fixations before compared between-group using ANCOVA.	(Hernández-Méndez & Muñoz-Leiva, 2015)
9	University students (5 females and 4 males)	<u>Non-linear stimuli</u> : Travel websites <u>Eye-tracking, questionnaires and interviews</u> : Fixation durations and fixation counts analysed with questionnaires and interviews to identify importance of online information sources.	Mariussen, Ibenfeldt, and Vespestad (2014)
16	Faculty and staff members of a university (no demographic information)	<u>Non-linear stimuli</u> : Four sets of hotel sites: (1) five hotels with images; (2) five hotels with text description only; (3) 20 hotels with images; (4) 20 hotels with text description only. <u>Eye-tracking and questionnaires</u> : Number and time of fixation compared using two-way repeated ANOVA to examine whether number of options and presence of images influenced percentages of hotels viewed. Interviews were conducted to give further explanation.	Pan, Zhang, and Law (2013)
41	Faculty and staff members of a university (no demographic information)	<u>Non-linear stimuli</u> : Online travel agencies' websites with a task of planning a weekend trip to Orlando and Las Vegas <u>Eye-tracking and questionnaires</u> : Navigational paths, heat maps, participants' verbal protocols, and observational notes analysed.	Pan, Zhang, and Smith (2011)
12	International graduate students from a European university (7 females and 5 males)	<u>Non-linear stimuli</u> : 13 US destination online pages <u>Eye-tracking and questionnaires</u> : Comparison of results of eye-tracking study with previous one that used self-reported data	Marchiori and Cantoni (2015)
20	Chinese undergraduate and MBA students (7 females and 13 males)	<u>Linear stimuli</u> : 53 self-reported ratings of visual appeal of 49 hotel webpages. Based on ratings, six hotel webpages selected for viewing with an eye-tracker (10 s per webpage). <u>Eye-tracking, questionnaires, and interviews</u> : Fixation durations and heat maps used to show appealing components of websites. Questionnaires probed ratings of visual appeal; interviews provided qualitative interpretations.	Hao, Tang, Yu, Li, and Law (2015)

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Table 1 (continued)

Sample Size	Participant pool	Methods	Authors
21	Participants (no demographic information)	<u>Non-linear stimuli</u> : Vancouver 2010 website <u>Eye-tracking and survey</u> : Time to first fixation, fixation counts, fixations before AOI, fixation durations, and self-reported data on website appeal	Green, Murray, and Warner (2011)
<i>Topic: landscapes, cities, and museums</i> 112 in 10 conditions	University students (57 females and 55 males)	<u>Linear stimuli</u> : Image of service representative with a specific smile (seven seconds) <u>Eye-tracking and questionnaires</u> : Attributes of service representatives, fixation durations, and likelihood of forgiving service failure analysed using ANOVA.	Ngan and Yu (2018)
36	Participants (25 females and 11 males mainly from Wielkopolska)	<u>Non-linear stimuli</u> : Three different landscapes <u>Eye-tracking and questionnaires</u> : Gaze plots and heat maps created based on eye-tracking data. Open-ended questionnaires analysed through content analysis.	Potocka (2013)
12	Participants (6 females and 6 males)	<u>Non-linear stimuli</u> : City panorama with an eye-tracker <u>Eye-tracking</u> : Correlation between total exploration field and exploration duration, between total number of visited AOIs and exploration duration, and between exploration duration and number of AOI revisits examined.	Kiefer, Giannopoulos, Kremer, Schlieder, and Raubal (2014)
8 in each museum	Participants (4 experts and 4 novices)	<u>Non-linear stimuli</u> : Linden-Museum Stuttgart 'Pacific Oasis' Exhibition and LiMo 'Nexus' Exhibition wearing an eye-tracker <u>Eye-tracking and cued retrospective reporting</u> : Participants were asked to watch their own processed eye-tracking videos and retrospect on their goals of attention.	Eghbal-Azar and Widlok (2013)

2. Literature review

2.1. Marketing-based eye-tracking research

Since eye-tracking technology allows for the examination of physiological assessment of a stimulus (Fox, Krugman, Fletcher, & Fischer, 1998), its application in marketing research has been extensive and thorough. Duchowski (2002) outlines three important reasons to consider a methodology focused on the subject's eye-movements: (1) greater efficiency during complex tasks, (2) the criticality of understanding how individuals acquire and store information in marketing research, and (3) the data produced by studying eye-movements is unobtrusive and objectively presented. Although marketers have been keen to adopt eye-tracking technology to better understand how their consumers choose and interact with their products and services (Wedel & Pieters, 2008), until recently the usage of eye-tracking in academic research has been relatively sparse. Even when it is used, it is often limited to recording simple eye movements and determining where a user is looking on a page, without consideration of *why* they are looking there in the first place. Correlations have been found between positive preferences toward an advertisement and the increased amount of time in which the participant pays attention to it (Maughan, Gutnikov, & Stevens, 2007; Orquin & Loose, 2013). This suggests that along with being able to gauge how long a participant pays attention to an advertisement, studies using eye-tracking technology can also be coupled with additional qualitative techniques, such as one-on-one interviews, to match those results with the participants' feelings toward those ads.

Another important application is the ability of eye-tracking studies to incorporate real-world dynamics, such as time pressure and other considerations, to the experiment. One particular study involved limiting purchasers' time to choose between different grocery store items, concluding that the time it took to choose their most preferred items increased as external information overloaded their decision-making process (Reutskaja, Nagel, Camerer, & Rangel, 2011). Yet each of these studies, which typically pay great attention to changes across tasks or time (Orquin & Loose, 2013), have largely avoided a discussion on the meaningful differences that occur across participants themselves. Successful segmentation research using latent-class approaches combined with eye-tracking data analysis have uncovered broad readership styles, based on level of involvement with the advertising material. To illustrate, Rosbergen, Pieters, and Wedel (1997) have identified three broad segments in their study of magazine readers by eye-movement

behaviours (in order of group size): scanning, initial attention, and sustained attention. By combining these segments into their level of interaction with brands, along with pictures and text on the page, interesting stories begin to emerge that tell marketers and researchers about the power of understanding how their readers differentiate from one another. Imagine, for example, two distinct segments that both spend relatively more time looking at images on the page – perhaps one segment looks at the images as a precursor to spending a more involved time examining the text, whereas the other group just scans the images before quitting the guide altogether and paying no further mind to it. Clearly, despite similarities, these are distinct patterns of behaviour that are worth paying special attention to, which modern eye-tracking technology can allow for. In light of the importance of better understanding these segments in the context of guidebook readership behaviours, and in overcoming the limitation of past research which frequently ignores these potentially important differences among their participants, this study will seek to tell a more complete story of not only how behaviours may be different not only across tasks (in this case, areas of interest), but also across participants (in this case, through possible typologies).

2.2. Tourism-based eye-tracking research

The use of the word 'gaze' in tourism research typically refers to the early work by John Urry (1992), who describes the tourist gaze as the lens by which tourists experience the places they visit and interact with, and that "it varies by society, by social group, and by historical period [and that] such gazes are constructed through difference" (p. 1). Indeed, as the old adage goes, we do not see things as they are but rather as we are. This is true of all things related to subjective perception. Fortunately, most recently there has been an increase in the amount of research in the field of tourism that affords researchers a way of seeing the world as others see it through the use of eye-tracking technology, enabling them to draw comparisons in a variety of contexts. Table 1 provides a comprehensive list of the existing tourism and eye-tracking literature at the time of writing, indicating the various types of studies that have been created as a result of this modern methodological approach.

The current study closely mirrors the research done by Mariussen et al. (2014) who have successfully triangulated eye-tracker technology with other methodologies to better understand the image of the destination by a tourist. A common theme among these existing eye-tracking

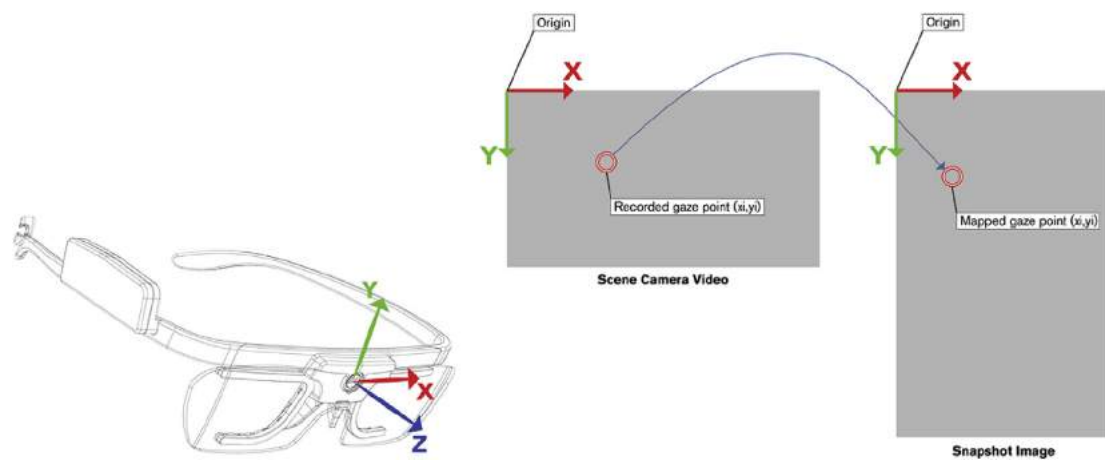


Fig. 1. Illustration of Tobii Pro 2 Glasses eye-tracking algorithm (from Tobii Pro Lab User Manual, n.d.).

studies in tourism is the interpretation of important differences that exist among the study's participants. Such differences include an investigation of the subjective 'point of boredom' experienced by travellers to Germany by having them view an attraction and measuring the time between when they start and finish viewing it (Kiefer et al., 2014), the varying levels of arousal and environment classification across cultures using images that represented various activities and attractions of Australia (Wang & Sparks, 2016), and each subject's attention to hotel options based on frequency and order of appearance (Pan et al., 2013). In each of these cases, the authors advocate for the use of such technology in future research in explaining the potentially important differences among their study's participants. As a result, this paper will pay close attention to these differences among readers of visitor guides in the effort to demonstrate the capability of eye-tracking technology in delineating between these segments.

2.3. Segmenting travel guidebook readers

Past tourism-based research has examined categorisations including cultural typologies (McKercher & Du Cros, 2003), dark tourism typologies (Stone, 2006), typologies of sustainable practices (Hjalager, 1997; Selin, 1999), tourism innovation typologies (Brooker & Joppe, 2014), among numerous others. Since tourism information sources have demonstrated an ability to form an image and create a sense of wonder for the tourist (Garrod, 2009; Molina & Esteban, 2006), determining typologies of guidebook readers is a natural next step. The theory of destination image, which offers a strong predictor of intention to (re) visit a place (Stylos, Vassiliadis, Bellou, & Andronikidis, 2016), is a beneficial lens to situate this study in its exploration of guidebook reading typologies. Indeed, how tourists build images based on information sources has been examined extensively in the destination image literature (Baloglu, 2000; Baloglu & McCleary, 1999; Goossens, 1995), yet often there is a temptation to give one-size-fits-all recommendations based on generalisable information search behaviour. In reality, each type of information source offered to tourists appeals to different behaviour types that engage with that source in often disparate ways. If a travel guidebook does not get the right information across in a way that is meaningful to the majority of its readers, tourists may reject the destination entirely in favour of another with more relevant information (Coltman, 1989). This research therefore builds on this value of categorising tourist behaviours by including travel guidebook reader typologies to the field, in determining not only what each profile may look like, but which ones are the most dominant in terms of reading behaviours. This leads to the first research question:

RQ1. Which of the identified travel guidebook reader typologies is most (least) prevalent?

2.4. Adapting guidebook design to reader typologies

Despite the importance of a well-designed tourism guidebook, nascent literature has demonstrated that the adoption of a destination's information sources can also differ significantly by a variety of factors such as gender, travel companions, and transportation method, to name a few (Chang, Wang, & Lin, 2017). Although past attempts to reconcile tourism information-source usage behaviours of these various groups have been made (e.g. Burton & Klemm, 2011), limited current research has considered the role of the guide itself in regard to its layout and design as unique users browse through its pages. Certainly, as tourists themselves are different in their *travel* behaviours, they may also vary by their *guidebook-reading* behaviours. As an effective layout of a travel guide can help its ability to convey relevant information to potential visitors (Snell-Hornby, 1999), building this understanding is of great importance. The second research question therefore seeks to understand an answer to the following:

RQ2. In what ways can a travel guidebook be adapted to have greater appeal toward different readership typologies?

3. Methodology

3.1. Research design

Recruitment for this study involved the use of university-level students who were not sensitive to infrared light or prone to seizures, and who have not previously lived in the city of Ottawa. For the study, participants were asked to take part in an eye-tracking session using Tobii Pro 2 glasses. These eye-tracking glasses intersect gaze vectors from both of the participant's eyes to measure the distance between the viewer and the object: in this case a travel guidebook. While wearing the eye-tracking glasses, the participant's eye movements were recorded into a 'snapshot' which uses sophisticated algorithms to determine the precise location the participant is focused on at that time. By utilising a total of three vector points (a Z-axis pointing straight out, a Y axis pointing straight up, and an X axis pointing to the left), the camera is able to pinpoint granular movements in the viewer's eyes and record them into meaningful data for subsequent analysis, illustrated in Fig. 1.

During the eye-tracking session, participants were specifically asked to plan a two-day trip to Ottawa, and to read through the Ottawa Tourism travel guide while writing down their preferred itinerary. Following this, they were given 14 Likert-scale statements (ranging from 1 'strongly disagree' to 5 'strongly agree') aimed at understanding their perceptions of Ottawa as a tourist destination. They were: 'The brochure helped me in planning my trip', 'It is easy for me to find the location of the destination that I would like to visit', 'I know how to get to the

destinations (e.g. bus or walk)', 'I need Google Map to find the location of the destinations', 'I like to read advertisements in the Ottawa Visitor Guide', 'I often read a visitor guide when I plan a trip', 'The brochure increased my intention to visit Ottawa', 'It would be more enjoyable if the Ottawa Visitor Guide could be designed better', 'Other online reviews (e.g. TripAdvisor, Zicasso) are more informative', 'I trust the information of online reviews (e.g. TripAdvisor, Zicasso)', 'The map at the end is helpful in planning a trip', 'The list at the end is helpful in planning a trip', 'I have a different perception of Ottawa after I read this Visitor Guide', and 'I trust the information delivered in the visitor guide'. They then participated in a semi-structured interview regarding their intentions and knowledge about Ottawa as a tourist destination. During this interview, highlights from their eye-tracking experience and survey responses were discussed, as well as any other pertinent information regarding their chosen destinations for their imagined visit.

3.2. Sampling procedures and data collection

After the initial screening question to remove participants: 'Have you ever lived in Ottawa in the past, or do you currently live in Ottawa or the surrounding area?', there were 22 completed interviews/eye-tracking sessions before saturation of the data was observed. Of these 22, 13 were female and nine were male, with a mean age of 25 (range of 18–35). The sample included participants from 11 different nationalities, including four participants from China but from different geographic regions from Beijing to Southern China. The largest sub-group was Canadians from across the country. All were conversant in English and as such represent the diversity of the Canadian domestic market, the prime audience for this travel guidebook. Following the eye-tracking session, Tobii Pro software helped to analyse participant eye-movement patterns. Specifically, the software was capable of dissecting each page of the guide, which provided meaningful statistics such as the time it took participants to look at specific items on the page (time to first fixation), how long they spent on each page (fixation duration), the pattern in which their eyes moved across each page (gaze plots), the frequency of times spent looking at each area of interest (AOI), and the duration of fixation on a specific area of interest (heat maps) including headings, content, photos, photo context, advertisements, and promotions. Next, interview transcripts were transcribed and coded using NVivo qualitative analysis software to look for themes or connections to the typologies examined in the subsequent methodology. Finally, similarities and patterns were observed among the participants in creating a final list of travel guidebook reader typologies (Y). This overall relationship is depicted visually in Fig. 2.

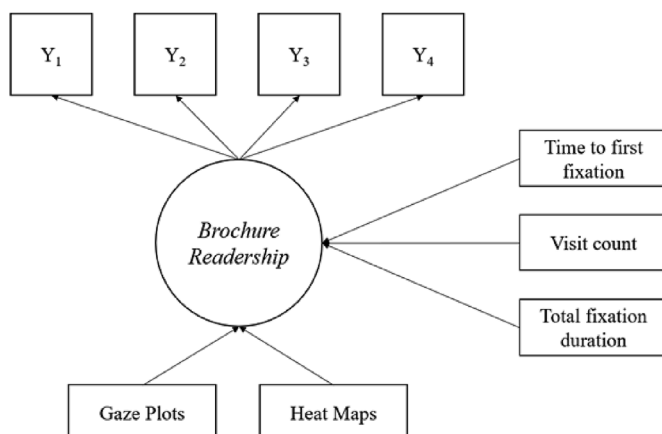


Fig. 2. Conceptual model of tourist guidebook reader typologies.

3.3. Data analysis

The analysis of this data focused on separating the sample of 22 participants into different segments as demonstrated through not only the eye-tracking data in the form of time to first fixation, visit count, and total fixation duration, but also in combination with the Likert-scale data and subsequent interview transcripts. This triangulated approach was invaluable in its effectiveness in overcoming any potential researcher bias, in that if a participant could fit into more than one segment, the other data sources helped to confirm one over the others. It was also effective at confirming the choice of segment by aligning it with their opinions following the eye-tracking procedure. For example, if a participant ranks high on total fixation duration regarding the promotions linking the content in the guide to social media sites (e.g. 'Follow us on social media and share your photos with #MyOttawa' – Page 5), and subsequently indicates their preference for online sources through the survey results (e.g. 'Other online reviews (e.g. TripAdvisor, Zicasso) are more informative'), and finally discusses the power of Google and TripAdvisor during the interview, the participant can confidently be placed into a group that prefers to supplement the physical guide with online searching. The process of typology development followed similar tourism-related segmenting techniques used in past research (Castro, Armario, & Ruiz, 2007; Decrop & Snelders, 2004, 2005).

Starting with the eye-tracking output, which organises the data by page number (in this case, 68 pages in total), the layout was modified to indicate the averages of time to first fixation, visit count, and total fixation duration for each participant for each AOI in the study: headings, promotions, content, photo, photo context, and advertisements. These different AOIs are provided in Fig. 3 from two pages in the Ottawa Tourism 2017–2018 visitor guide, which formed this study's context. Once this was completed, the data were averaged overall to create an aggregate average, which depicts how the guidebook would be read if the participant pool were amalgamated into a single person. This aggregate average was then used as a benchmark comparison to each of the 22 participants in the study, along with their survey and interview responses, to successfully code them into disparate segments. The final result was corroborated across the authors and no significant differences were discovered.

4. Results

After organising the participants' eye-tracking patterns by AOI type, focusing specifically on their average elapsed time to first fixation, visit count, and averaged overall fixation duration, the three charts on the left-hand side of Fig. 4 establish the variations that occurred among the 22 participants' readership patterns. Using this information along with the interview transcripts and Likert scale data, four travel guidebook readership typologies emerged: holistic content examiners, visual passives, supplemental scanners, and visual dominants, whose patterns for the same AOI are depicted in the three charts to the right-hand side of Fig. 4, with either time or visit count in the Y-axes and the participants or segments in the X-axes. Each chart in Fig. 4 is also labelled (i.e. Fig. 4(a)–(f)) to aid in drawing associations between the written findings and the location of the data within the figure.

4.1. The 'average' travel guidebook reader

Before describing these four identified types in detail, it is worthwhile comparing them to the aforementioned aggregated average to determine the profile of the 'typical' travel guide reader in this study to allow for a better sense of how each typology deviates from it.

The average reader of a travel guide in this study typically follows a direct path along the content provided within and across each of the pages: first, the reader notices the advertisement with a sizeable gap in time before any other content on the page (Fig. 4(a)). Next, in quick succession, the reader's gaze darts from the content, to the headings, to



Fig. 3. Mapped areas of interest.

the accompanying photos, suggesting that rather than the headings providing a context the reader would like to explore further, they are first ignored as the reader tends to skim the page, seeking words that appear interesting or relevant to their particular interests. This quick succession of content-headings-photos continues for another block of time, until, approximately 10.5 s after beginning on the page, the reader will move on to promotional information, which is lastly followed by the context regarding the specific photo in the picture. These last two AOIs are often overlooked altogether before the reader flips to the next page in the guide. This 'average' reader will look at photos and content three times more than the context of the photo or this promotional information (Fig. 4(b)). They will also look more frequently at the photos and content than they will the headings of the content or any of the advertisements. In terms of total duration, the content on the page will receive substantially more time investment than the other areas of interest with an average of over eight seconds per page (Fig. 4(c)). In distant second, the advertisements are heavily looked at for 2.9 s per page, followed by photos (1.5 s), headings (1.4 s) and promotional information (1.1 s) and lastly the promotional information with only 0.2 s on average per page. Fig. 5 highlights several pages from this aggregated reader to give an illustration into their total fixation duration through visual heat maps: with green, to yellow, to red indicating a range from shorter to longer fixation on that specific area on the page.

4.2. Holistic content examiners

Members of this group ($n = 6$) were connected through their tendency to have previously favourable opinions of the destination and were confirmed as belonging to the holistic content examiners typology if their enthusiasm for the destination matched with their engagement in reading through the guide. On average, participants looked at each page for 3.7 s (compared to 2.3 for visual dominants, the next highest value), indicating a strong interest in the content contained within each page (Fig. 4(f)). When asked about their perception of Ottawa after having read the guide, one participant described how the guide overcame limitations of less organised information from his peers:

Although I visited Ottawa before, the information I gathered is

mostly from forums and friends, and [tends] to be more scattered. This brochure really systematically introduces the city and its charm to the prospective tourists, and as this brochure is an official brochure, I tend to trust the authenticity of the information (Participant 2).

Especially regarding online sources, this group was the most sceptical compared to the information provided directly in the guide (mean = 3.17). Indeed, holistic content examiners felt very strongly that the guide helped them in planning their trip to the destination (mean = 4.33). This group was so fond of the guide, in fact, that even the listings section which is generally seen as overly wordy compared to other sections, was relatively well-received (mean = 3.83). In total, this group felt that the guidebook took their already positive opinions of the destination and strengthened their intention to visit after reading it (mean = 4.00/5).

Yet despite their thoroughness and general positive outlook toward Ottawa as a destination, this group did not feel the need to return to information after having read it, and therefore the examined content should aim to capture their attention the first time around. Another element of the guide for this group is the presence of promotional information in anchoring their attention to the page. These are important considerations for visitor guide designers as by using these anchors they keep holistic readers engaged with the content. It is also suggested here that although this group spent most of their time reading the content (Fig. 4(f)), they were also the first group to look at both headings and photo context before doing so, much more so in fact than the other types, and therefore these elements are also important in maintaining their interest in the page's contents. This pattern can be discerned in the following examples from the holistic examiner group's gaze plots in Fig. 6, which depict the order in which the content was examined (with '1' being the first point that the participant gazed at and following a sequential order showing the path from that point onward throughout the remainder of the page).

4.3. Visual passives

The largest participant sample was visual passive readers ($n = 8$).

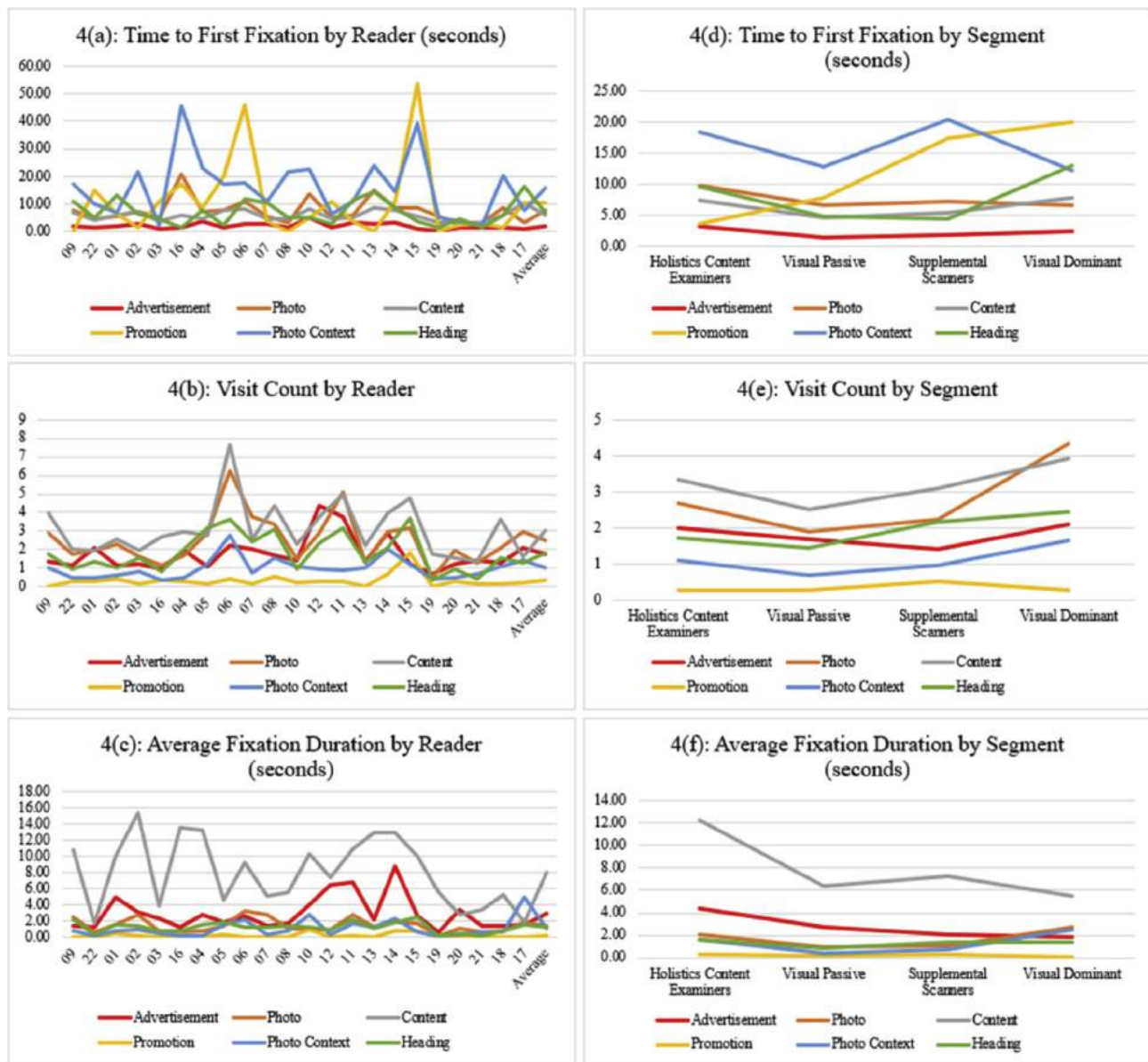


Fig. 4. Trend charts of eye-tracking AOI behaviours.



Fig. 5. Visual heat maps from aggregated reader data.



Fig. 6. Gaze plots for holistic content examiners.

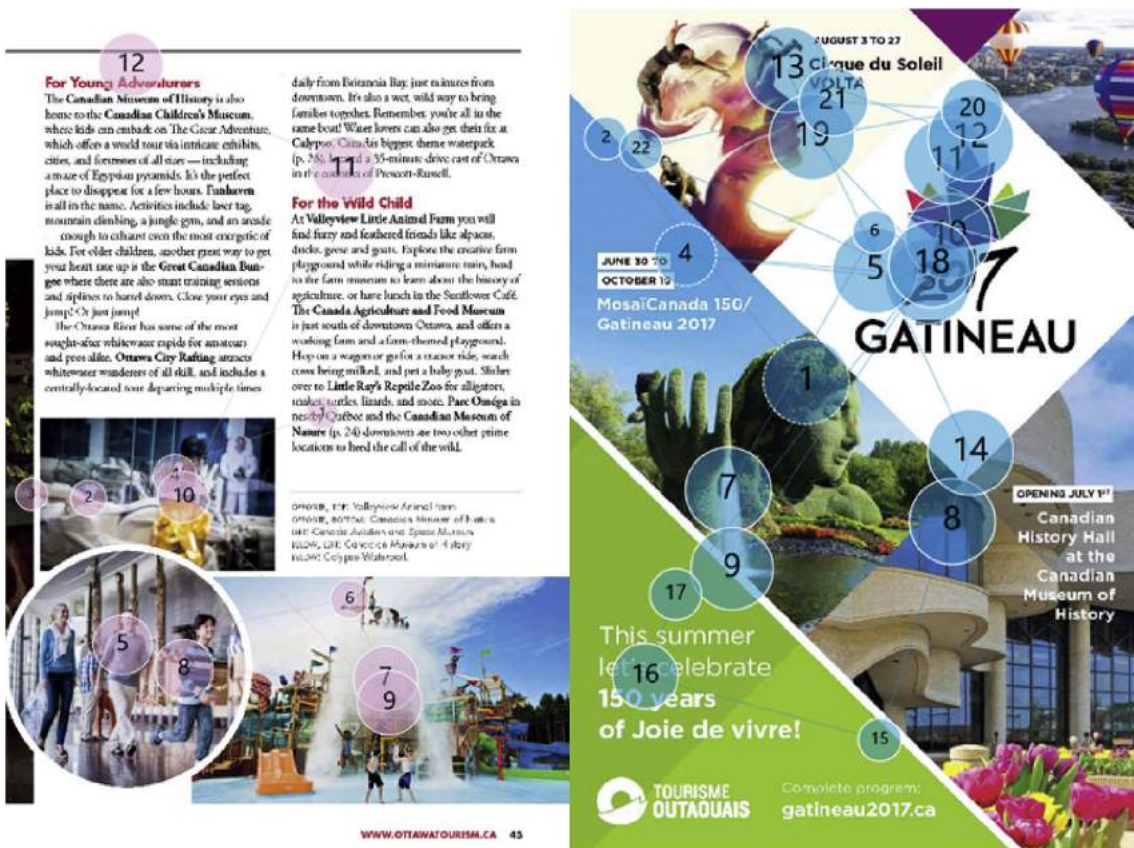


Fig. 7. Gaze plots for visual passives.

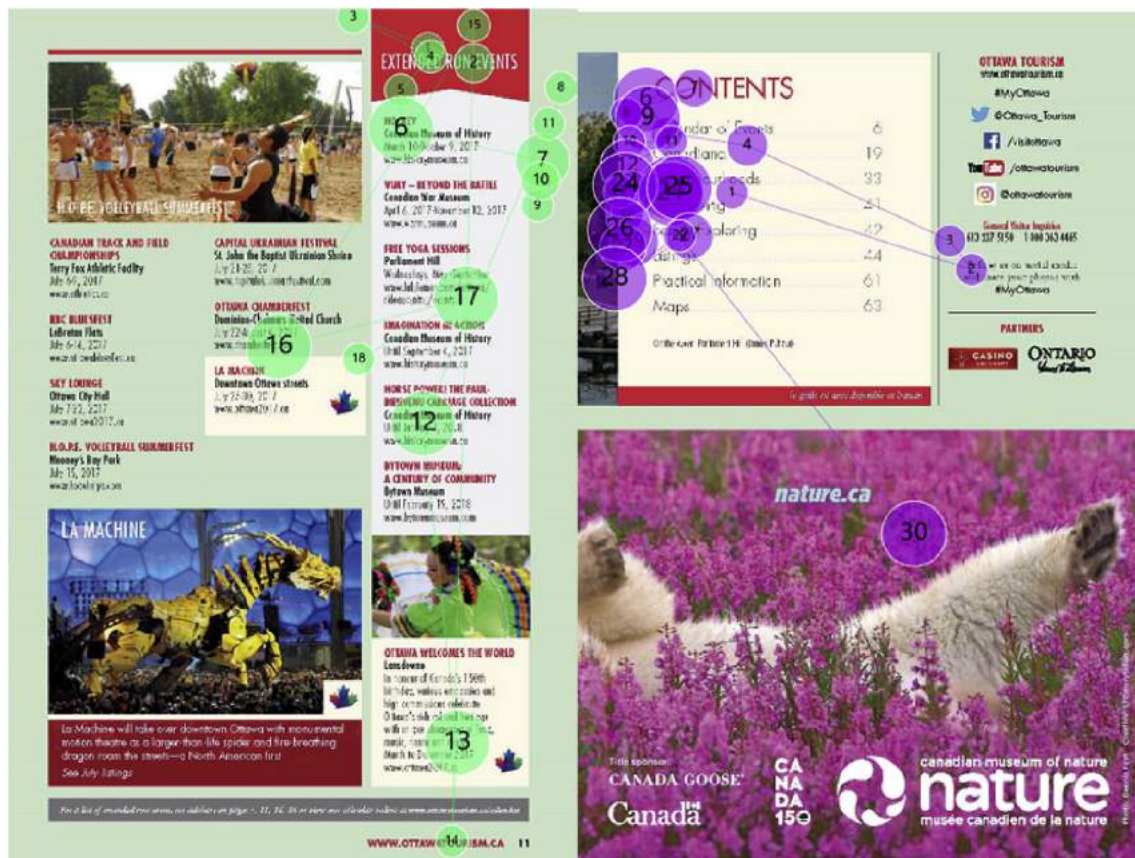


Fig. 8. Gaze plots for supplemental scanners.

Being the least engaged of the four types, this segment spent almost no time looking at all AOIs on a page before flipping to the next, with many pages being skipped altogether (Fig. 4(e)). Broadly, visual passive readers prefer to passively scan the book without investing much effort – but with one exception: though they did move more quickly through the guide in general compared to the other types, they looked at the advertisements specifically more than visual dominants or supplemental scanners (Fig. 4(f)). They viewed headings and advertisements nearly simultaneously; yet they spent considerably less time reading the content (less than half of the time spent by the holistic content examiners) and more time looking at both photos and advertisements or skimming through headings. This can be seen in the gaze plots of Fig. 7: little interest is shown in the content but moderate attention is paid to the images and advertisements:

When probed about the reasons for their interest in viewing the advertisements, participants in this segment tended to emphasise the attractiveness of the images as a reason to focus on them:

Because it [has] the picture. Because some of, like, the Adventure Park and like the resort, I like to just see the picture because it gives me a sense of what the place looks like. That's what I'm really interested in, and if the place looks really nice [in] the picture I would probably go there if the advertisement is really attractive, just to give me a sense of how the place really looks like (Participant 12).

Unexpectedly, visual passive readers tended to look at content even before the holistic content examiners (Fig. 4(d)), despite how heavily this latter group emphasised examining the content. One possible explanation is that the visual passive group, on average, looked less at almost all sections, indicating a general disinterest in the guide's material. As such, they were inevitably going to look at the content sooner than those who look at it for longer durations. An even more surprising result from this study demonstrated that, despite their ambivalence,

this group believed that the guide was most helpful in planning their trip as compared to the others. This finding is important as there may be the assumption that a passive glance by the reader suggests less interest in visiting the destination, whereas the opposite appears to be the case. This indicates that although they are moving quickly through the guide it does not necessarily mean that they are not interested in visiting the destination, and that destination marketers may benefit from this knowledge by considering a redesign of guides that allows for a speedy read-through option with an emphasis on imagery and travel-relevant advertising rather than lengthy descriptions of the destination's many offerings. For instance, one participant who otherwise enjoyed skimming through the guide found their interest waning particularly in the listings section (mean = 3.25), almost missing out on a piece of information that was directly relevant to their interests: 'It's not eye-catching, too many words, font size is really small. I didn't know there's craft beer' (Participant 20).

4.4. Supplemental scanners

During several of the eye-tracking sessions, there were often instances in which the participants would quickly scan a topic of potential interest, write it down, and then move promptly on without reading further about the topic in the guide. When asked about this pattern, those who are now considered as part of the supplemental scanners (n = 5) segment discussed their strong preference for outside sources of information beyond that found within the guide itself:

First I search on Google what are the best destinations, and what [are the] most important things to do in Ottawa, so I search that and I read other people's experience, the story of their experience first, then I can narrow down my options to a few things if I want to try the food there, or if I want to see the history there, and then I can find the direction to go. Because by reading this brochure, it is too

broad and it presents you [with] everything you can experience. Too many options is a burden for the readers (*Participant 5*).

This resulted in supplemental scanners having the most negative views toward the guide compared to the other segments, believing it to be generally unhelpful in planning their trip (mean = 2.20). Further, this segment felt that their perception of Ottawa was relatively unchanged after having read the guide (mean = 2.60) and therefore it did not increase their intention to visit as compared to the other types (mean = 3.20). One noteworthy characteristic of this group is that they looked more frequently at promotions, which leads readers away from the guidebook and into other sources such as online or social media. Once this link to online sources was presented in the guide, this group would spend much more time on the page, being the only segment to notice the website link at the bottom of the guide's pages or the invitation to follow them on social media and to share their own photos of the destination using a hashtag, as seen on the right-hand page in Fig. 8:

Regarding these external sources, the interviews helped to strengthen the perception of this group as using the travel guide only to get initial ideas but relying much more heavily on digital sources before making any decisions. With an above average opinion that other online reviews such as TripAdvisor or Zicasso are more informative than print-based guides (mean = 4.80), one participant described her preference to do her own research rather than rely on the text in the physical guide:

After I read this brochure, I will do a little research on my own ... because for digital ones, in that way interactive and you can explore a little bit more, more fun. But here, it's tedious (*Participant 5*).

This sentiment was also expressed with respect to supplementing the maps at the back of the guide. Participants found it challenging to find the location of the destinations they wanted to visit (mean = 2.20) and unclear as to how to get to them in the first place (mean = 1.80). They believed that the map was not helpful in planning their trip (mean = 2.00) and that the listings were also unhelpful, although less so than the maps (mean = 3.20). When asked directly about preferring Google Maps as an online alternative, this group was unanimous in believing that they need Google Maps to find the location of the destinations found in the guide (mean = 5.00).

Based on the strong opinions by this group regarding the challenges of using a physical guide and their strong desire for better design (mean = 4.60), destination marketers should consider how to better connect the guide to a related online environment. Given this segment's strong belief that online reviews are more informative than the information provided in the guide (mean = 4.80), this redesign could include such reviews in printed format, with a link to the online content to ensure that the data is as up to date as possible. Overall scores of places from sites such as TripAdvisor may also be used in the physical guide, with readers seeing that certain places received strong ratings from less biased sources including other travellers. Since this group felt that not only were the online reviews more informative but were also more trustworthy, this could be an opportunity for the destination marketer to address both limitations as perceived by members of this segment.

4.5. Visual dominants

This last group (n = 3) was the smallest segment in the study and represented those who indicated the least interest in reading a guide when planning their trips (mean = 1.00). This explains their interest in the imagery in the guide but not as a strong target for encouraging an actual visit with the travel guide alone. This group was also the most unpredictable in their eye-tracking behaviours, making it difficult to classify them during the early stages of this study. For instance, they were the most frequent viewer of almost all AOIs – advertisements, photos, content, photo context and headings, often visiting the same

section two or three times before moving on (Fig. 4(e)).

Almost acting as a combination of holistic examiners and visual passives, visual dominant readers paid far more attention to photos than text (from the eye-tracking data they viewed photos *more* than any other group and text *less* than any other group) and spent large amounts of time on a photo's context to learn more about the destination being depicted. Advertisements caught their interest more due to their graphical nature, while text-based aspects of the guide (headings and content) were only observed after careful examination of the imagery. This type had the highest average increase in intention to visit Ottawa after having read the guide (mean = 4.00); However, their perception of Ottawa overall was relatively unchanged (mean = 3.33), confirmed through this statement by one participant regarding their preference for images over text: 'Definitely the pictures [drew my attention the most], I'm a very visual person, so yes ... I often read the picture first, and then went to the text' (*Participant 7*).

Given their preference for visual cues, this group was the most confident in traveling to the destinations found in the guide's maps (mean = 3.00) and were the least reliant on external sources of information such as Google Maps, making them the exact opposite to the supplemental scanners segment. Finally, despite their lack of interest in using guidebooks in general, this group expressed the most trust toward the information delivered in the guide (mean = 4.67) rather than through reviews online (mean = 3.67), indicating another strong deviation by this group over the supplemental scanners.

Suggestions for marketers regarding this segment should be taken with caution, given the relatively smaller proportion of this group as compared to the others (only 14% of the study population), as well as their erratic eye-tracking patterns and wavering interest in guidebooks overall. Nonetheless, there is much to be learned from this group, in the form of tailoring the imagery in the guide to suit the contents surrounding it, and to ensure that the guide's overall 'flow' is consistent, to avoid the need for readers to switch back and forth over the same sections, which may risk turning a holistic examiner or a visual passive into a visual dominant reader.

5. General discussion and conclusions

This research provides a glimpse into the behaviours of tourism guide readers, uncovering several major typologies as found through a triangulated approach of eye-tracking technology, surveys and interviews. Specifically, the study set out to answer two research questions, namely: (1) Which of the identified travel guidebook reader typologies is most (least) prevalent? and (2) In what ways can a travel guidebook be adapted to have greater appeal toward different readership typologies? As guidebooks continue to act as a catalyst for travel through increasing one's knowledge of the destination (Roberson, 2015), this study considers specific readership patterns to offer unique insights into how certain variations may impact on this knowledge creation. In seeking a better understanding of travel guide readership, the main finding of this research is the existence of a typology in which certain types of reader are more interested in visiting the destination after having read the guide than others. Fodness and Murray (1998) have called for research that goes beyond 'how' tourists use information, toward gaining a better understanding of the relationship between the source of information and the individual characteristics of the reader interpreting it. This study begins this inquiry by comparing readership types with potential guidebook designs. Specifically, it appears that a more visual-heavy visitor guide with a strong connection to supplemental online search information has the greatest influence on the reader's intent to visit, while a guide rich in content may be more utilitarian in helping to plan a trip using what is found to be a trustworthy source. Take, for example, a page from the visitor guide depicted in Fig. 9 illustrating the differences between the four typologies (from left to right: Holistic Content Examiners, Visual Passives, Supplemental Scanners, Visual Dominants):



Fig. 9. Comparison of gaze plots across types.

The combination of text and relevant visuals has clearly maintained the focus of all types other than the visual passive readers, while providing important external sources of information such as a link to the website for the supplemental scanners to seek further information and rebuild their waning trust in the guidebook. As this example aims to demonstrate, marketers would find it worthwhile considering variations among their readers. For instance, a reader who is already planning a trip and is using the visitor guide to confirm their itinerary may prefer greater content and listing information, whereas those who are earlier in the trip-planning phase may choose to build a 'dream trip' based on the guide's rich imagery. A redesign of traditional guidebooks may help to create these meaningful changes, such as dividing a guide between imagery and text, or allowing for easier connection to digital information sources like social media.

5.1. Theoretical implications

From the questions posed at the opening of this research, this research contributes a better understanding of the prevalence of passive readers of a destination's promotional material, followed by more engaged and technologically savvy readers. This builds on existing typological research in the field of tourist guidebooks, particularly the book chapter by Peel and Sørensen (2016) who describe the 'nominal consumer', akin to this study's supplemental scanner. This research builds on theirs but goes beyond describing typologies and helps to explain the meaningful differences among them.

Research on the conceptual development of destination image research is limited as empirical studies remain this theory's principal lens (Pike, 2002; Qu, Kim, & Im, 2011; Zhang, Wu, Morrison, Tseng, & Chen, 2018). By combining eye-tracking technology and survey with qualitative semi-structured interviews, this study provides a strong foundation for tourism researchers to better understand how differences in the interaction with a destination's promotional material may help to explain why some perceive the destination as a worthwhile option while others remain unconvinced. Such findings offer the opportunity to inform tourism researchers by depicting a more well-rounded sense of a tourist's image of the destination, including the relevant marketing materials that are often that person's first encounter with that place and are used to help shape the remainder of their overall perceptions and impressions of it. With a more realistic portrayal of the variations that exist with those who engage with a destination's promotional materials, this research offers a starting point for academics who seek to understand the impact that these differences can have on a tourist's holistic

image of the destination, which is directly linked to their intentions to (re)visit it (Gibson, Qi, & Zhang, 2008; Stylos, Bellou, Andronikidis, & Vassiliadis, 2017).

Given the importance of travel guides in influencing tourists in selecting their next destination (Zillinger, 2006), this is the first study of its kind to consider how a travel guidebook may influence travel behaviour depending on the typology of the individual reading it. Further, this research builds on the currently small – but growing – body of research which adapts eye-tracking technology into a tourism context to better understand how to divide participants into meaningful segments. Given the importance of eye-tracking research, particularly within the marketing field due to its unobtrusive and objective nature (Duchowski, 2002), studies which effectively use it stand to gain a considerable level of sophistication over other traditional techniques.

5.2. Practical implications

Knowing which aspects of a brand's marketing elements to prioritise (Kladou, Kavaratzis, Rigopoulou, & Salonika, 2017) is challenging, yet knowing how to tailor these elements to different types of consumers can ensure that they properly attract the right type of visitor to the destination. Beyond the many suggestions provided in this paper for each individual type, there are some broad areas on which destination marketers can focus while developing their promotional material, particularly that which is printed and distributed and can be quite costly and therefore important to get right the first time.

The most significant finding from this study emphasises the need to be aware of certain types of readers over others, depending on how prevalent they are in the population and how engaged they are with the guidebook. Indeed, as past research has shown, incorrectly identifying one's target audience can have ill-effects on the success of the venture by discouraging word-of-mouth (Hultman, Skarmas, Oghazi, & Beheshti, 2015). In this study's context, visual passive readers – though lacking in meaningful engagement with the guide – should be of primary interest to the destination marketer, given the size of this segment (as compared to the other identified types) as well as their belief that a physical guide is most helpful in planning a trip to a destination.

Since it is impractical for marketers to design different guidebooks for different readership styles, it is a more viable solution to design the guidebook in a way that appeals to all types identified in this paper, simultaneously. For example, knowing that visual passive readers are quick to read through the guide despite stating that the guidebook was helpful indicates that one with a 'speed-read' option (such as a margin

with major points from the page) is worthy of consideration, as doing so would still allow a holistic examiner to read through the content in greater detail.

Next, both holistic content examiners and supplemental scanners represent widely different, yet equally important, readership types. This emphasises the need to strategically balance meaningful and relevant information and content within the guide, while also providing an alternative digital source for learning more about the attractions and events and to glean more trusted information from fellow travellers and not just from the destination marketers themselves. Finally, visual dominant readers, though small in representation, must be acknowledged by marketers who seek to provide visually rich imagery, but not in a way that encourages skipping over content or visiting the same AOI more than once. Taken together, these practices will ensure that future visitor guides offer elements that cater to each of these travel reader segments.

5.3. Limitations and future research

Given the size of the sample for this exploratory study, the strength of these findings lies in building a foundation which aims to encourage future researchers to empirically measure the typologies outlined here using larger samples. The fact that more research on guidebook readership typologies does not currently exist is surprising, since it is equally important to target one's advertising to the appropriate audience as it is to procure them in the first place. Particularly within the costly realm of print advertising, the findings here should be considered a first step into better understanding how various segments are interacting with travel guidebooks, with the opportunity for future researchers to better compare and contrast traditional print guides with increasingly popular digital media sources. Further, the rapid growth of contemporary research tools, particularly eye-tracking technology, enables future researchers to not rely solely on self-reported data, and instead gives them the freedom to examine real-time behaviours which can then be run through sophisticated software and followed up with interviews or surveys which have been tailored to the discoveries made by the eye-tracking procedure.

Additionally, future research is ripe for comparing and contrasting the segments of guidebook readership typologies with other ways in which modern tourists are compared, such as by lifestyle (e.g. enjoyment, achievement, etc), push motivations (e.g. sport seekers, relaxation seekers, etc), nationality, or frequency of travel (light versus heavy) (for a review of these, and other, tourist types, see Decrop & Snelders, 2005). If it were discovered, for instance, that sport seekers read promotional material faster than relaxation seekers, then destinations which promote a more active image could make a stronger effort to truncate their visitor guide into a much more digestible offering. Finally, future scholars would seek to benefit from considering the appropriate channels of distributing travel guidebooks among unique readership types. Given that readers engage with guides in different ways, it would be worthwhile to determine the feasibility of focusing the guide on dominant segments without inadvertently alienating the others. This can be natural in some cases (e.g. supplemental scanners are more technologically savvy anyway, so targeting them through digital sources such as social media would make sense), but may take more effort in other regards and is worth a closer examination.

A final opportunity for future researchers is to consider linking the typologies identified in this paper to the theory of planned behaviour to explore the roles of attitudes, subjective norms, and behavioural control elements that can provide a rationale for some of the described intentions by the participants of this study regarding their level of intention toward visiting the destination, as well as monitoring the actual behaviour in terms of booking travel or accommodation. Perceived behavioural control would be an important element to this future research, since even with the best intentions to visit the destination, confounders

such as cost, time, or ability must be factored in and should therefore be explored in greater detail.

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Appendix A. Supplementary data

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