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Research Article

Subjective experience and visual attention to a historic building: A real-world eye-tracking study

Luis Alfonso de la Fuente Suárez

Architecture School, Universidad Autónoma de Nuevo León, San Nicolás de los Garza (Monterrey), 66455, Mexico

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Abstract The objective of this exploratory study is to discover the relations between visual attention to an architectural work and the subjective experiences produced during its observation. A subjective experience with a building is the specific manner in which an architectural element or the building as a whole are presented to a person. The qualities of the element as how they are perceived and the inner world of the observer are both considered in this subjective experience. The aims of this study are to describe the experience that a building generates in people, pinpoint what has attracted the participant's attention during each view of the building in an itinerary; and understand which aspects of this selected case study have made it an object of attention. An eye-tracking study was carried out using a portable eye tracker. This tool allowed the participants to walk freely around the exterior of a historic train station in the city of Monterrey, Mexico. Two groups of participants, with routes starting from opposite sides of the building, contemplated it while using the eye tracker. Eye tracking allowed for the identification of the architectural elements that were objects of attention, the lengths of observation, and the points of view from which the elements were observed. Other data collection techniques, such as the think-aloud protocol and a special type of survey, were used to deeply understand the experiences that accompanied the visual exploration of the historic building. Results suggest that the participants observed the different architectural elements for a time that was neither influenced by the route used to explore the building nor the point where that route was initiated. The architectural elements identified as examples of high-quality architecture and perceived as aesthetically pleasing by the participants during the itinerary were observed for longer times.
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E-mail address: luisalfonsodelafuente@hotmail.com.
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1. Introduction: Attention and subjective experience in real-world environments

Visual attention has often been understood as a spotlight whose beam illuminates everything within a particular region of the visual field; the illuminated area is what the observer attends to, whereas the darkened areas are those not selected (Posner et al., 1980, p. 171). However, several studies propose that attention selects specific objects in a visual field and not the entire area within this field (see reviews in Cave and Bichot (1999) and Scholl (2001)). Both ways of understanding attention share a common view of this concept as a selective process. Attention must be selective owing to the limited human capability to process visual information (Carrasco, 2011, p. 1486; Duchowski, 2003, p. 4). Dealing with all of the information simultaneously in an environment is too demanding; therefore, attention is allocated one task at a time (Niebur and Koch, 1998, 164–165).

The sensory modality examined by most attention studies corresponds to the visual mode (Driver and Spence, 1998, p. 1319), and this study shares the same focus. Visual phenomena begin with light, which allows human beings to obtain useful information to interpret the environment (Nelson, 2017, p. 107). The retina is the surface in the back of the eye possessing light receptors and where environmental light lands, forming an inner image of the viewed environment (Goldstein and Brockmole, 2017, p. 22; Nelson, 2017, p. 218). Fovea, which is the central part of the retina, possesses a higher density of light receptors compared with the surrounding zones (Anton-Erxleben and Carrasco, 2013, p. 188; Frishman, 2005, p. 64). Given the higher spatial resolution of the fovea, the eye must constantly move to position the object of attention, i.e., its retinal image, on the high-resolution zone (Wade and Tatler, 2011, p. 18).

The higher acuity of the central part of the retina may explain why the eyes move to attend to different objects in the environment; however, the reasons why the objects or environmental stimuli attract an observer in the first place should also be understood. In general, attention involves both bottom–up and top–down control types. The first type depends on the physical qualities of the stimulus, with the attention being directed to what is prominent in the environment, and what involuntarily attracts attention because of a quality, such as color or luminosity (Theeuwes, 2010, p. 77). However, attention is directed beyond the visual qualities of objects (Duchowski, 2003, pp. 6–7). Apart from the bottom–up control of attention, the top–down control operates depending on the meaning that the observer gives to the environment based on his or her previous experience and knowledge (Wu et al., 2014, p. 1), and willingness to direct attention to specific elements of that environment (Theeuwes, 2010, p. 78). Both types of control play a part in the attention process. However Theeuwes (2010, p. 97), points out that the bottom–up (stimulus-driven) control precedes the top–down (goal-driven) control. In particular, during the first 150 ms, a contrasting element may attract attention, but the intention of the observer and the meanings that he or she imposes upon the objects will direct or hold the observer's attention after the initial milliseconds (Theeuwes, 2010).

In the top–down control, the relevance of a given element of the environment to the observer's performance of a task may play a decisive role in attention. When a research participant is asked to estimate the height of a space or memorize the position of objects in a scene, the task will have a high influence on his or her ocular behavior, as shown in the studies of Buswell (1935) and Yarbus (1967) and more recently by Cronin et al. (2020). Moreover Cronin et al. (2020, p. 7), suggest that "task instructions can influence both when the eyes move and where the eyes move in a scene." Meanwhile Land and Tatler (2009, p. 41), state that participants are able to select "their own high-level approaches to looking at scenes" during the free viewing of scenes. Given that the present study is interested in the subjective experience of people while observing a building, the participants had been allowed to decide what to look at, when to do so, and how to experience the building.

According to Reid (1823, p. 157), "in the common course of life, the eyes always follow the attention." The object where the gaze of the observer is positioned may coincide with what the observer is paying visual attention to at a specific moment; however, this is not always the case. Besides the bottom–up and top–down controls, another important distinction regarding attention is between the overt and covert types. Overt attention is when the focus of attention follows the movements of the eyes (Carrasco, 2011, p. 1487), whereas covert attention is directed to an element without gazing at it, i.e., it is independent of eye movements (de Haan et al., 2008, p. 102). While gazing an object overtly, the peripherally located covert attention aids in the selection of the subsequent eye movements to be made (Carrasco, 2011, p. 1487; Paré and Dorris, 2011, p. 266–267).

During observation, the eyes move to apprehend the objects of the environment. The rapid movements of the eye are known as saccades (Yarbus, 1967, p. 103). By contrast, fixations are produced when the gaze stops briefly on certain points of an object, supposed to be the centers of attention in the visual experience at a given moment (Buswell, 1935, p. 10). We observe an object or a scene through multiple visual fixations on it, allowing us to compose an integrated impression from fragments (Duchowski, 2003, p. 4; Hochberg, 1972, p. 68).

An eye tracker is an experimental device capable of measuring observation times and detecting the location of eye fixations with respect to the observed object or scene. Such a device can help determine what observers direct their overt attention to (Duchowski, 2003, p. 14). Poole and Ball (2006, p. 211) define eye-tracking as "a technique whereby an individual's eye movements are measured so that the researcher knows both where a person is looking at any given time and the sequence in which the person's eyes are shifting from one location to another." Eye tracking reveals the degree to which a scene or an item had been objects of attention. The higher is the informativeness of a zone during an observation of a scene, the higher is the concentration of fixations on it, and such informativeness may be related to the meaning of the zone or the discontinuities in visual characteristics, such as changes in color or texture (Henderson and Hollingworth, 1998). Therefore,

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informativeness may be related to either top—down or bottom—up control of attention.

Eye-tracking data visualizations complement statistical analysis and are capable of depicting spatial and temporal data dimensions—in this case, data related to attentional processes (Kurzhals et al., 2014, p. 64). An eye-tracking heat map is a visualization image in which the colors indicate how much the zones of an object or scene had been observed by one or several observers. In these visualizations, warmer colors represent longer observation lengths or a higher number of fixations (Bojko, 2009; Špakov and Miniotas, 2007, p. 57). Heat maps may help identify zones in a scene that were more informative for the participants during their observation.

Another type of visualization used in eye tracking is the scan path or gaze plot, in which the fixations over the stimuli are represented by circles connected with lines in a sequence, the latter representing the saccadic movements of the eye (Kumar et al., 2019; Noton and Stark, 1971, p. 310). Nevertheless, gaze plot visualizations can be visually cluttered if the information presented is too much (Blascheck et al., 2017, p. 264). Considering the above disadvantages, heat map visualizations have been used in this study, as the attention of several participants can be visualized without the information clutter.

An important concept in eye tracking is the area of interest (AOI), which corresponds to a segment or region that may be observed in a scene or object. AOIs allow the eye tracking metrics to be linked to specific segments or regions (Hessels et al., 2016, p. 1694). In the present study, the segmentation of the building in the AOIs had been used to obtain the lengths of observation of the architectural elements or the building zones.

Segmentations in AOIs can help discover how long the individual elements of the building had been observed. The views of interest (VOIs)—the main views of a building introduced in this article—allow a researcher to represent which elements of the building had been the objects of attention in consideration of the spatial location of the observer. The pertinence of VOIs resides in the fact that this study is interested in the spatial and temporal aspects of the attention paid to a real building by an observer during an exploratory itinerary.

Buswell's (1935) eye-tracking experiments and some recent studies (Doğan, 2019; Lisińska-Kuśnierz and Krupa, 2018, 2020; Tuszyńska-Bogucka et al., 2020) used two-dimensional representations of architectural environments to identify what is paid attention to by observers. However, the observation of static scenes through photographs by the static observers were artificial situations, which differ substantially from what occurs in the immersive real world (Land and Tatler, 2009, pp. 190—192). The visual information to be attended when observing a two-dimensional image is always the same, whereas the information is unlimited in a three-dimensional scene (Burch, 2018). The experience of an architectural work and that of any real environment unfold in both time and space, since in addition to eye movements, the movement of the observer and the observer's head are also included in this experience. Gibson (1968) pointed out that the visual system—and other senses as well—are not passive channels of sensation and instead are active collectors of information about the environment. Observation is therefore a dynamic exploration process. The inquiry into the eye movements during the observation of scenes is a relevant field of study, as the manner in which human beings dynamically acquire information from scenes is vital in understanding human perception and cognition (Henderson and Hollingworth, 1998, p. 270).

The studies on eye movements in real environments where participants can move freely only began a few decades ago along with the development of portable eye trackers (Foulsham, 2015, p. 196). Before the emergence of this technology, the participants in eye-tracking studies had to stay still and could not interact with their environment. The current studies that adopt portable eye-tracking glasses in real environments are mostly focused on wayfinding and museum visitor studies (Jung et al., 2018; Pelowski et al., 2018; Tang, 2020). The other ways of apprehending the external objects of an environment—including those presented in this article, wherein an architectural work and its elements are the center of the attentive experience— have not yet been studied with eye tracking. Table 1 shows a comparison of this study with the existing eye-tracking research, with special emphasis to the stimuli used in the studies and their research area. The first and second studies share the research areas of aesthetics and environmental preference with the present study. Nevertheless, those studies did not provide participants with a direct experience with real buildings and instead focused on their indirect experiences with photographs or virtual models. The third and fourth studies, which are mainly related to wayfinding and visitor studies, used real environments as the stimuli, but their research area and data visualization techniques are distinct to those of the present study (fifth item listed in Table 1).

The studies on the relationship between observation length and the liking of artworks suggested that during an aesthetic experience, an observer spends a long time appreciating an object; the time spent observing the artwork can thus reveal the degree to which that object was found aesthetically pleasing by that particular person (Brieber et al., 2014, p. 1). Nevertheless, the present article is not aimed at using solely the observation duration of a building's elements as the measure of aesthetic pleasure. Beyond the liking generated in people towards an architectural element, other subjective experiences that may accompany the attentive observation may be studied, e.g., those related to its importance, its meaning, the uncommonness of its shape or materials, or its structural function. This study attempts to clarify that subjective experiences correspond to all the possible conscious contents of both the internal world of a person and the way he or she apprehends the external world (Gray, 1995, p. 669; Jackendoff, 1987, p. 3; Richardson, 1999, p. 469). James (1890, pp. 403—404) defines attention by focusing on both its selective quality and relationship with conscious experience: "It is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence." The main interest of the present study is the relationship between subjective experience and the attention paid to a building. In other words, this article delves into the connection that

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Table 1 Comparison between existing architecture and urban eye-tracking research with the present study. The stimuli presented to the participants is the main characteristic used to classify the studies.

Stimuli presented to participants	Existing studies by research area	Methodological considerations and scope of the studies	Data visualization techniques of attention (if applicable)
1 Photographs, drawings, renderings or stills of 3D models of buildings and architectural environments	Formal, aesthetic and cultural aspects of buildings. Doğan (2019); Cho (2016); Hasse and Weber (2009); Lee et al. (2015); Lisińska-Kuśnierz and Krupa (2018, 2020); Mohammadpour et al. (2015); Nichols et al. (2016); Tuszyńska-Bogucka et al. (2020); Weber et al. (1995). Environmental preference. Chmielewska et al. (2019); Martínez-Soto et al. (2019). Wayfinding. Buechner et al. (2012).	These studies of attention are carried out with images; therefore, the participants are not directly experiencing an architectural environment. Most of these studies use fixed eye-trackers, the images are shown on screens, and the movement of the observer has to be avoided. Since the scene is depicted from a single point of view, the attention generated in the participants is specific to that point, and it is uncertain how the attention would change if the observer moved further in the scene.	The same static images as presented to the participants are the basis for the visualizations of attention, whether they are heat maps (Buechner et al., 2012), or both heat maps and gaze plots (Lisińska-Kuśnierz and Krupa, 2020; Martínez-Soto et al., 2019).
2 Virtual architectural and urban environments	Aesthetic aspects of buildings. Kim and Lee (2020). Environmental preference Zou and Ergan (2019); Zhang et al. (2019). Wayfinding. Clay et al. (2019); Dubey et al. (2019); Tang and Auffrey (2018); Zhang et al. (2015). Measurements of stress in virtual environments. Hirt et al. (2020).	Some of these studies present the virtual scene to the participants through a Virtual Reality headset in an immersive manner (Zhang et al., 2019), while others present a virtual model of an environment on a screen without using a VR headset (Zou and Ergan, 2019). In studies that use VR headsets in conjunction with an eye-tracker, even though the latter is portable, the displacement of the participants may be restricted to a specific physical area in the laboratory, e.g. 4×4 m, and the participants should displace through a more extensive virtual space with a hand controller (Hirt et al., 2020).	Most of these studies use a still of the recording of the eye-tracker to create the heat map visualizations (Tang and Auffrey, 2018; Zhang et al., 2019). Other studies use a 360° photograph as a heat map visualization of attention which encompasses everything that can be seen in a virtual scene from a specific point of view (Kim and Lee, 2020).
3 Real urban and outdoor environments	Pedestrian Navigation and wayfinding. Christofi et al. (2020); Emo (2014); Kiefer et al. (2012); Afrooz et al. (2014); Kiefer et al. (2017); Wenczel et al. (2016).	The participants of these studies are asked to perform different tasks in relation to wayfinding, e.g. looking for specific destinations with the aid of a map while they walk in an environment (Kiefer et al., 2012). In some studies, participants must remember the most important landmarks that they found during their walk (Christofi et al., 2020). Participants' attention is directed to a specific goal, and their experience with the environment as a whole is beyond the scope of these studies.	Despite the fact that participants in some of these studies walk for as long as 1 km in an urban environment, a single view (photograph) in which several buildings and other elements appear is commonly used to create a heat map visualization of attention for all participants (Christofi et al., 2020).

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4 Real architectural environment: interior of a building	Wayfinding. Cave et al. (2014); Schwan et al. (2019); Tang (2020). Visitor studies in museums and exhibitions. Eghbal-Azar (2017); Pelowski et al. (2018); Jung et al. (2018); Santini et al. (2018); Tatler et al. (2016). Comparison of attention in real and virtual scenes. Hermund et al. (2018); Schwarzkopf et al. (2013). Retail environments. Harwood and Jones (2014).	Wayfinding studies conducted in buildings' interiors are mainly focused on the attention that people pay to signs during a wayfinding task in an architectural environment, e.g. an airport (Cave et al., 2014). Other aspects related to the experience of the interior environment are not studied. Likewise, visitor studies in real environments are not interested in the attention to the building itself, but in discovering the attention paid by the participants, e.g. to works of art in a museum (Pelowski et al., 2018), or to a specific type of object, as decorative textiles in a Historic manor house (Tatler et al., 2016). Other studies have been carried out in real interiors of buildings in order to compare attention in real and virtual spaces (Hermund et al., 2018). Nevertheless, despite the fact that the latter studies have been conducted with a portable eye-tracker, they restricted the displacement of the observer to specific spots.	Most of these studies present still pictures from an eye tracker recording that correspond to instants of the itinerary walked by one participant inside the building. These images show the fixation of a participant located in a point in space. (Cave et al., 2014; Eghbal-Azar, 2017). Other studies present heat maps created with a 360° photograph of the interior from a single point in space (Tang, 2020). Even though the participants walked inside a real building, the visualization images of these studies do not show how their attention evolved through space and time during the itinerary.
5 Real architectural environment: exterior of a building	Attention to and subjective experiences with buildings. Present study.	The present study asked the participants to take a free walking itinerary around a real building while observing it. This exploratory study focuses on an individual study case, and it aims to discover the subjective experience that lies behind the attention paid to the exterior of a historic building.	With the objective of describing attention as a spatial-temporal process, and reporting how attention to the different elements of the building changed during the itinerary, a series of heat map images with the main views of the building are included in this article.

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may exist between the conscious contents of the inner world of the human beings who explore a building and the conscious contents of their external world, i.e., the part or quality of the building that they select as the focus of attention. An architectural experience may be defined as the specific manner in which the encounter of the inner and outer (built) world manifests itself to a human being. A main interest in this research are the experiences with architecture that are generated through the visual appreciation of a building during the displacement of observers. This type of visual experience or encounter with buildings is mainly related to the following: (1) the perception of the formal qualities of architecture, such as symmetry, openness, or volumetric composition (Alihodžić and Kurtović-Folić, 2010; de la Fuente Suárez, 2012; de la Fuente Suárez and Millán Gómez, 2012; Ergan et al., 2018); (2) the meanings of the building, its style, and historic period, together with the knowledge of the function or the constructive technique (Carlson, 2000; Coburn et al., 2017; Crowther, 2009); (3) the explorative behavior in which the building is discovered during an itinerary or promenade (Blundell Jones and Meagher, 2015; Plummer, 2016); and (4) the emotions related to interest and the aesthetic aspects of architecture (de la Fuente Suárez, 2019; Ellard, 2015; Marković and Alfirević, 2015; Vartanian et al., 2017; Vijayan and Embi, 2019). When an object draws attention, the feeling that arises is called interest (Burnham, 1908). Therefore, interestingness is "the power of attracting or holding one's attention" (Grabner et al., 2013).

The present study only focuses on the visual attention and interest to a building while walking around it. Nevertheless, an encounter with an architectural work is an embodied experience that entails other senses apart from sight, as emphasized by Pallasmaa (1996), de la Fuente Suárez (2012, 2013, 2016), and Temple (2014). Other studies will be conducted to inquire into the multisensory aspects of an architectural experience.

In view of exploring the subjective experience of an architectural work, other qualitative and quantitative methods, namely, the think-aloud protocol (TAP) and the visuospatial zoning survey (VIZOS), are used in this study besides eye tracking. During TAP (Ericsson and Simon, 1984), participants verbally report their feelings or the ideas that come to their minds while performing an activity. Similarly to the present research, eye tracking and TAP have been used together to study the subjective experiences produced in an art gallery during the contemplation of paintings (Ashrafi and Garbutt, 2017). Regarding VIZOS, it allows participants to specify what parts or zones of a building bring forth a specific type of experience while encircling certain elements on a photograph of a selected building (de la Fuente Suárez, 2019). While eye tracking shows where the fixations are positioned during the observation of a scene and determines how long an element is being observed, the TAP and VIZOS, enable a researcher to know the experiences that the building produces in people, the specific elements or objects that cause them, and the intensity of those experiences.

The present exploratory study is focused on a single case and thus neither explains what makes the buildings interesting in general nor identifies the architectural elements that mostly attract the attention of people. Rather, this work aims to discover the subjective experiences that underlie the attentive observation of a specific architectural work.

2. Methods

2.1. Selection of participants and case study

The group of participants included 40 students enrolled in their first semester of the Bachelor's degree program in Architecture at the Universidad Autónoma de Nuevo León (UANL). The average age of the participants at the time of the study was 17 years old. The participants' naive experiences in architecture was approximated by the technique of not disclosing to them any information about the building, its history or current function, neither before nor during the experience.

The importance of the participants being adolescents over 16 years old can be explained as follows. (1) Compared with childhood and especially with adulthood, adolescence is a sensation-seeking age, with higher interest for the novel and willingness to explore (Romer et al., 2017). The traits of adolescent participants are desirable in a study that aims to analyze the subjective experience and the attention to a building during a free itinerary around it. (2) Compared with younger people, individuals aged 16—17 years old and older have more developed intellectual abilities, including verbal fluency (Steinberg, 2008), which is an important trait in answering the survey of this study.

The selection of young Architecture students can be explained as follows. (1) Under the hypothesis that Architecture students freely chose they career, it is likely that they can present intrinsic motivation and interest when asked to explore a building. Intrinsic motivation is the performance of an activity for the enjoyment of its experience, whereas extrinsic motivation refers to the interest in another type of goal (Ryan and Deci, 2000). Therefore, by recruiting Architecture students, the likelihood of participants having an authentic motivation to explore and walk around a building will be high. By contrast, recruiting participants without interest in architecture increases the likelihood that they will force themselves to accomplish the activity, or they may participate simply for the sake of a reward, i.e., extrinsically motivated. (2) The perceptions of architects greatly differ from those of the laypeople (Gifford et al., 2002). As Architecture students are "socialized into the values of the profession" (Wilson, 1996, p. 36), studying a degree in Architecture transforms their experience with architecture and the environment. In view of preventing socialization among the participants and inhibiting those participants with deep knowledge of buildings, the recruitment focused on students in their first weeks (first semester) of architectural education. (3) The final reason for selecting Architecture students is related to the importance of taking care of the portable eye tracker used by the participants during the study. The eye tracker is a highly expensive experimental device. As the participants were students registered in the UANL Architecture School, they were less likely to behave inappropriately and damage the eye tracker, compared with people recruited in situ.

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The selected building was the train station called the Antigua Estación del Golfo (Old Gulf Station) in the city of Monterrey, Mexico (Fig. 1). The 60-m-long building was designed in Richardsonian Romanesque style (Burian, 2015, p. 58) by the American architect Isaac S. Tylor (1891). The Antigua Estación del Golfo is currently owned by the Nuevo León Council for Culture and the Arts (Consejo para la Cultura y las Artes de Nuevo León) and houses a railway museum and temporary plastic art exhibitions. The field research was carried out at 8—11 a.m. to avoid the summer

Fig. 1 Antigua Estación del Golfo, city of Monterrey, Mexico. (a) The historic building as seen from the east. (b) The building's main volume with the turrets and the main entrance. (c) The building and the yellow caboose as seen from the west. (d) The west wing with the veranda and the historic objects from the train station. (e) The bay window, the main volume, and the hip roof with a dormer window.

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hours under the maximum temperature. The study consisted of three parts: TAP, a survey, and eye tracking.

2.2. TAP: participants' comments while visiting the building

A subset of 12 students individually commented on everything they saw and that went through their minds about the building while walking around its exterior. Their comments were recorded as they followed a route from the east to the west side of the building (see east route in Fig. 2). The column on the left of Table 2 shows the comments given by the TAP participants during their exploration of the historic building. The TAP was conducted in Spanish; the corresponding comments shown in Table 2 are the English translations. A detailed explanation of how TAP, as well as VIZOS (Section 2.3), was used in the study of architectural experiences can be found in the article of de la Fuente Suárez (2019).

2.3. VIZOS

In VIZOS, participants are asked to use a marker to encircle on a building's photograph, the parts or zones that have instilled an experience in them or those they consider to have a certain quality (de la Fuente Suárez, 2012). A thick marker is used to encircle the part or area that was the most capable of causing an experience in the participants, in response to a question such as: "What part or area of the building did you observe more attentively?" Meanwhile, a thin marker is used for questions such as, "What other parts or zones of the building did you observe attentively?" (Fig. 3).

The ten types of experience most frequently commented in TAP were used to create survey questions, as shown in the right column of Table 2. Three other questions were added to the questionnaire to comprise a total of 13 items. The first of these questions was about the most important parts or zones of the building, and it was added to reveal the hierarchy of the building's elements. The second question was about the most attentively observed zones, particularly those in which the participants concentrated their attention. This item was included in VIZOS to compare the following: (1) the building's elements that the participants indicated as having observed more attentively (subjective appreciation) and (2) the observation times of those elements (objective measurement recorded with the eye tracker). Discovering the most attentively observed zones, as reported by the participants, may help identify the elements that aroused interest in them. The third question involved the encircling of building zones that grabbed the participants' attention at the beginning of the itinerary. Moreover, the participants were asked about the elements they found visually salient (see last section of Table 2). Notably, instead of directly asking the participants what they considered to be interesting, they were asked about three different manners in which the elements of the building drew their attention: (1) the elements that mostly kept their attention during the itinerary, i.e., those elements that were attentively observed; (2) the immediately noticed elements, i.e., those elements that attracted their attention at the beginning of the route; and (3) the visually salient elements.

The 28 participants of the survey (not the same participants of TAP) were randomly selected from 320 first semester Architecture students. The participants were given the following instructions: "Walk around the building while observing it from wherever you want; when you have finished, return to where you started. Take the time you need." Fourteen participants began exploring the train station from the east side, while the other 14 explored the structure from the west side (Fig. 2). The participants received the survey questionnaire after walking freely around the exterior of the building, then they were asked to answer the forms while looking at the building from different points of view, i.e., not in a static manner. The time limit for answering the questionnaire was 30 min.

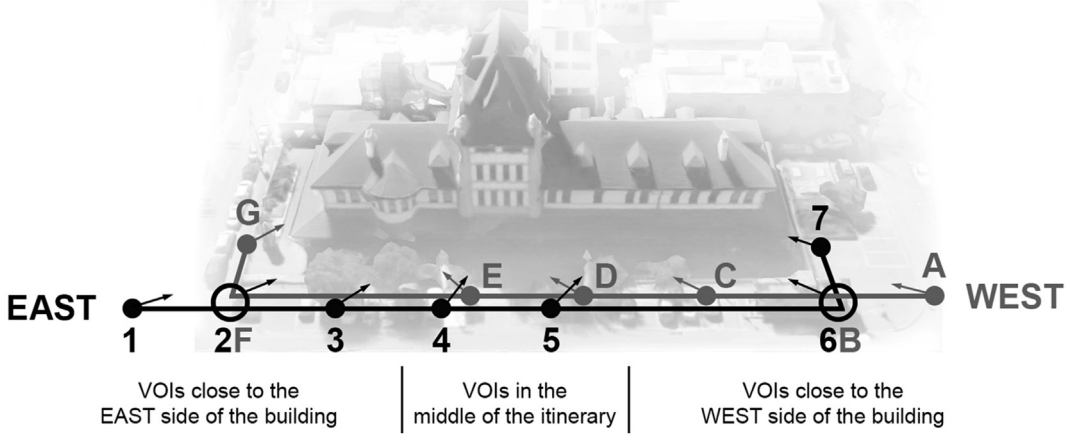

Fig. 2 Aerial view of the Antigua Estación del Golfo showing the east and west starting points for the exploration made by the participants, and the linear sequences of Views of Interest (VOIs) that the groups of participants more commonly followed. When heading to their starting point, the participants of one group passed by the views that the other group observed first. The background image is a modified photograph of the building taken from Google Maps.

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Table 2 Comments made by the participants during the Think Aloud Protocol conducted in the Antigua Estación del Golfo classified by experience type; and the questions formulated for the VIZOS.

Examples of TAP comments classified according to the types of experiences	VIZOS questions
Impression that the elements of the building make it similar to a castle. ' … I had not seen that [the turrets] were pointed, and that makes them look more like a castle … ' ' … I like the middle part, the one with stone, it looks like a type of castle or something like that … ' [the main volume of the building] ' … it looks like an European style building, like a castle; that is the first thing that came to my mind when I saw the building, first of all because of its height, the roof tiles, the gabled roofs … those things are not common here … '	What part or zone of the building is the one that mostly makes the building similar to a castle? What other parts or zones of the building make the building similar to a castle?
Impression that the building or its parts seem to be antique. ' … it called my attention that it looks like an antique building, but at the same time it seems modern because of the colors … ' ' … the doors, the rounded shapes [arches], they make the building to seem antique, because at the present time all windows and doors are square shaped; furthermore the windows [of the building] are made of wood, and nowadays the windows are mostly made of metal and glass … '	What part or zone of the building is the one that mostly seems to be antique? What other parts or zones of the building seem to be antique?
Aesthetic pleasure caused by the building or one of its elements. ' … I like it [the building] because its right side has nothing to do with its left side; the right side is a little bit longer than the left side, while the middle part is very tall … ' ' … I like a lot the combination of the gray and white colors with the brown color of the wood of the roof … ' ' … I like the shape of the windows and the arches made with stone [ground floor windows] … ' ' … the shadow in the lower part of the building that is produced by the roof [of the veranda] is very pleasant … '	What part or zone of the building do you like the most? What other parts or zones of the building do you like?
Impression that the building elements are supporting something. ' … it is clearly a strong building because of the stone columns [the turrets] … ' ' … the structures that look like a half-circle are supporting the roof [veranda roof] … ' ' … those things that look like structures [those of the veranda roof], why are they there? they are supporting the roof, but I don't think that they need to be so big … ' ' … the frames, arches and columns are reinforced. It is noticeable that those parts have been made thicker with structural purposes (…) in order to be able to withstand all the weight of the wooden elements … '	What part or zone of the building is the one that mostly seems to be supporting something? What other parts or zones of the building seem to be supporting something?
Doubts about the materials the elements of the building are made of. ' … they look like made up of [concrete] blocks [the turrets], but they can't be: blocks are square-shaped, so they cannot form a cylinder … ' ' … on the corners of the walls there are these gray squares (…) they are made of concrete, or are they made of stone? … ' [stone quoins] ' … I think that these structures that look like square rulers [the veranda structures] are made of wood; and I don't know if the roof is … yes, it is also made of wood, isn't it? … '	What part or zone of the building is the one that caused you more doubts about the material it is made of? What other parts or zones of the building caused you doubts about the materials they are made of?

(*continued on next page*)

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Table 2 (*continued*)

Examples of TAP comments classified according to the types of experiences	VIZOS questions
Appraisal of the building or its elements as examples of high-quality architecture. ' … the doors are very wide (…) the building was built to allow many people to go inside and outside, that is, to hold a large capacity of people … ' ' … the wood carvings of the doors are typical of that age; the wooden doors are very well built as things used to be built in the past … ' [doors of the west wing of the building] ' … the angles [the veranda structures] between the overhang roof and the wall are made of wood, nowadays they are metallic and do not present shapes like these. They are structural reinforcements but they [those who ideated the building] intended to give them a beautiful design … ' ' … they [those who designed the building] took maximum advantage of the sunlight (…) the building has many windows in the front, and not that many on the sides; I believe this is because of the sun, in order to prevent the building from getting hot during the day … '	What part or zone of the building is the one that mostly seems to possess architectural quality? What other parts or zones of the building seem to possess architectural quality?
Protrusion of the building elements. ' … I see that the windows are not at the same level as the roof; they are slightly protruding … ' [the dormer windows] ' … it looks like a type of cylinder that protrudes from the building … ' [bay window] ' … [The building] has several small white walls protruding from the roof … ' [the chimneys]	What part or zone of the building is the one that protrudes the most? What other parts or zones of the building protrude?
Visual saliency of the parts or zones of the building. ' … the front of the building is what mostly attracts attention … ' ' … the color is attention-grabbing, the fact that it is different, the brown color of the roof looks natural, and the contrast with the white walls looks beautiful … ' ' … every floor of the building is different to the others and that grabs my attention … ' ' … the number of doors and windows draws my attention … ' ' … the shape of the semicircle catches my eye [bay window] (…) there is another curve [an arch] in the top of the glass door [main entrance], I think I concentrate on the curves a lot … ' [laughs]	What part or zone of the building is the one that mostly seems attention-grabbing or eye-catching? What other parts or zones of the building seem attention-grabbing or eye-catching?
Meanings given to the building or its elements owing to their similarity to common objects. ' … I saw one more time something like three little houses over the first floor … ' [the dormer windows in the west wing of the building] ' … the bars of the doors look like those of a jail … ' [the doors in the main façade] ' … the stone columns [the turrets] on the front part, the round ones, look like a throne … '	What part or zone of the building is the one that mostly looks like something else, or gives you the impression of being something that it is not? What other parts or zones of the building look like something else, or give you the impression of being something that they are not?
Doubts that were provoked by the building elements about what they are or what their purpose is. ' … there is another white element that I thought was a chimney, but it seems that it is not … ' [the chimney in the west wing] ' … I don't know what these little windows are for (…) they look like little rooms … ' [the dormer windows] ' … what is the name of this? The little roof that protrudes … ' [veranda roof]	What part or zone of the building is the one that caused you more doubts about what it is or what its purpose is? What other parts or zones of the building caused you doubts about what they are or what their purpose is?

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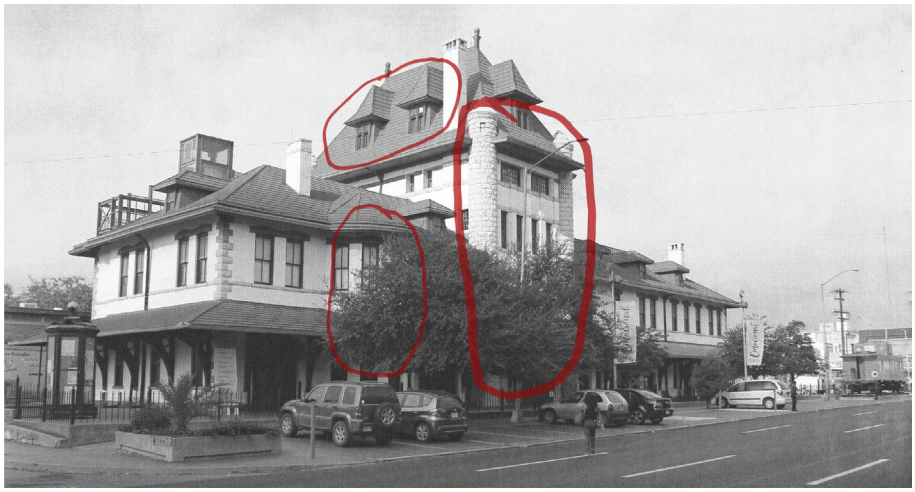

Fig. 3 Example of an answered item from the Visuospatial Zoning Survey (VIZOS), in which the participant selected the elements of the Antigua Estación del Golfo that were most attentively observed.

The survey method can show the intensity of an experience as it is generated by the different elements of a building, e.g., how aesthetically pleasing, interesting, or important the elements are for the participants. Heat map visualizations of the VIZOS results (Figs. 9—11) were created by assigning the values of 100 and 50 to the areas encircled with thick and thin markers, respectively. Meanwhile, the parts of the building that were not circled were assigned a value of zero. The visualizations can be used to show the mean values of the evaluations given by the participants to the elements that compose the building.

2.4. Eye tracking

The use of the eye tracker is justified in this study as it allows for the measurement of the durations of the participants' observations of the building's elements. The observations lenghts are presumably related to the degree in which the elements had been the objects of visual overt attention by the participants. Fourteen of the 28 survey participants explored the building wearing the Tobii Pro Glasses 2 eye tracker (seven participants for each starting point via the east or west route, Fig. 2). After the building was explored, the observers were instructed to take part in VIZOS. The remaining 14 students only answered VIZOS after walking around the building.

The Tobii Pro Glasses 2 is a wearable eye tracker that records eye movements binocularly at a sampling rate of 50 Hz. The frame of these glasses is unobtrusive and allows a field of view of more than 160° horizontally and 70° vertically. The lenses have four eye-tracking sensors that record the orientation of the eyes. The glasses also have a camera oriented to the field of view of the user that records high-definition videos of the scene in front of him or her.

The eye-tracking software (Tobii Pro Glasses Analyzer) does not automatically map the fixation points of an observed three-dimensional object; but of flat pictures. Thus, the fixation points of the participants were mapped manually in the software. However, manual mapping is time consuming. Given this limitation, the number participants that were asked to use the eye-tracking glasses was limited to 14 only.

The Tobii Pro Glasses 2 eye tracker is intended for interior use only under low-light conditions. Therefore, the intense exterior light received by the eye tracker during the participants' exploration of the building needed filtering. A device was designed to allow the eye tracker to work correctly in exterior daylight.

The experience of walking around a city while looking at buildings and other urban elements from different points of view is called serial vision (Cullen, 1961, p. 17). The data obtained through eye tracking were visualized by selecting the participants' main views of the building from their serial visions, then eye fixations were mapped on them. VOIs—which are introduced in this article—are key moments along the routes chosen by a participant. Each VOI involves a change or an event with respect to the previous one; that is, an architectural element may appear in the visual field, become hidden or left behind. Each VOI thus corresponds to a specific scenic configuration of elements that depends on the observer's point of view. Contrary to the techniques that divide a path into segments by an approximate distance to obtain viewing points (Yu and Ostwald, 2018, p. 501), the VOIs proposed in this study are more qualitative than quantitative. The VOIs differ from one another based on the elements that can or cannot be seen in them.

A camera with a fisheye lens was used to ensure that the photograph of each VOI would include the largest possible number of elements of the building. The Tobii Pro Glasses Analyzer software was used to map each participant's eye fixations onto the VOI with the most similar scenic configuration of elements to that actually seen from the participant's point of view. VOIs do not depict a building as observed from a static point at a given moment; instead, they represent a time phase along a route around the building. For example, a VOI may have a temporal duration of 20 s, after which the participant shifts to another VOI.

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With such a flexible characteristic, VOIs can be used to represent similar but not identical points of view as those taken by the participants while observing the building.

The 12 VOIs presented in this article correspond to the points of view from which more than half of the participants observed the train station building. Atypical views, such as those seen by the participants who visited the rear of the building, were not considered. Although the participants could decide what exploration route to take around the building, they mainly followed two distinct routes. The VOIs were organized into two linear sequences corresponding to the most common routes followed by the participants (Fig. 2). The first sequence with the starting point from the east side of the building could be represented by 1—(2F)—3—4—5—(6B)—7, whereas the other sequence starting from the west side could be represented by A—(6B)—C—D—E—(2F)—G. VOI 2F and VOI 6B were included in both routes because they had served as the intersection points of the routes (Fig. 2). The participants were asked to return to the origin point after walking around the building; therefore, they took a route in the opposite direction on their way back (the route the participants of the other group took first).

Two metrics obtained through eye tracking would be used in this study to establish the correlations with the evaluations regarding the subjective experiences of the participants. The first metric is OT, which corresponds to the total length of observation of an element during the whole itinerary by a participant. This metric encompasses all observation lengths carried out in the different VOIs from which the element was observed. The second metric is the observation time per view of interest (OT/VOI), which is the result of the total OT of an element by a participant divided by the quantity of VOIs in which that element was observed by that participant.

The observation lengths of the different elements of the building were quantified by dividing the latter into AOIs. The answers given by the participants of the survey, i.e., the manner in which they encircled the elements (Fig. 3), were used to determine what could be considered an element or part of the building; therefore, they served as the basis for the partition of the building in the AOIs. Figs. 4—7 show the VOIs and the multiple AOIs that compose the historic building.

2.5. Data analysis

Descriptive statistics was used to show the mean lengths of observation of the building's elements and the mean evaluations regarding the experience produced by those elements. Mann—Whitney *U* test was used to discover whether the differences between the east and west groups of participants were significant in relation to the times of observation of the building's elements and their evaluations of what they considered to have observed attentively. Moreover, Spearman rho test was used to find the correlations between the data obtained through eye tracking (observation lengths) and the evaluations given by the participants to the parts of the building that accord with the experiences they had. Nonparametric tests were selected on account of the small sample size of the study.

3. Results

3.1. Visualization of observation lengths on the photographic views of the building

The VOIs to be described in Sections 3.1.1—3.1.4 correspond to the following: (1) the VOIs close to the east side of the building, (2) the VOIs in the middle of the itinerary, (3) the VOIs close to the west side of the building, and (4) the VOIs of the lateral façades of the building. The number of participants that went through each VOI will be specified as not all of them observed the building from all points of view. In this study, the VOIs lasted from 11 to 33 s, the average duration of a route through the 12 VOIs was 207.7 s, and the average duration of the total route around the building, including the atypical views, was 287.1 s.

As shown in Figs. 4—7, the AOIs corresponding to parts or zones of the building that attracted the participants' attention are included in the VOIs. The average time that an AOI (an element of the building) was observed from a specific VOI was 0.99 s. The AOIs that appear in each figure of a VOI are mainly those that had been observed for 0.99 s or more by any of the two groups of participants. The contour of an AOI in Figs. 4—7 is blue when it had been observed for 0.99 s or more by the east group, in black when it had been observed for 0.99 s or more by the west group, and in both colors when it had been observed attentively by the east and west groups. Figs. 4—7 also include cyan—yellow—red heat maps created on the basis of the fixation points of all participants. As stated in the Introduction, the higher is the concentration of fixations over a zone of a scene, the higher is its informativeness (Henderson and Hollingworth, 1998, p. 272). The heat map calculation method selected in the Tobii Analyzer software was absolute duration, which is calculated with the duration of fixations. The radius used to calculate the heat maps was kept small to be able to visualize the details of the building that had been observed at much longer times. A large radius in the heat maps would lead to red zones encompassing several elements, and the details that could attract the gaze of observers would not be discernible.

3.1.1. VOIs close to the east side of the building

The participants of the east group began their itinerary in VOI 1 (Fig. 4). In this VOI, all seven participants observed several zones of the building, e.g., the bay window (d) and the zone of the main entrance and ground floor areas, with the latter showing a high density of fixations (g, zone in red). As for the non-building elements, the participants observed the areas of the sidewalk that they were about to follow (e and f). The mean duration of VOI 1 was 31.25 s and was much longer compared with the durations of the other VOIs.

In VOI 2F (Fig. 4), the east group of participants concentrated their attention mainly on the bay window (j), which they had already observed before. Meanwhile, in VOI 3, all seven participants focused their attention on the two

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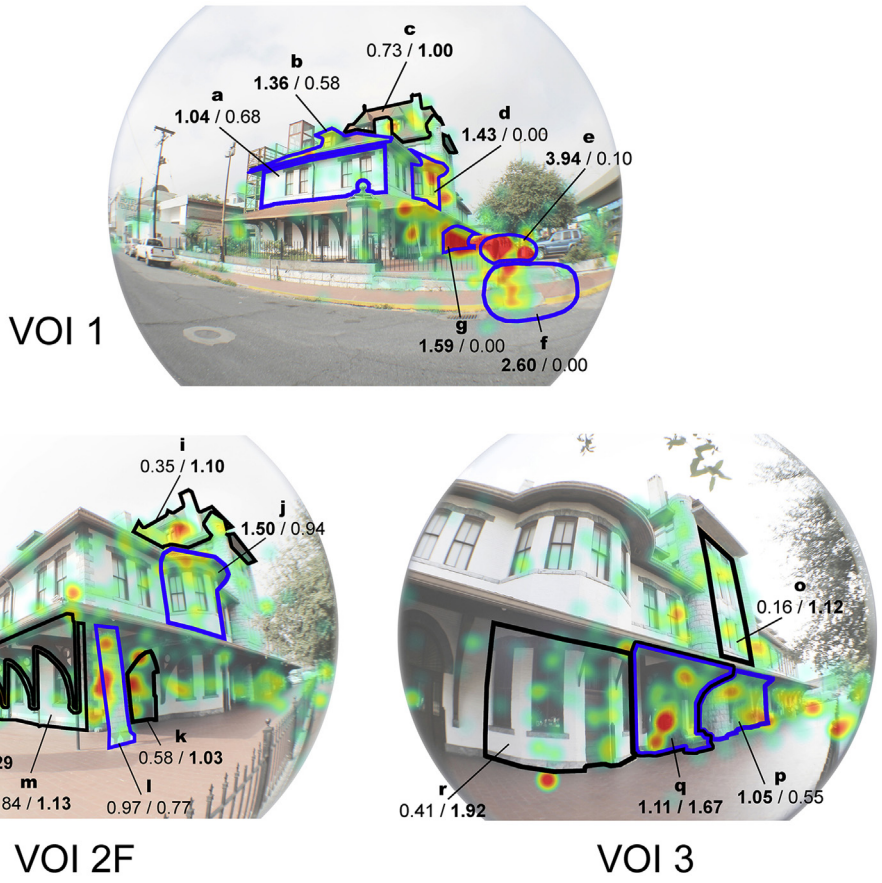

Fig. 4 Views of Interest close to the east side of the building: VOI 1: eastern point of origin, VOI 2F: front façade and east lateral façade, and VOI 3: bay window as seen from the east. Views of interest of Fig. 4—7 superpose heat map visualizations with the Areas of Interest mainly observed by the east group (blue) and the west group (black). The mean observation times per Area of Interest (AOI) are also indicated, for the participants who started from the east (left-hand number) and the west (right-hand number). Antigua Estación del Golfo, city of Monterrey, Mexico.

doors they encountered at this point of the route (p and q in VOI 3, Fig. 4). After an initial scattered observation of multiple elements of the building from afar (VOI 1), a reduced set of elements in the subsequent VOIs was selected for attentive observation from a closer distance by the east group.

While VOIs 1, 2F, and 3 were located at the beginning of the route for the east group, they were the VOIs located at the opposite side of the starting point for the west group. In VOI 2F (Fig. 4), the east side of the building was revealed for the first time to six participants walking from the west. Since the veranda structure and the underlying zone were both hidden in the first part of the route, they were objects of attention for the west group in VOI 2F (h and m). Only one participant from the west group took VOI 1 to observe the building, paying attention mainly on the main volume's hip roof (c in VOI 1).

The six participants who started from the west and saw VOI 3 paid special attention to the ground-floor level of the bay window (r) and the door beside it (q). The building was partially hidden by trees on this VOI. As the participants had to walk under vegetation, the participants from both groups were inclined to observe mainly the ground floor areas of the building. This situation might have also caused VOI 3 to have the shortest duration (11.27 s) among all VOIs.

3.1.2. VOIs in the middle of the itinerary

The participants of the east group continued their itinerary with VOIs 4 and 5 (Fig. 5) where they were able to move close to the main vertical volume of the building and the west wing, respectively. They observed attentively almost all of the AOIs of VOIs 4 and 5, especially the main volume's windows (b in VOI 4).

The building had no obstruction in sight in VOIs 4 and 5; these were the views that presented more similarities between what was observed by the two groups of participants. In addition to the main volume's windows, the arched doors and the multiple historic objects of the west wing in both VOIs attracted the attention of the two groups (f in VOI 4; o and p in VOI 5). The west group observed the main volume's windows and the west wing elements for a long time in those views, even though the participants of the west group were on their way back from their route, and they had already paid attention to those elements previously.

The main volume's windows were also the center of attention in VOI D regardless of the point of origin of the

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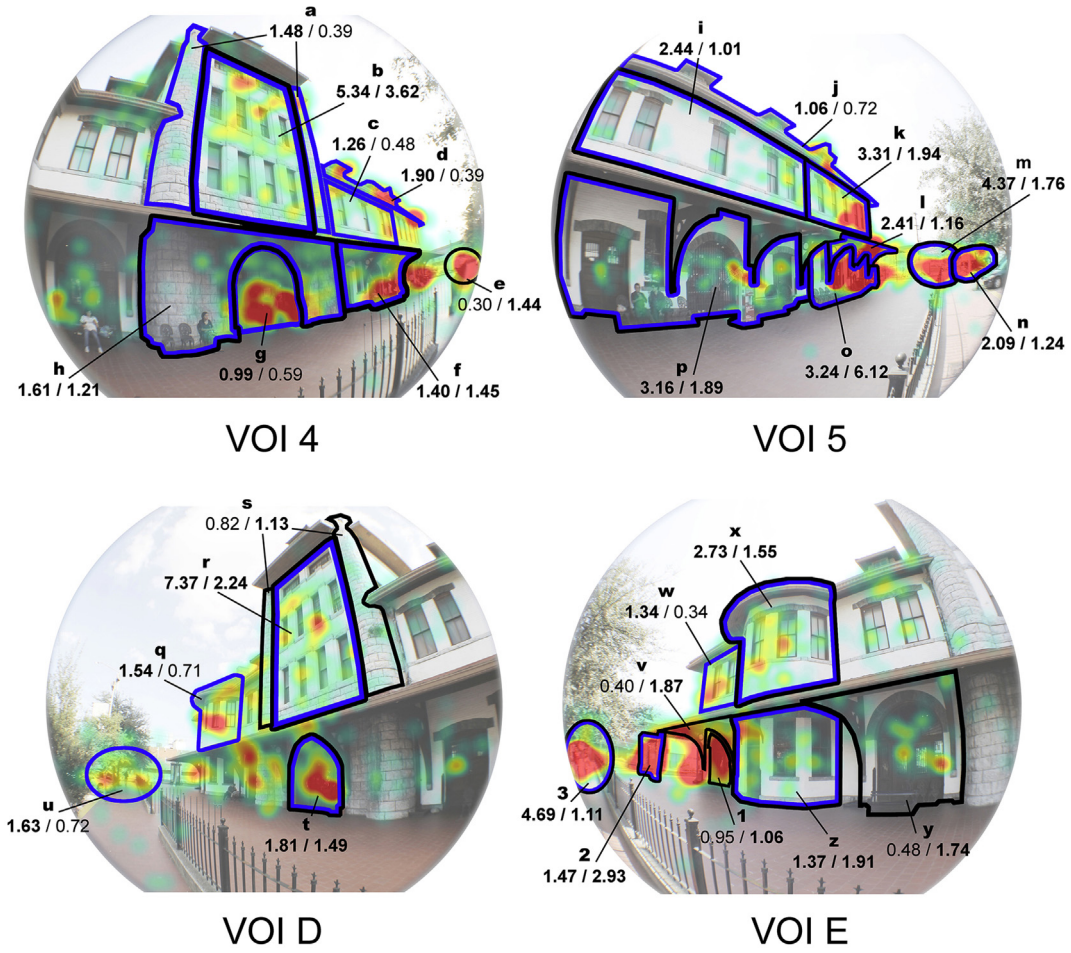

Fig. 5 Views of Interest in the middle of the itinerary: VOI 4: main volume as seen from the east, VOI 5: front façade of the west wing as seen from the east, VOI D: main volume as seen from the west, and VOI E: bay window as seen from the west. Antigua Estación del Golfo, city of Monterrey, Mexico.

itinerary of the participants (r in VOI D). As opposed to the main volume's windows, the turrets were observed attentively only when the participants moved close to the main volume for the first time, but these same elements were not observed attentively at later times. The east group was able to observe the turrets in VOI 4 (a), while the west group was able to observe the same element in VOI D (s).

In VOI E (Fig. 5) the bay window (x and z) is not covered by trees and it was attentively observed by both groups. By contrast, the bay window in VOI 3 was surrounded by trees and thus was not much an object of attention (Fig. 4).

As depicted by the VOIs mentioned above and those to be described in the succeeding sections, the building's doors appear in red in most of the heat map views (they present higher fixation densities and therefore higher informativeness according to existing theory). A special case of the latter situation being the main entrance. The other zones that may appear in red in the VOIs are the rectangular windows, the dormer windows, and the ground floor area of the building's west wing where the historic objects are located. The most informative zones of the building correspond to meaningful architectural elements possessing strong figure qualities, i.e., doors and windows. In other respects, the far areas of the sidewalk on which the participants would follow their route will likely appear in red in the heat maps, such as the case of e in VOI 4.

The heat maps were helpful in revealing specific elements or small details that were informative objects, since the smaller the objects of attention, the closer the fixations and the more likely their appearance in red in the heat map. In this manner, in a large AOI as b in VOI 4, the heat map allowed to locate the specific windows that received higher fixations.

3.1.3. VOIs close to the west side of the building

VOI A corresponds to the beginning of the route for the participants who started from the west (Fig. 6). At the beginning of their route, the attention of all seven participants to the building was reduced by the presence of the caboose (a in VOI A). During this study the building was obstructed by several elements of construction equipment in VOI A. This scenario might have influenced the behavior of the observers, as they used VOI A to move closer to the building and move around the obstructing elements but not necessarily observe attentively the building's parts. VOI A only lasted 18.03 s on the average, which is much shorter than 31.25 s for VOI 1. In general, the visual obstruction of the building, whether by trees or other elements, severely

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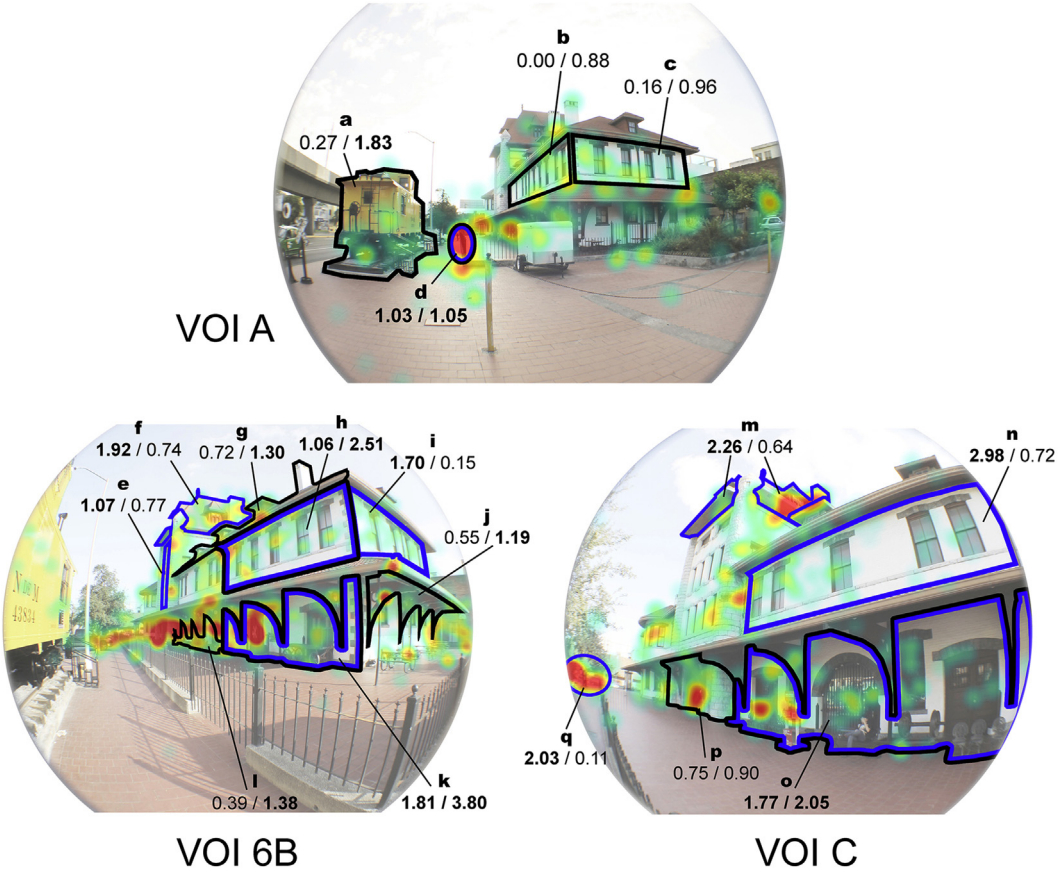

Fig. 6 Views of Interest close to the west side of the building: VOI A: western point of origin, VOI 6B: front façade and west lateral façade, and VOI C: midpoint of the west wing as seen from the west. Antigua Estación del Golfo, city of Monterrey, Mexico.

reduced the length of observation of the building's elements in the corresponding VOI. The obstructions also reduced the duration of the VOI.

The west group continued with VOI 6B (Fig. 6) where their attention expanded to encompass many other elements of the building. VOI 6B entailed a noticeably long mean duration of 31.76 s, and could be regarded as the first view of the building to be observed in depth by the west group. In VOI C (Fig. 6), the attention of the west group concentrated mainly on the west wing's ground floor (o) where the historic objects were located.

The participants coming from the east point of origin (opposite side of the building) hardly observed the building from VOI A (Fig. 6). Nevertheless, on their way back to the starting point (VOIs 6B and C), the east group paid attention to several parts of the building, including the hip roof with the dormer windows, which had not been previously an object of attentive observation (f in VOI 6b; m in VOI C).

3.1.4. VOIs of the lateral façades of the building

All 14 participants were motivated to explore the frontal façade of the building, but only half of them observed the building from the lateral façades (VOIs G and 7 in Fig. 7). The last view from which the building was observed was mainly that of the lateral façade located close to the corresponding starting point; that is, VOI G was the last VOI for the east group, while VOI 7 was the last VOI for the west group. VOI G allowed the participants to observe a contemporary addition to the historic building—a metal stair that was densely fixated (a and e in VOI G). Even though VOI 7 did not present new architectural elements to the participants, they attentively observed several elements of the building, especially the windows on the first floor (f).

3.1.5. Comparison of what the groups paid attention to in the VOIs

As the locations of the starting points of the two groups were in opposite directions, the order in which the building's elements were discovered and approached was antagonistic. Furthermore, the context of the observation (e.g., elements that obstructed the views of the building) also differed between the two groups since the beginning of the itinerary. These situations seemed to have caused notable differences between the two groups regarding what they had paid attention to in the VOIs.

In certain cases, the elements or zones of the building that were previously hidden and eventually became visible attracted the participants' attention. Nevertheless, while certain elements of the building were observed attentively when they were discovered, other elements continued to be observed even when they had already been objects of attentive observation in previous views. Those elements included the main volume's windows, the main entrance, and the west wing's ground floor area. The possibility of

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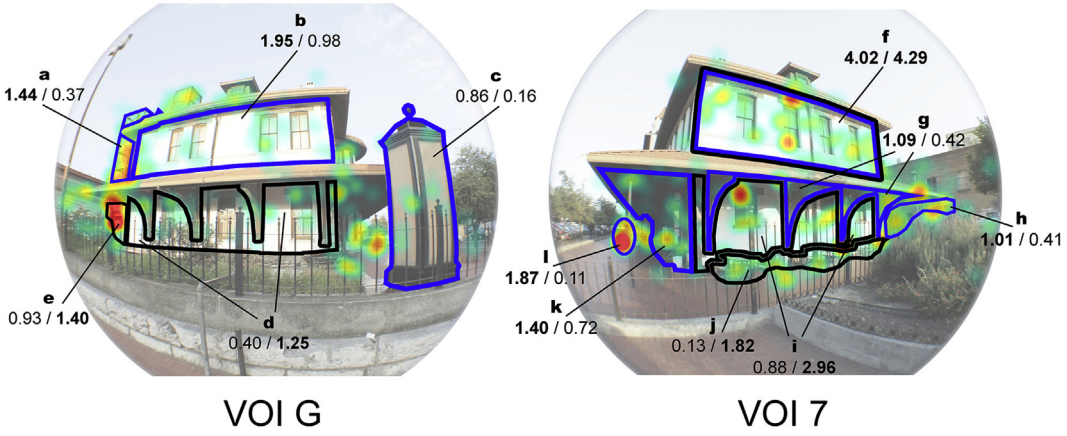

Fig. 7 Views of Interest of the lateral façades of the building: VOI G: east lateral façade, and VOI 7: west lateral façade. Antigua Estación del Golfo, city of Monterrey, Mexico.

these elements being the most interesting, visually salient, or aesthetically pleasing parts of the building will be discussed in the succeeding sections.

3.2. OT per zone of the building

The differences in the observation times of the building elements between the two groups at the different phases along their respective routes are depicted in the VOIs shown in Figs. 4—7. In order to compare the total OT of the zones of the building carried out by the two groups for the whole itinerary, the multiple AOIs composing the building were grouped into 16 larger zones that comprised one or several AOIs (Fig. 8). According to the Mann—Whitney *U* test performed with SPSS (significance level of 0.05; Table 3), no significant differences exist between the two groups for the total OT of the 16 building zones. Thus, despite having started their routes from different points, both groups dedicated similar amounts of time to observe the different building elements. During the exploration of the historic building, the participants observed the building's elements for a time irrespective of the starting point of the routes, and therefore, not influenced by the sequential order by which the elements appeared to them.

3.3. TAP and VIZOS of architectural experiences

Table 2 shows the TAP participants' comments, which had been subsequently used to create the questions of the survey, except for the questions about the most important elements, the elements that were attentively observed and those immediately noticed from the start.

Similar to the comparison between the observation lengths of the elements between the two groups, no differences were found between the east and west groups in terms of what they considered as having observed attentively in VIZOS (Mann—Whitney *U* test). Therefore, the results to be discussed in this section correspond to

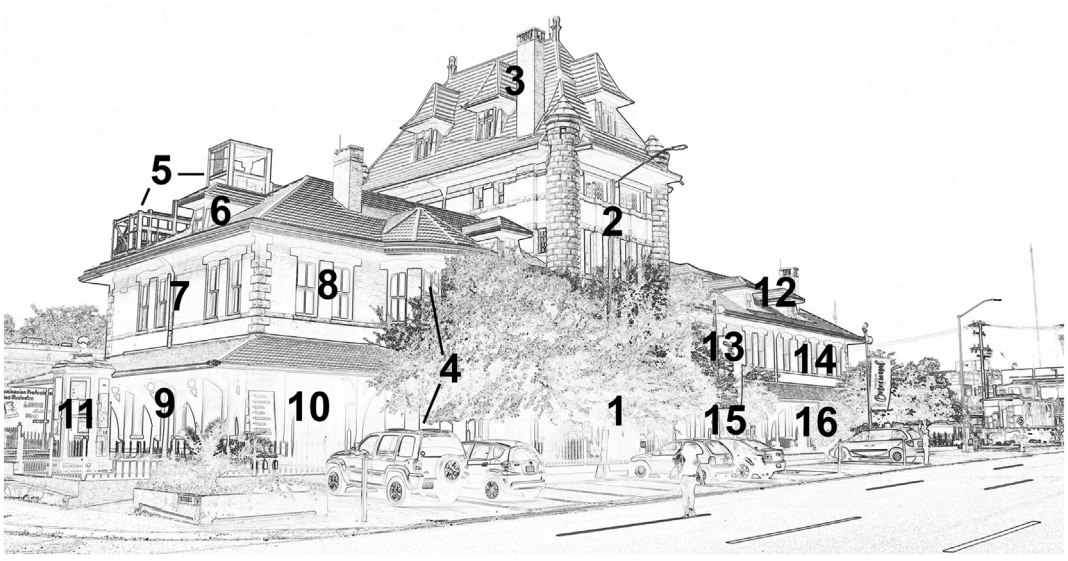

Fig. 8 The 16 zones of the building which are composed of one or more Areas of interest (AOIs). The ground floor zones include the roof structures and objects surrounding the building. Only the zones that were visible in the photograph of the building presented to the participants of the survey are included (Fig. 3).

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Table 3 Descriptive and Mann–Whitney *U* test statistics for the time during which the 16 zones of the building shown in Fig. 8 were observed by both groups of participants.

		General mean duration	East group mean	West group mean	General std. deviation	Mann-Whitney U	Exact Sig. [2*(1-tailed Sig.)]
	Whole building	146.45	147.29	145.62	58.22	23.00	.902[a]
1	Main entrance and surrounding zones	8.15	7.82	8.47	4.50	23.00	.902[a]
2	Turrets and main volume's windows	13.08	15.12	11.03	8.92	18.00	.456[a]
3	Main volume's hip roof	3.32	4.11	2.53	3.81	22.00	.805[a]
4	Bay window	9.23	10.05	8.41	3.95	20.00	.620[a]
5	Elevator and metal stair	0.59	0.81	0.38	0.94	20.00	.620[a]
6	East wing roof	0.72	1.36	0.08	2.18	17.00	.383[a]
7	First floor of east façade	1.61	2.17	1.04	2.57	18.00	.456[a]
8	First floor of east wing	1.35	1.81	0.89	1.10	13.00	.165[a]
9	Ground floor of east façade and veranda	2.83	2.67	2.99	2.35	21.00	.710[a]
10	Ground floor of east wing	2.57	1.73	3.40	2.30	17.00	.383[a]
11	Hexagonal prism message center	2.18	2.25	2.12	1.73	24.00	1.000[a]
12	West wing dormer windows and roof	2.93	3.28	2.58	2.14	20.00	.620[a]
13	First floor of west wing	4.27	5.20	3.33	4.09	18.00	.456[a]
14	First floor of west wing (final part)	4.24	3.39	5.09	4.12	18.00	.456[a]
15	Ground floor of west wing	8.05	6.79	9.30	5.20	18.00	.456[a]
16	Ground floor of west wing (final part)	10.19	7.32	13.07	6.85	12.00	.128[a]

[a] Not corrected for ties.

the total 28 students who participated in VIZOS. Fig. 9 presents the color sequence used in the heat maps of Figs. 10 and 11, which correspond to the data collected in VIZOS.

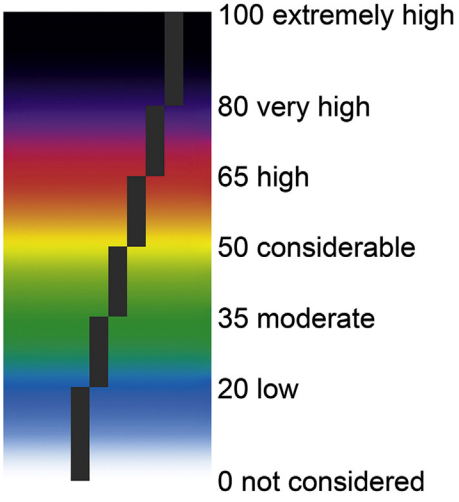

Fig. 9 Color sequence used in the Visuospatial Zoning Survey heat maps in order to show the participants' mean evaluations. Participants used two markers in order to circle specific zones of the building causing them a certain experience. A zone circled with the thick marker is the one that mostly caused an experience to a participant and it was assigned a value of 100. Other zones that produced such experience were circled with the thin marker and they were assigned a value of 50. The zones that were not considered as causing an experience obtained a 0 value. Heat maps of Fig. 10 and 11 show the mean values considering all participants of the VIZOS. See Fig. A1 in the appendix for other types of color vision.

In accordance with the values given by the participants, the turrets and the main volume's windows and roof were considered the most important elements of the building (Fig. 10c). Those elements were observed attentively by the participants (Fig. 10b) and drew their attention from the beginning of the itinerary (Fig. 10a), possibly owing to their noticeable height.

According to the TAP participants, the train station was similar to a castle mainly because of the turrets. The high intensity of that experience for the participants is shown in the heat map of the VIZOS (Fig. 10d; see turrets in purple). The findings for the turrets were as follows: they seemed antique (Fig. 10e); they resulted in the highest aesthetic pleasure among the participants (Fig. 10f); they were considered examples of high-quality architecture (Fig. 11g); and they, together with the veranda structure, mostly seemed to be supporting something (Fig. 11h). Furthermore, as signaled by the participants in TAP and VIZOS, the material of the stone turrets raised the most doubts (Fig. 11i). The turrets held the most meaning about the building as a whole for the participants.

The main volume's windows were one of the most aesthetically pleasing elements (Fig. 10f), and they were evaluated as high-quality architecture (Fig. 11g). Meanwhile, the main volume's hip roof and dormer windows were selected as the most protruding shapes (Fig. 11j) and the most visually salient elements of the building (Fig. 11k). In general, the visually salient elements of the building were those with protruding qualities or the opposite. The main volume's hip roof and dormer windows also produced aesthetic pleasure among the participants (Fig. 10f). The surveyed participants viewed the dormer windows as antique (Fig. 10e), and those windows were immediately noticed from the beginning of the route (Fig. 10a).

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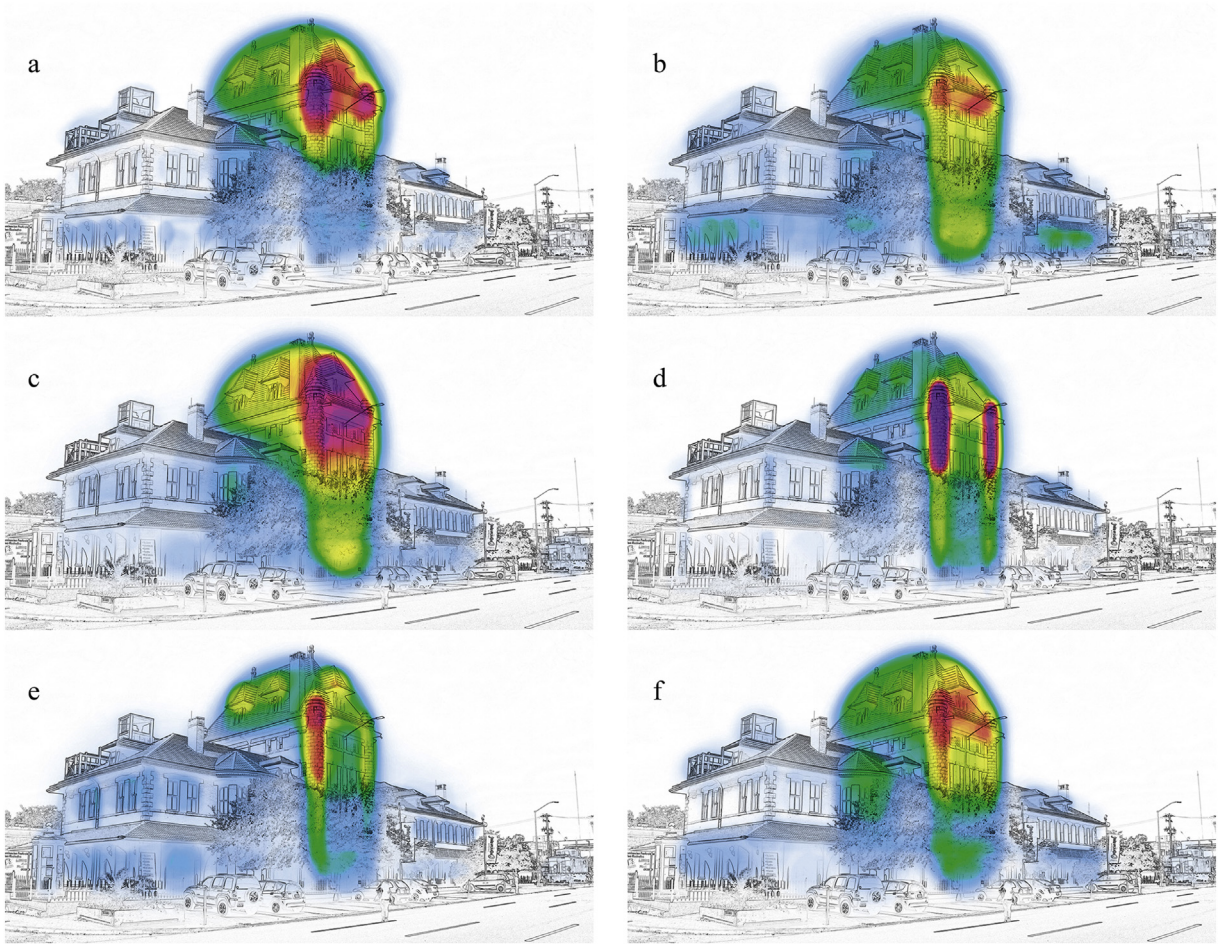

Fig. 10 Results of the Visuospatial Zoning Survey (VIZOS) showing the intensities of the subjective experiences generated by the different parts of the building as evaluated by the participants. Antigua Estación del Golfo, city of Monterrey, Mexico. See Fig. A2 in the appendix for other types of color vision. (a) Immediately noticed zones of the building (which draw the attention of the participants at the start of their route). (b) The attentively observed parts of the building. (c) The most important zones of the building. (d) Elements that make the building similar to a castle. (e) Parts of the building that seem antique. (f) The most aesthetically pleasing elements of the building.

The main entrance to the building was also considered important (Fig. 10c) and had been observed attentively (Fig. 10b). Nevertheless, as the entrance was not clearly visible from the starting points unlike the highest parts of the main volume, it did not draw attention at the beginning of the itinerary (Fig. 10a).

The bay window was perceived as a protruding element (Fig. 11j) and considered a high-quality architecture (Fig. 11g). In another aspect, the chimneys were elements that sparked the imagination of the participants. The chimneys appeared similar to common objects (Fig. 11l) and raised doubts about what type of element they are or their purpose (Fig. 11m).

3.4. Relation between lengths of observation of the building's elements and the subjective experiences that accompanied their observation

The numeric values of the evaluations of the building's elements by the 14 eye-tracking participants are presented in Table 4. The averages of the observation durations (i.e., OT), the OT/VOI, and the VOIs from which each element was observed are also listed in the table. The data correspond solely to the participants who wore eye-tracking glasses and subsequently answered the survey. With the aim of finding the correlations between the eye-tracking observation lengths and the participants' experiences with the different parts of the building, the Spearman rho test was conducted with the mean values presented in Table 4.

The correlations among the eye-tracking data (OT, OT/VOI, VOIs), and VIZOS data, i.e., the experiences that the elements of the building produced in the participants, are shown in Table 5. As the objective of the present study is to correlate eye-tracking data with subjective experiences, this table do not present the multiple correlations existing among the experiences themselves, e.g. the correlation between what was aesthetically pleasing and what was considered important.

As shown in Table 5, the evaluations on the subjective experiences with the elements of the building are more related to OT/VOI (i.e., the mean duration of observations

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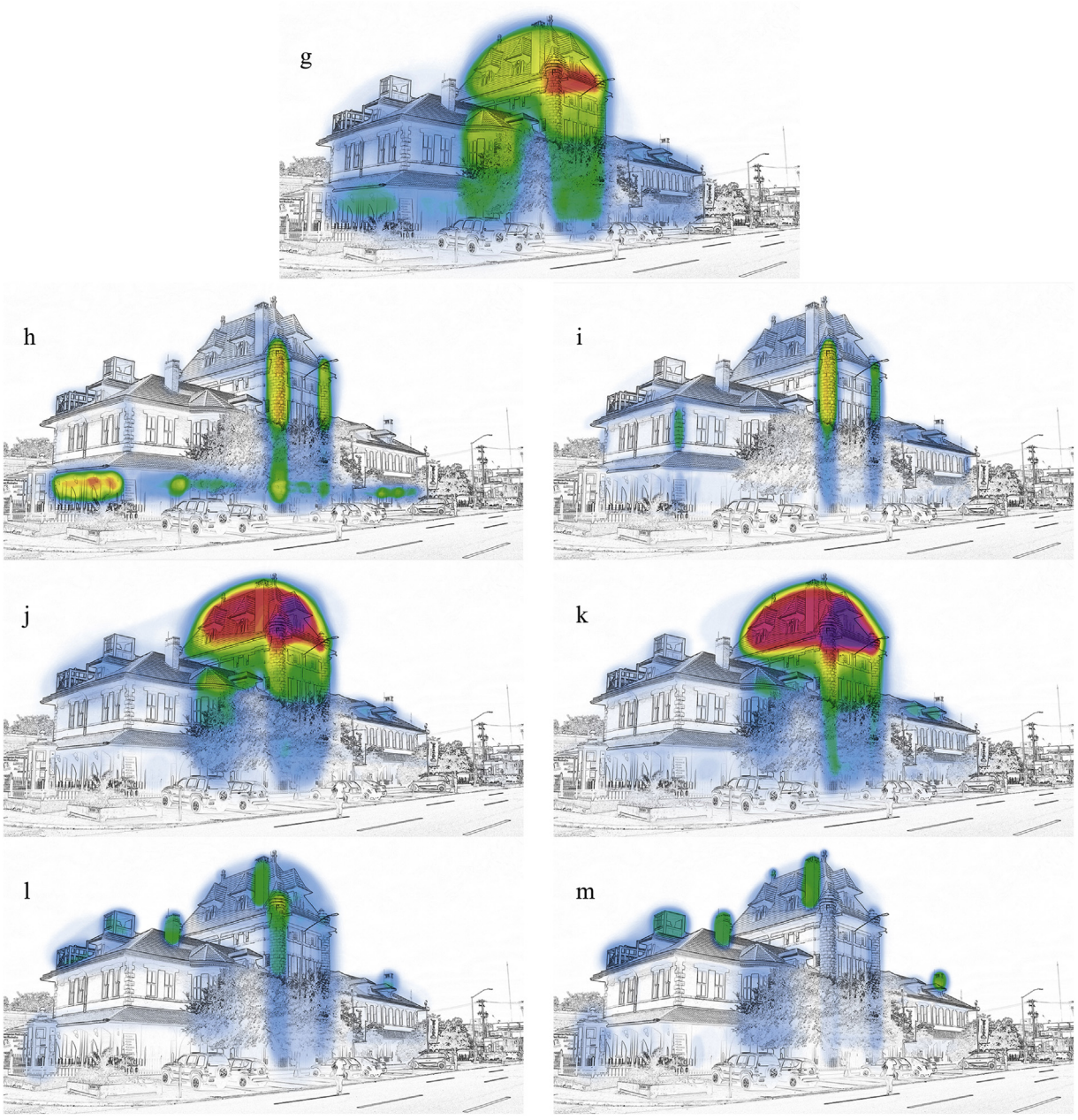

Fig. 11 Results of the Visuospatial Zoning Survey (continuation of Fig. 10). See Fig. A3 in the appendix for other types of color vision. (g) Parts of the building that were experienced as possessing high architectural quality. (h) Elements that mostly seemed to be supporting something. (i) Zones of the building that raised the most doubts about the material they are made of. (j) The most protruding elements of the building. (k) The most visually salient elements (the attention-grabbing and eye-catching zones according to the participants). (l) Elements of the building that were found similar to common objects or gave the impression of being something they are not. (m) Parts of the building that raised doubts about what they are or what their purpose is.

considering the several VOIs from which the element was an object of attention) than the observation durations (i.e., OT; total sum of the lengths of observation during the whole itinerary).

The VOIs can be used to depict different aspects of an architectural work. In other words, the VOIs can be understood as the stages in the process of walking towards/around a building and observing it, during which several elements of the building are visible while others are not. The quantity of Views of Interest in which a zone of the building was observed (i.e., VOIs) is highly correlated (0.91) with the total OT. Therefore, a central element of a building that has been briefly observed from multiple VOIs may obtain a high total observation duration (i.e., OT) even if it has not received long observation durations from the VOIs from which it has been observed (i.e., the OT/VOI metric). Besides studying attention to the elements of a building considering the total OT, it should be studied considering the observation times of the elements during the different moments, scenes and views

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that composed the itinerary—as represented by the OT/VOI.

As for the subjective experiences related to attention and interest, this case study has yielded strong correlations between the OT/VOI metric and (1) what immediately captured the participants' attention from the start of the route (0.76) and (2) what the participants have indicated as the elements they observed attentively (0.71). The correlation between these two attention-related experiences is 0.82 (not shown in Table 5). Therefore, the elements that captured the attention of the participants from the start of the route were found interesting during the rest of the itinerary and led to longer observation times. The latter relations are not present in other buildings or environments where the most attentively observed elements in the route are not visible at the beginning of the itinerary but discovered in succeeding VOIs. The conspicuous height of the main volume in this case study may have played a role in attracting the attention of the participants from the beginning of the route and in maintaining their attention subsequently.

Contrary to the other items in VIZOS regarding an experience that may be spontaneously noticed while answering the survey ("What part or zone of the building do you like the most?"), the item on the most attentively observed elements is a retrospective one. The participants needed to remember what they observed attentively from the start of their route, which may be a harder task for them. Therefore, the difficulty of remembering what mostly kept their attention during the route might have reduced the correlation strength between what was pointed out as observed attentively and the eye-tracking observation durations (OT/VOI), which yielded a result of 0.71.

The visual saliency of the elements of the building presented a moderate correlation with OT/VOI. As described by the TAP participants, attention-grabbing or eye-catching elements are those elements that differ from or contrast their surroundings, e.g., color contrast. However, even though the salient qualities attracted the attention of the participants, they were not highly related to the sustained observation of the building's elements (0.54).

With regard to the subjective experiences related to preference that accompanied the observation of the building's elements, the correlations suggest that the elements viewed by the participants as high-architectural quality (0.83) and aesthetically pleasing (0.78) received longer OT/VOIs. The aesthetic pleasure produced by the elements of the building (i.e., spontaneous liking) and the judgment of the architectural quality of the elements considering the functional, structural, and aesthetic aspects played important roles in the experience of the building (see TAP comments on Table 2). The evaluations by the participants on architectural quality were likely based on their knowledge and what they considered to be a well-achieved design intention. Among all of the experiences studied, the appraisal of the building's elements as having high architectural quality is the experience with the highest correlation with OT/VOI. On this basis, two findings should be noted. First, even though the participants were Architecture students at the start of their studies, they were able to observe for longer times (i.e., OT/VOI) the elements representing the most important values considered in architectural theory. Second, top—down control played an important role in directing the attention of the participants to the elements of the building.

Regarding the other specific experiences not categorized as interest or preference, their correlations with OT/VOI were moderate. Such experiences correspond to the following: (1) elements that seemed to be structurally supporting something (0.63), (2) elements experienced as protruding (0.57), and (3) elements that seemed antique (0.50). The correlation between OT/VOI and the item on similarity of the building's elements with those of a castle was not significant. Nevertheless, considering the p-value of 0.07, employing more participants in the study might have led to a significant result.

On the basis of the obtained correlations, the following interpretation seems plausible: during the itinerary, the participants were searching for elements producing specific experiences in them, e.g., representing high-quality architecture, and they devoted longer observations to elements that corresponded to those experiences. Eventually, regardless of the starting point of a route, the participants found and observed those elements causing the experiences. This phenomenon may explain why the time devoted by the participants to observe the building's elements was not significantly different between the two groups even when the order of appearance of the elements depended greatly on the starting point, as described in a previous section.

Finally, the subjective experiences that do not correlate with the observation lengths (i.e., OT/VOI) are those related to the doubts regarding what the elements are or their material, the experiences in which the participants found the elements to be similar to other objects, and the experience of the importance of the elements. In relation to the items on doubt and similarity to common objects, the non-correlations may be due to the fact that those experiences were generated by a few small elements of the building. These elements are allocated in the 16 larger zones wherein the building had been partitioned (e.g., the chimneys in the roofs). A possible way to find correlations between observation lengths and the items on experiences with smaller elements is to partition the building into more zones.

The experience on the importance of architectural elements was included in the VIZOS questionnaire, but it was not commented by the participants in the TAP. The scenario is the same as two items on attention-related experiences (the items on immediately noticed and attentively observed elements). Nevertheless, these experiences seem to be present during the observation of any building, i.e., there is often an element noticed as attended first and an element observed more than the rest. The experience on the importance of elements was not correlated with the observation lengths, which may indicate that the latter experience did not accompany the observation of the historic building in this study. In order to obtain correlations between observation durations and VIZOS experiences, asking the participants about the elements of the building producing experiences that are actually noticed by them seems to be vital. A qualitative technique, such as TAP, before creating the survey

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Table 4 Mean data corresponding to the 14 eye-tracking participants regarding their evaluations of the building zones, the Observation Times (OT) of those zones, the Views of Interest (VOIs) from which the zones were observed, and the Observation Time per View of Interest (OT/VOI). The highest values of each column are shown in bold.

		Observation Time (OT)	VOIs	OT/VOI	Immediately noticed (drew attention at the start)	Attentively observed	Considered as important	Similar to a castle	Seemed antique	Aesthetically pleasing	Considered as high-quality architecture	Seemed to be supporting something	Caused doubts about the material	Perceived as protruding	Visually Salient	Similar to common objects	Caused doubts about what it is
1	Main entrance and surrounding zones	8.2	4.6	1.8	35.7	**53.6**	50.0	**50.0**	42.9	35.7	46.4	46.4	17.9	17.9	28.6	17.9	21.4
2	Turrets and main volume's windows	**13.1**	4.6	**2.7**	**78.6**	**78.6**	**82.1**	**96.4**	**64.3**	**64.3**	**57.1**	**60.7**	**60.7**	39.3	**46.4**	**32.1**	21.4
3	Main volume's hip roof	3.3	1.7	1.7	**60.7**	50.0	**85.7**	42.9	**50.0**	**53.6**	**57.1**	14.3	21.4	**82.1**	**89.3**	**32.1**	**64.3**
4	Bay window	9.2	**5.2**	1.8	21.4	21.4	35.7	28.6	28.6	28.6	42.9	21.4	10.7	**53.6**	32.1	3.6	7.1
5	Elevator and metal stair	0.6	0.5	0.5	7.1	14.3	3.6	0.0	7.1	10.7	3.6	17.9	3.6	14.3	14.3	**46.4**	**39.3**
6	East wing roof	0.7	0.3	0.7	3.6	0.0	3.6	10.7	17.9	0.0	14.3	0.0	7.1	10.7	10.7	7.1	7.1
7	First floor of east façade	1.6	1.5	0.8	3.6	14.3	10.7	14.3	32.1	3.6	10.7	17.9	**35.7**	0.0	3.6	0.0	3.6
8	First floor of east wing	1.4	1.4	0.8	3.6	10.7	10.7	10.7	21.4	3.6	10.7	10.7	**35.7**	0.0	3.6	0.0	0.0
9	Ground floor of east façade and veranda	2.8	1.9	1.5	17.9	17.9	3.6	7.1	32.1	10.7	28.6	**53.6**	21.4	10.7	14.3	0.0	0.0
10	Ground floor of east wing	2.6	1.4	1.8	21.4	10.7	3.6	10.7	35.7	21.4	21.4	21.4	17.9	14.3	7.1	0.0	3.6
11	Hexagonal prism message center	2.2	2.1	0.9	0.0	0.0	3.6	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	14.3	17.9
12	West wing dormer windows and roof	2.9	2.4	1.3	17.9	14.3	14.3	17.9	17.9	7.1	28.6	3.6	32.1	14.3	25.0	21.4	**39.3**
13	First floor of west wing	4.3	3.3	1.2	0.0	3.6	10.7	3.6	14.3	0.0	17.9	0.0	3.6	0.0	3.6	0.0	0.0
14	First floor of west wing (final part)	4.2	2.5	1.5	3.6	7.1	14.3	10.7	14.3	0.0	17.9	0.0	3.6	0.0	3.6	0.0	0.0
15	Ground floor of west wing	8.1	**5.3**	1.5	7.1	25.0	0.0	0.0	10.7	14.3	21.4	14.3	3.6	10.7	10.7	0.0	0.0
16	Ground floor of west wing (final part)	**10.2**	3.9	**2.7**	10.7	21.4	3.6	3.6	10.7	17.9	21.4	17.9	3.6	10.7	10.7	0.0	0.0

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Table 5 Correlations between the eye-tracking data and the participants' subjective evaluations given to the building's elements. The Spearman Rho test was used to calculate the correlations with the data shown in Table 4. Significant correlations at 0.05 are presented in bold (the number after the slash corresponds to the p-value).

	Observation time of the zones (OT)	Views of interest in which the zones were observed (VOIs)	Observation time per view of interest (OT/VOI)
Observation Time (OT)	—	**.91/.000**	**.87/.000**
VOIs	**.91/.000**	—	**.67/.005**
OT/VOI	**.87/.000**	**.67/.005**	—
Immediately noticed (drew attention at the start)	.50/.051	.29/.281	**.76/.001**
Attentively observed	**.64/.007**	**.56/.026**	**.71/.002**
Considered as important	.41/.115	.26/.325	.38/.144
Similar to a castle	.35/.189	.16/.548	.46/.071
Seemed antique	.24/.363	.02/.944	**.50/.048**
Aesthetically pleasing	**.56/.024**	.38/.146	**.78/.000**
Considered as high-quality architecture	**.72/.002**	**.53/.033**	**.83/.000**
Seemed to be supporting something	.37/.165	.24/.373	**.63/.010**
Caused doubts about the material	-.01/.974	-.16/.557	.18/.506
Perceived as protruding	.38/.150	.21/.425	**.57/.021**
Visually Salient	.43/.098	.28/.295	**.54/.030**
Similar to common objects	-.03/.903	-.08/.777	.01/.963
Caused doubts about what it is	-.10/.704	-.16/.568	.01/.973

questionnaire should be implemented, as not all subjective experiences manifest in people while observing a specific architectural work.

3.4.1. Comparison between the observation durations of the building's elements and what the participants indicate as observed attentively

The zones of the building most attentively observed according to the VIZOS participants are shown in Fig. 12. The figure also includes the total OT of the different zones of the building and the OT/VOI values, as previously presented in Table 4. The item on what the participants pointed out as attentively observed and the actual averages of the observation times per zone were compared. Besides focusing on the zones where the aspects are related, the succeeding sections will present the zones that received long observation durations in terms of both OT and OT/VOI but were not signaled as attentively

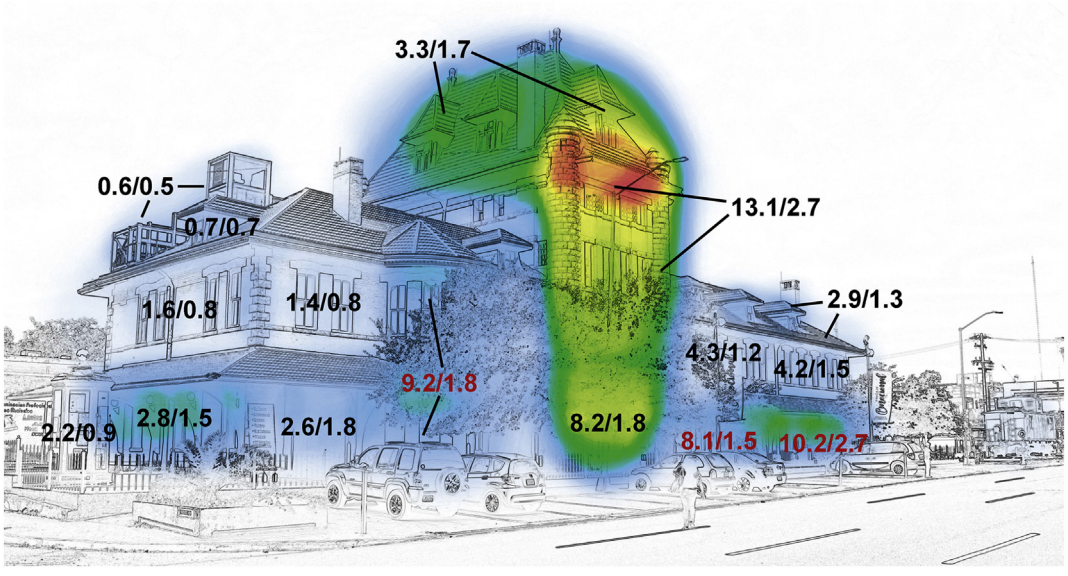

Fig. 12 Heat map showing what the participants pointed out as attentively observed (already shown in Fig. 10) and the average observation times (in seconds) per zone. The first number corresponds to the total Observation Time (OT), while the second number corresponds to the Observation Time per View of Interest (OT/VOI). The numbers in red indicate a clear discrepancy between the VIZOS' scores regarding what was attentively observed and the data obtained from eye tracking. See Fig. A4 in the appendix for other types of color vision.

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observed by the participants in VIZOS. The observation durations of those zones are highlighted in red in Fig. 12.

The bay window was noticed in both route directions and obtained high mean observation times, possibly because it was experienced as possessing high architectural quality (Fig. 11g) and it protruded from the façade surface (Fig. 11j). However, the bay window did not obtain a high score for the attentively observed item in the survey (Fig. 12). As previously discussed, the participants had to pass under trees when walking by the bay window; therefore, this was a portion of the route through which the participants walked quickly. Given that the bay window was not considered very important (Fig. 10c) and because it was hidden by trees, it seems plausible that the participants did not take the time to stop and observe attentively this element. In fact, while the main volume and its surroundings could be observed from a nearby stationary point for up to 9.4 s (mean for all participants), the bay window and its nearby areas were statically observed for no more than 2.4 s, suggesting that they were observed mostly while walking. It is likely that in certain cases, what a person considers to have paid attention to may be more related to static observation time rather than observation time in general.

In another aspect, the zones of the west wing's ground floor, which hold the historic objects, were observed for long durations (see red numbers on the right side of Fig. 12). They were also statically observed for up to 8.1 s. Nevertheless, these zones were not identified as attentively observed zones by the participants (only one of them appears in green in Fig. 12). This finding may be explained by the participants' attention, which was attracted by the cluttering of elements, and was distributed among the many doors, structures, windows, and historic objects in the zone instead of being focused on an individual element. Another possible reason for the discrepancy between the observation lengths of this zone and the evaluation of what had been observed attentively can be deduced from the VIZOS question "What part or zone of the building did you observe more attentively?" This item specifically asks about the building; the historic objects in that zone may have not been considered during answering.

3.4.2. Comparison between the building elements immediately noticed at the start of the route and their observation durations in the first VOIs

Most of the first comments given by the TAP participants on arriving to the starting point of their itinerary were related to the main volume (its roof or its height). Similarly, the eye-tracking participants noticed the elements of the main volume from the beginning of their walk, i.e., the hip roof, the turrets, and the windows between them. When answering the survey, the latter participants also indicated that the main volume's elements (Fig. 10a) captured their attention immediately at the beginning of the building exploration. Nevertheless, this aspect does not correspond to the short observation lengths obtained by those elements during the first VOIs (VOI 1 and VOI 2 for the east group, and VOI A and VOI B for the west group). The first impression and the whole experience towards the building may have been greatly shaped by the main volume; this main volume may have enhanced the interest and willingness of the participants to move further to appreciate the building in detail. Nevertheless, as the participants moved closer, their gaze was focused on other elements along the way.

3.5. Utility of attention heat maps in the research on the attention and subjective experiences produced by buildings

In the existing research on the attention to built environments conducted mainly with photographs, the zones with higher concentrations of observation durations or fixations (highly informative zones appearing in red in the heat maps) correspond mainly to doors, windows, signals, texts, people, paths, and vanishing points (Emo, 2014; Follet et al., 2011; Li et al., 2016; Ueda et al., 2017). Nevertheless, the zones of a scene or building experienced as being observed attentively do not necessarily correspond to red informative zones and therefore they are not evident in the heat maps of eye-tracking data. If heat map visualizations are interpreted following the idea that the red zones correspond to what people experienced more deeply or what was more interesting, then the conclusion would always be the same, that is, the doors and windows are the most attentively observed and interesting architectural elements in any case study. This explanation does not align with the evidence presented in this article. What concentrates the most fixations and what is consciously experienced as keeping attention and interest should not be treated as equal concepts. This statement demonstrates the importance of the simultaneous use of quantitative and qualitative techniques to study attention in real environments. Heat maps allow for the viewing of specific details of an architectural element that received high observation lengths. The red blobs in the heat maps and the AOIs with high observation lengths offer complementary information in the study of human attention in real-world environments. Nevertheless, interpreting the heat maps of eye-tracking data with neither the observation lengths of the building's AOIs nor the subjective data obtained with other complementary methods may be misleading and offer little insights into the study of attention in relation to human experience.

4. Discussion and conclusions

The present eye-tracking study made it possible to discover the process of paying visual attention to a real building that evolved during a route around it. The elements of the building that were observed, the lengths of their observation, and the points of view (i.e., VOIs) of the participants were recorded with a portable eye tracker. Two groups started their routes from opposite sides of the building. The results indicate that the role of exploration is to follow a route, allowing the parts of the building to be accessed and observed for a time independent of the origin point and the configuration of the route itself.

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The results on the relation between visual attention and subjective experiences produced by the building indicate longer observation times for architectural elements experienced as possessing high architectural quality and considered to be aesthetically pleasing. Moderate correlations were found between observation durations and survey items such as the impression that the architectural elements are structurally supporting something. Furthermore, the elements that were immediately noticed from the start of the exploration do not necessarily receive long observation durations at that moment, and the elements that received long observation durations for the whole itinerary are not always experienced as attentively observed.

The main subjective experiences that accompanied the participants' visual attention to the building were discovered through VIZOS whose questionnaire was created on the basis of the TAP carried out previously. In the TAP, the experiences with a building that people comment on while walking around are likely to show correlations with the observation times of the building's elements. The importance of conducting TAP and VIZOS to study visual attention and subjective experience emanates from this aspect.

In addition to the synergy of the qualitative and quantitative methods to study human experience with the built environment, another strength of the present study is that the stimulus was a real building instead of a photograph. The participants observed the building while walking around it; they were not restricted to a static position in front of a screen. In summary, the technical and methodological contributions of this exploratory study are as follows: (1) a special device was created to allow the eye tracker to record data under intense sunlight; (2) the attention paid to a building during free exploration was mapped on a series of views that enabled the researchers to discover how attention could vary depending on the point of observation and the starting point of the itinerary; (3) VIZOS was used in conjunction with eye tracking, which makes it possible to study subjective experiences that accompany the attention paid to building elements; 4) a new eye-tracking metric was introduced (i.e., the OT/VOI metric) with which the evaluations of the subjective experiences of the building's elements presented multiple correlations. These contributions are expected to extend the possibilities of conducting research about attention in real environments.

This study encountered certain limitations, the first of which is the small number of participants. This limitation is related to the considerable time needed to map the fixations on the VOIs. As stated in Section 3, the mapping was carried out manually using the eye-tracking software. The second limitation is related to the selection of participants. The recruitment of adolescent Architecture students aligns with multiple advantages mentioned earlier (e.g., their high willingness to explore). Nevertheless, the students belonged to the same age group and shared similar interest for buildings, thus leaving doubts concerning the subjective experiences and attention that people in general may have with the historic building. The third limitation of the present study resides in the participants not asked about their general appraisals of the building as a whole but only the appraisals of the architectural components. Further studies should be conducted to discover whether the general appraisals of a whole building (e.g., its interestingness) are related to longer observation times of it.

The findings related to attention and subjective experience may be specific to the studied building, e.g. the salient quality of the elements is not highly but only moderately correlated to the observation durations. Therefore, a similar research on other buildings with different characteristics, such as a contemporary building, should be conducted. The general hypothesis that motivates further research is as follows: what attracts the attention to a building and what causes interest and other experiences may be specific and unique to that particular case. Rather than looking for general laws about what people observe or experience of buildings, the focus should be on the richness and multiplicity of experiences that the field of architecture is able to generate and the distinctive qualities of each architectural work. Architects should expand their knowledge about how people experience a variety of environments and buildings and use the knowledge in designing innovative architecture works that generate positive experiences among users.

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Declaration of competing interest

There is no conflict of interest.

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Appendix. Figures for other types of color vision (to be found in the electronic version of the article only)

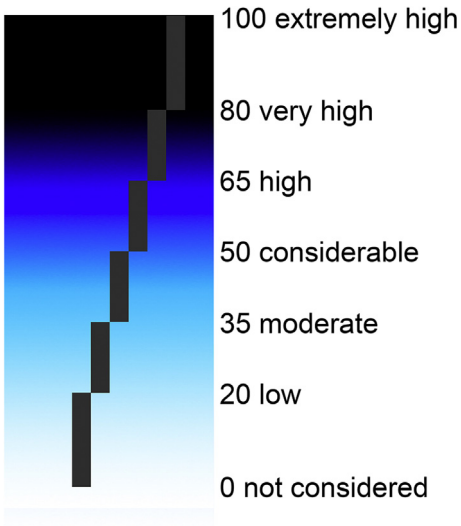

Fig. A1 Color sequence used in the Visuospatial Zoning Survey heat maps in order to show the participants' mean evaluations. Participants used two markers in order to circle specific zones of the building causing them a certain experience. A zone circled with the thick marker is the one that mostly caused an experience to a participant and it was assigned a value of 100. Other zones that produced such experience were circled with the thin marker and they were assigned a value of 50. The zones that were not considered as causing an experience obtained a 0 value. Heat maps of Figs. A2 and A3 show the mean values considering all participants of the VIZOS.

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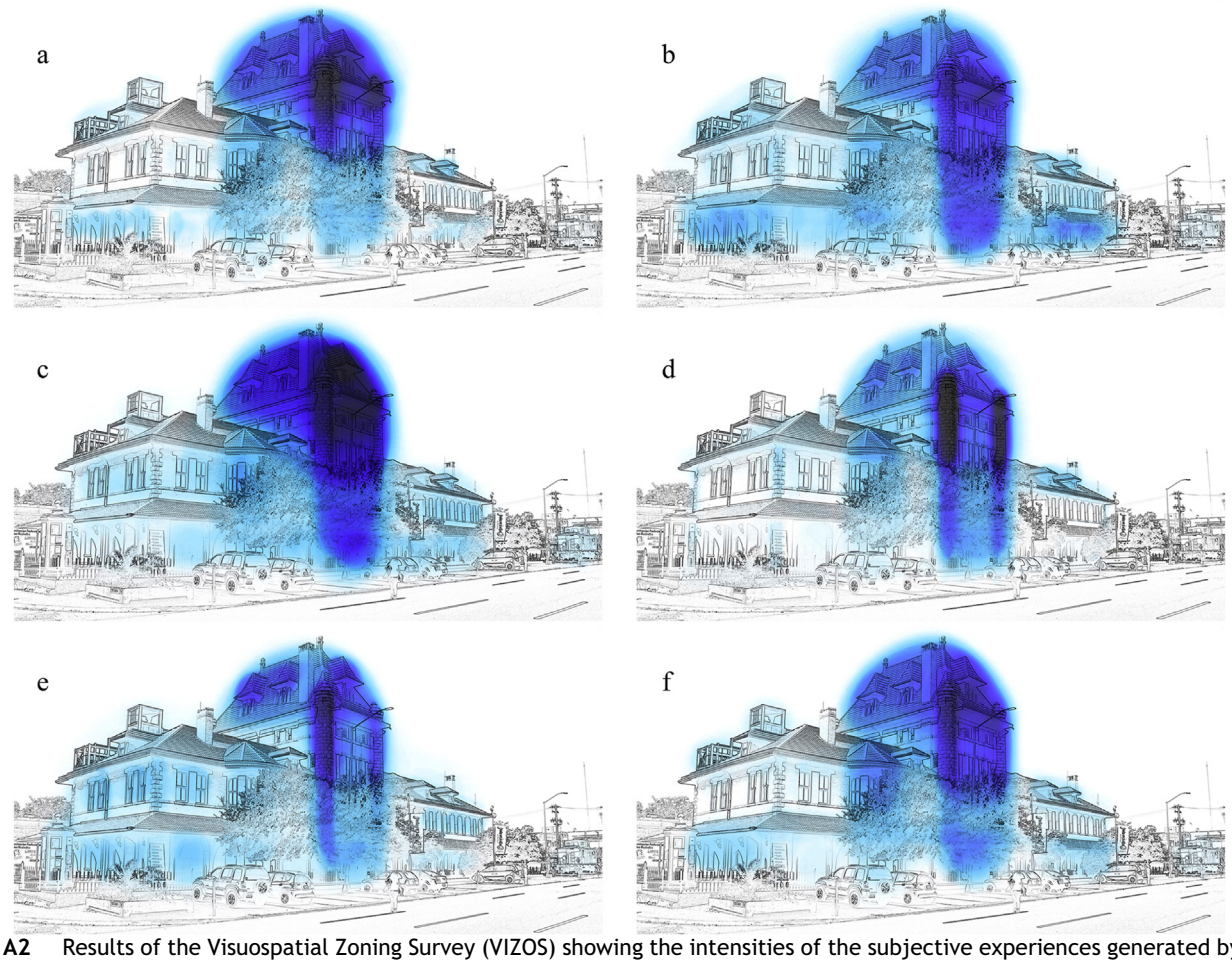

Fig. A2 Results of the Visuospatial Zoning Survey (VIZOS) showing the intensities of the subjective experiences generated by the different parts of the building as evaluated by the participants. Antigua Estación del Golfo, city of Monterrey, Mexico. (a) Immediately noticed zones of the building (which draw the attention of the participants at the start of their route). (b) The attentively observed parts of the building. (c) The most important zones of the building. (d) Elements that make the building similar to a castle. (e) Parts of the building that seem antique. (f) The most aesthetically pleasing elements of the building.

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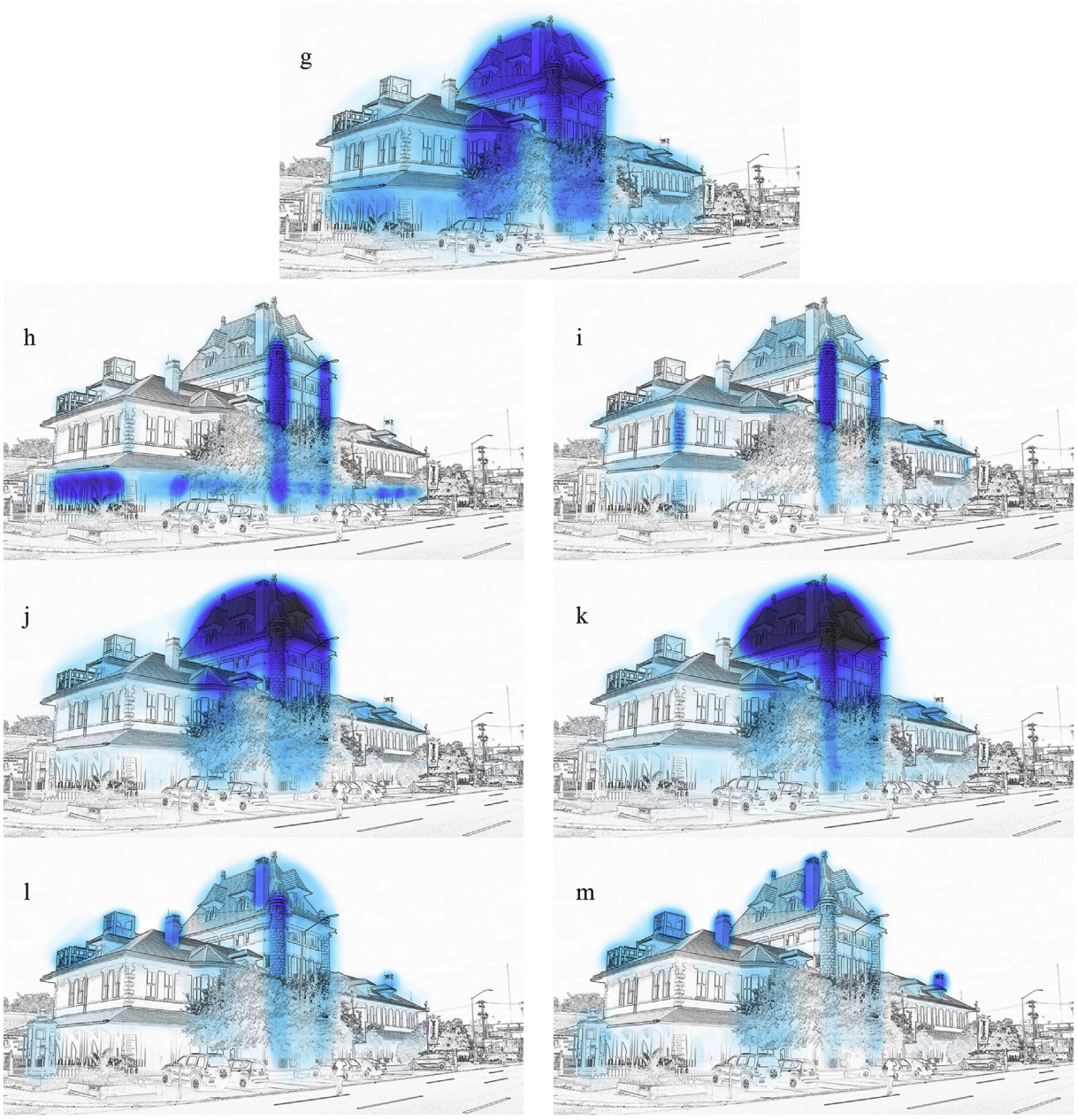

Fig. A3 Results of the Visuospatial Zoning Survey (continuation of Fig. A2). (g) Parts of the building that were experienced as possessing high architectural quality. (h) Elements that mostly seemed to be supporting something. (i) Zones of the building that raised the most doubts about the material they are made of. (j) The most protruding elements of the building. (k) The most visually salient elements (the attention-grabbing and eye-catching zones according to the participants). (l) Elements of the building that were found similar to common objects or gave the impression of being something they are not. (m) Parts of the building that raised doubts about what they are or what their purpose is.

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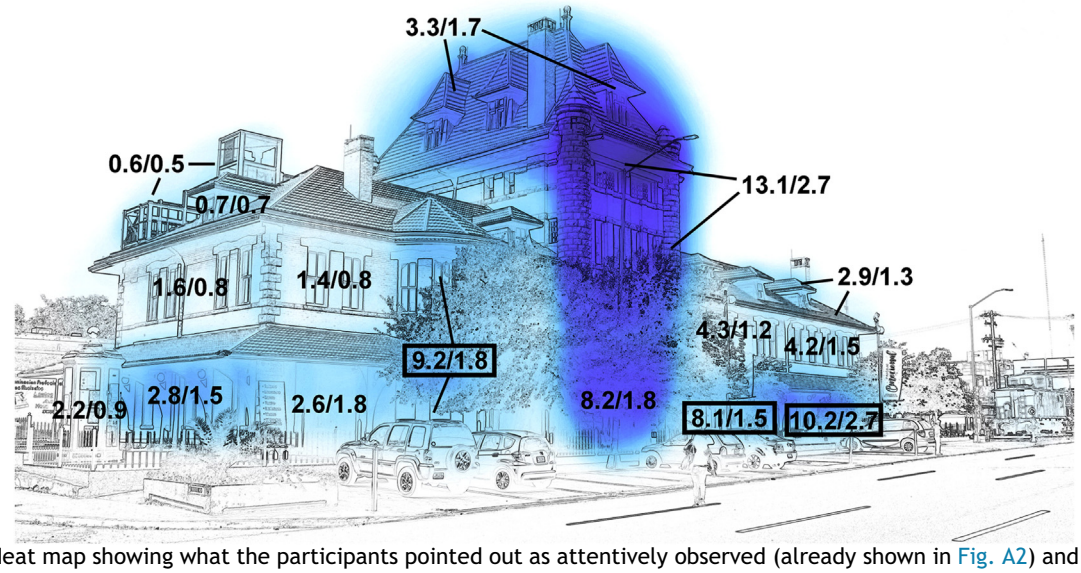

Fig. A4 Heat map showing what the participants pointed out as attentively observed (already shown in Fig. A2) and the average observation times (in seconds) per zone. The first number corresponds to the total Observation Time (OT), while the second number corresponds to the Observation Time per View of Interest (OT/VOI). The framed numbers indicate a clear discrepancy between the VIZOS' scores regarding what was attentively observed and the data obtained from eye tracking.

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