Article

Study on Liking and Disliking in the Historical Urban Landscape of Ibarra, Ecuador

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Abstract: This article presents the results of a study on opinions on the elements and spaces of the historical urban landscape in Ibarra, Ecuador. This research aimed to propose an objective way of interpreting historical landscapes based on the opinions of people who frequent those places. Our hypothesis was that personal characteristics (e.g., age, gender, educational level, and frequency of visits) condition people's judgments of urban landscapes, and we aimed to establish which of these characteristics were the most influential. A survey was conducted in the place of study, and passersby were asked to mention three elements and spaces that they liked or disliked. The methodology had two parts: a descriptive statistical analysis that was used to locate each point on a map and a logistic regression model to study the relationships between people's opinions and their personal characteristics. The results show that (1) it was possible to demonstrate the elements and spaces that were liked and disliked in proportion graphs and planimetry and (2) that an explanatory analysis of opinions could be carried out using a logistic regression model to study significant characteristics. We found that the frequency of visits was the most significant characteristic for the elements and spaces that were disliked. We also concluded that the results of this study could provide objective tools for obtaining the opinions of people and combining them with planimetry. Additionally, the results could be used to establish priorities for urban authorities regarding improvements and interventions for elements and spaces that people like or dislike.

Keywords: local knowledge; social cohesion; urban design; historical landscape; Ecuador

1. Introduction

1.1. Study Overview

Urban images refer to mental schemes that people create about elements and spaces they remember. For historical urban landscapes, these schemes are configured from representative signs of culture, local knowledge, and social cohesion, which can occasionally be affected by conflicts.

Understanding the development of these landscapes in relation to the current moment is vital to preserve the occupying peoples' history, culture, and values and to showcase their heritage to future generations. It is fundamental to understand that decisions based on people's opinions are more conducive to sustaining historical places. The visual and functional landmarks of urban spaces express the diversity of their shared sociocultural and natural heritage and form the basis of the identities of historical landscapes [1].

Although there are different perspectives regarding people's behavior when judging environments, we were interested in approaches that focus on the perceptions of urban environments and understanding the relationships between people and those environments. Nassauer et al. indicated that in order to further support wellbeing, the scales of greenspace investigations should be more closely related to both the scales of everyday neighborhood

experiences and the scales of potential landscape interventions. A greater understanding of how everyday experiences of greenspaces affect wellbeing is needed [2]. This could then also be applied to urban landscapes if we integrate it with a focus on improving design projects and transferring management strategies in a historical and cultural sense [3,4]. Previous studies have shown that improving the quality of historical urban neighborhoods can contribute to higher social sustainability [5].

Historical landscapes reflect social cohesion [6–8] by showcasing the past and elements of values and cultural identity. Buildings and squares are characteristic of these places, especially in Latin American cities. They all share a certain heritage in terms of their layout and architecture, which express the character of these urban spaces. However, the current conditions of these places can cause deteriorations in the perceptions of people who visit them. Additionally, not all spaces and buildings are remembered by people, even when they have significant historical value.

Public regulations and institutions in Ecuador [9] indicate the importance of historical value and its contribution to the sustainability of cities. So, how do we establish which elements of urban spaces are the most valued? Are there clear connections between them? Are all buildings and historical spaces valued in the same way? Can priorities be established to improve built heritage based on what people value? Are there differences between the elements and spaces that are remembered by people who frequent or live there and those who do not?

The analysis of images and preferences [10–13] addresses the human mind and how it apprehends, knows, interacts with, and interprets information from the outside world, based on sequences of elements that guide the interpretation of urban spaces. "Urban image" [12] is the synthetic graphic representations that are created by identifying patterns in urban cognitive maps. "As a product of the orientation process, route-based knowledge is considered the most basic type of spatial knowledge. Signs and routes between places and/or people are often the first things learned when traveling through a new environment" [14]. Finding landmarks within landscapes contributes to place attachment and psycho-emotional experiences that are related to human factors [15–17].

Other authors have argued that urban design lacks theoretical support from scientific evidence [18]. Often, design decisions are made without the necessary evidence from sufficiently clear studies. The work we present points in this direction. The study took an ecological view about perceptions, mental images, and memories because they are all integral parts of environmental cognition processes [14,19–21].

1.2. Perception Assessment and Urban Images

In environmental cognitive processes, remembering phenomena implies the creation of mental images based on structured sequences of identified elements. This approach has two parts: remembering and valuing.

The way in which people perceive and organize spatial information through "mental maps" [12] is configured by identifying five elements: paths, borders, districts or urban sectors, nodes, and references. When these elements and their relationships within public spaces are remembered, we can create structured images of those spaces [12,15,22,23]. Identity and structure constitute components of the meanings generated from spatial forms and are related to emotions, place affection, and place attachment [17,24,25]. However, we have to ask whether meaning is related to the characteristics of a subject and which characteristics condition what people find attractive or not.

Assigning value to identified elements assumes that our responses are based on emotional satisfaction, which contributes to physical and mental wellbeing. The value of place attachment is in maintaining the attraction and significance of places by avoiding the loss of features that are meaningful and familiar to their users [6]. Therefore, we believe that it is necessary to identify elements and spaces that do not fit in a given place.

Aguilar explained that "the aesthetic pleasure that the landscape grants is, without a doubt, an educational process that has all its references in culture. The perception of

the landscape as 'landscape' has a different relationship depending on the characteristics, the cultural and aesthetic baggage of the observer" [26]. Additionally, other authors have suggested that people remember objects or spaces according to the type of daily interactions they have with them [2,5,17]. Can we use this notion to deduce how people assign value (positive or negative) to what they remember? Is this based on their accumulated aesthetic experiences and is it significantly related to their age, education, or familiarity with the place?

People's opinions can be related to factors that have been described previously [25], including "pleasure and exaltation" in aesthetic judgments according to the quality of the landscapes. Previous works [25,27] have identified both of these factors as the main "affective responses" manifested by individuals in their physical relationships with landscape. What these authors stated some time ago is still valid today, as can be seen in [17]. Such responses constitute valuable conceptual and empirical tools linked to affective psychological functioning, which adds to the idea of wellbeing. The affective state is defined as "a neurophysiological state that can be consciously accessed as a simple, non-reflective feeling that is an integral combination of hedonic values (pleasure–displeasure) and arousal (passive–active)" [13]. Pleasure is also equivalent to the assumptions of Chenoweth and Gobster [28], who affirmed that for feelings or emotions derived from aesthetic experiences, landscapes are evocative of pleasure, pride, happiness, relaxation, exploration, and exercise [29]. A positive valuation can be considered a measure of subjective wellbeing [7,30].

Supported by the recognition of affective [31] and cognitive relationships, this type of research explores the ways in which built environments affect behavior [28]. Interesting activities and the beauty of elements produce pleasurable aesthetic experiences [17,21,31]. It has been argued that built environments have "unique potential to influence our quality of life and wellbeing" [7]. They can also reinforce a sense of community identity [15] in that they can satisfy needs that are associated with social interactions, privacy, and civic participation. Such needs have been identified by Matsuoka and Kaplan as key parts of the design process that can be used to assess the relationships between people and the environments in which they live [32]. Other authors have affirmed that urban design must seek to influence "cognitive properties such as pleasure, ..., significant for an appropriate physical-social context" that supports mental health and the idea of wellbeing in its broadest sense [33].

In relation to value, the Urban Landscape Forum has suggested considering different dimensions [34]. Nevertheless, for this work, two dimensions were of particular interest: the space–time dimension, expressed in keys and structured tours of the city, and the sociocultural dimension, where landscapes are considered elements of heritage, whose visual appearance is key to identity and societal cohesion. McHarg pointed out that there is a system of natural and social values identified through the "elaborated and received form" [35]. Elaborated form refers to the presence of key elements within landscapes. Received form refers to the perception of landscapes, i.e., how people value them.

The approach of environmental psychology focuses on evaluating people's opinions on elements they remember in relation to their aesthetic judgments [17]. Surveys are the most used instrument for this type of research. In this regard, Galindo and Corraliza proposed three categories for the study of people's opinions: "(a) descriptive scales, referring to spatial configuration properties and physical attributes of the stimuli; (b) affective scales, fundamentally referring to the reactions of the subjects while they are exposed to the landscapes under study and (c) evaluative scales, indicative of the value and/or aesthetic quality of the environments of interest" [36]. The first consists in identifying elements, the second refers to the influence of personal characteristics, and the third category identifies the assigned value, for example, whether a person likes or dislikes a landscape.

Identifying and assigning value to landscapes are conditioned by the personal characteristics of the subject, and when this occurs in interaction with situations that produce pleasure, the landscapes are perceived as pleasant.

Luo et al. conducted a study based on a survey of 227 subjects on landscape preferences, which considered "perceptual priority (PP) and cognitive preference (PC)" from two approaches: perceived landscapes and cognitive landscapes. The first was objective, while the second was subjective, taking into consideration the fact that the answers were conditioned by age, sex, education, etc. They determined that there is a moderate preference for natural landscapes over artificial landscapes, based on the demographic characteristics of the subjects. In particular, "age and education showed a significant influence on the preference of the landscape" [19].

Different investigations have indicated how people respond to the meaning of places and the ways in which the brain reacts to them [37]. The results have emphasized that this type of study could contribute to social, urban, ecological, and psychological fields, among others, in which landscapes are valued as part of cultural identities. In other words, people feel appreciation and a sense of wellbeing in well-known places with which they identify culturally. These affective feelings are involved in a variety of affective and behavioral dimensions, based on memories, social connections, and emotional bonds. They highlight the value of natural landscapes compared to built landscapes and affirm that greater visual attention is required, hence our interest. Other authors have also agreed on this approach regarding emotional bonds (positive or negative) [20,37,38].

One of the conclusions regarding the brain's medial prefrontal cortex (mPFC) was that "activity in the mPFC for significant places reflects conscious access to positive memories and feelings associated with that place. Such personal memories and feelings of places contribute to appreciating the place and perceiving its restorative qualities" [37]. That particular study had 19 participants (10 females and 9 males, aged between 19 and 53 years), who were shown images of landscapes or objects with which they identified. They were also shown other images of rural and urban landscapes for comparison.

Regarding the concept of our preference for naturalness, some studies have inspired further urban research. Ode et al. reported results from their study of 703 respondents. They found that the two demographic factors that most contribute to the formation of preferences are gender and having a profession related to landscapes [39]. This implies that knowledge (education level) is related to naturalness.

Therefore, it is necessary to understand people's responses to elements that they remember and with which they identify. The elements and spaces identified on maps and the value that people assign to them (like or dislike) are very important, even more so within historical landscapes. Appropriate visibility within the wider context of cities and visual connections between elements and spaces are essential for improving urban structure [15]. This is because the emotions and feelings that people have for places or landscapes are very important for place attachment [6,8]. Additionally, the relationships between those responses and personal characteristics (such as age, sex, education, and familiarity with the place) can be altered by frequenting or visiting the places.

Place attachment theory may help us to understand the reasons why people react in specific ways to certain elements within landscapes [22,40]. Additionally, it is necessary to investigate why people like familiar places.

In this theoretical context, we studied historical landscape in Ibarra, Ecuador, to showcase the city's tangible and intangible heritage, as evidenced by its regular and compact urban layout, squares, architecture, and social and cultural practices. Although its significance was established in a previous study [41], its elements appear disconnected and deteriorated. Furthermore, there are no objective criteria allowing urban authorities to judge which elements and spaces people appreciate. This must change in order to improve urban quality.

Therefore, we present the results of our study of opinions on the elements of historical landscape in Ibarra. This study had two objectives. The first objective was to identify the elements and spaces that people like or dislike on maps and establish which urban structures people remember. We considered that elements represented on maps could be useful for local authorities when making informed decisions [4]. The second objective

was to understand the relationships between the identified elements and spaces and the personal characteristics of the participants. The value of place attachment is in sustaining the attraction to [6] and meaning of places. Thus, it is important to identify elements and spaces that do not fit within a given place, especially within places with which people are familiar.

The idea was to find out how we could guide the priorities of authorities to improve historical landscapes based on people's opinions.

We hypothesized that identified or remembered elements could be represented on maps by considering the frequency of answers, which we then related to the personal characteristics of the participants, especially familiarity with the place. We proposed that this affected value judgments or "affective responses". It was also conjectured that these characteristics condition people's judgments, and we aimed to discover which characteristics were the most influential.

To carry out this research, a survey was designed with the objective of determining the identity and structure of people's urban image. This instrument was applied over two days in November 2017. The data obtained were prepared and arranged in a Microsoft Excel file and processed using R statistical software [42]. A logistic regression model was proposed as the statistical tool for measuring the relationships between human factors (i.e., personal characteristics) and survey responses.

2. Materials and Methods

2.1. Spatial Scopes of Historical Landscapes in Ibarra

Ibarra is located 2200 m above sea level in a 242 km^2 valley in northern Ecuador. The character of this city is considered to be a crossover between the country's capital Quito and its neighbor Colombia. Its historical landscape has been configured according to the Spanish colonial model since its foundation in 1606. It has a regular layout in the form of a checkerboard, made up of 81 blocks. Downtown Ibarra is limited to the east and west by the Tahuando and Ajaví rivers, respectively. These natural elements serve as essential transport links, as well as roads that connect a system of agricultural cities, which was typical of the colonial period. The church and monastery of Santo Domingo, together with La Demarcación Street (now Colón Street), mark the northern and southern limits of the city (Figure 1). The Imbabura volcano is also located to the south and serves as a scenic backdrop for the small city.

After the strong earthquake of 1868, the city was rebuilt with wider streets and sidewalks, but it maintained its grid layout, small block structure, and classic European republican decorative style. The squares contain parks because of the greenspace landscaping design. The city then remained relatively unchanged until the early 1950s, when alterations were made to its borders, with the subsequent loss of the rivers as important natural remnants of the colonial era. In 1999, the first inventory of patrimonial real estate was carried out, most of which is contained in the historical downtown area [43]. Ibarra was the third city to be established in Ecuador and has the most registered and inventoried heritage assets. Its historical landscape is an important attraction for tourists.

2.2. The Survey

We applied our survey as a data collection instrument using statistical sampling, which was directed at passers-by in each place and was uniformly distributed (Figure 1).

Before applying the survey, we conducted a count in each sector to estimate the number of people who passed through the historical downtown area in a typical week. This amount was estimated to be 110,000 people per week (with possible repetitions). For all practical purposes, no problems were foreseen in enrolling interviewees, considering this large population compared to the city's total estimated population, which was around 140,000 according to the last census carried out in 2010. Additionally, we asked a randomly selected group of passers-by (1850 people) the key question of the study: in terms of its beauty, what do you think of this place? The intention was to preliminarily determine the

proportions of people who judged the aesthetics of the historical landscapes favorably and unfavorably and then incorporate these data into a definitive calculation of the sample size.
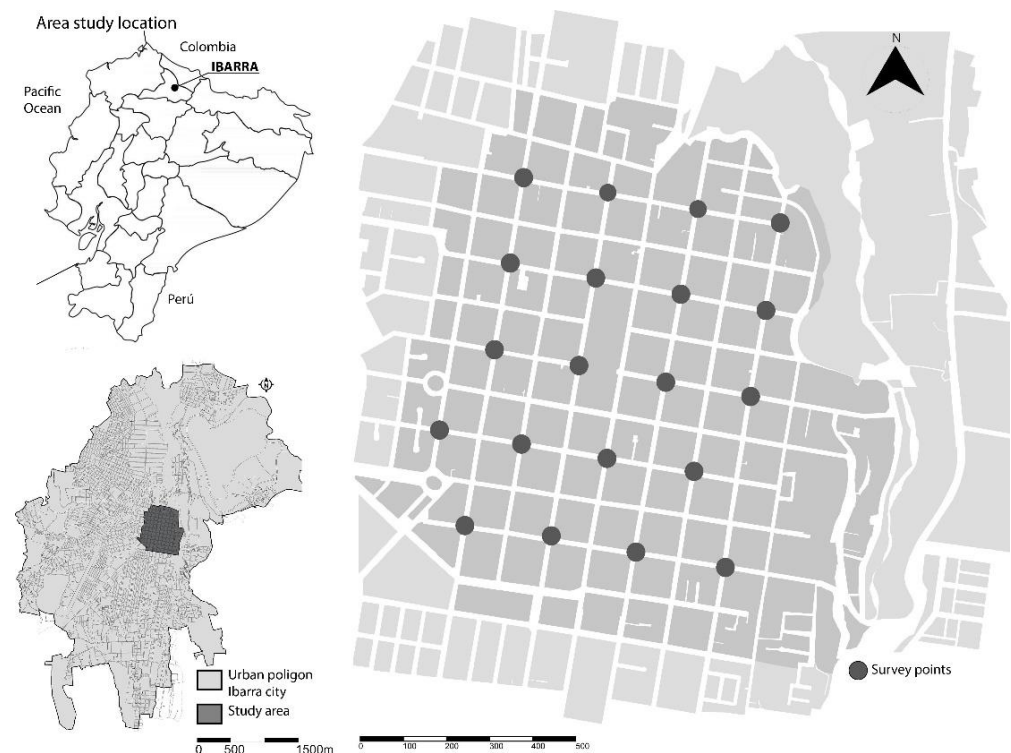

Figure 1. The locations of our survey on people's urban image of the historical downtown area of Ibarra [44].

Considering success (p) as an unfavorable response (since our interest was centered on problems or disagreements), a value of $p = 0.47$ was estimated for the pilot sample. Consequently, the favorable response had a value of $1 - p = 0.53$. With these proportions and setting a maximum allowable estimation error of 0.05, a definitive sample size of 399 people was calculated, using the formula for calculating the simple random sampling of proportions in finite populations [45]. In total, the survey was applied to a sample of 462 people, with an estimation error that was slightly lower than expected at the time of planning.

Starting with 11 open questions, the survey was carried out over two different days. The data were later transcribed, organized, and adjusted, resulting in 56 variables.

The questions of interest were the following:

- Likes: What are the three places, objects, buildings, or roads that you like the most in the historical downtown area of the city of Ibarra?
- Dislikes: What are the three places, objects, buildings, or roads that you most dislike in the historical downtown area of the city of Ibarra?

Each of these questions produced three freely given answers from the interviewees and induced three variables, one for each place mentioned. Each variable was then carefully reviewed, coded, and cross-referenced.

The order in which the places were mentioned was important, considering that people tend to mention what they remember the most first. However, on this occasion, the analysis was limited to the number of mentions, regardless of the order.

2.3. Quantitative Data Analysis

2.3.1. Logistic Regression Model

We supposed a Bernoulli phenomenon; that is, an experiment whose result in relation to an individual could only be a success or a failure (or equivalently, the presence or

absence of a characteristic). We also supposed that the outcome of the experiment was determined by certain measurable personal characteristic(s) (and possibly the directions of the relationships, if any). At this point, a model that could make it possible to estimate the probability of the success (or failure) of responses and relate it linearly to measured personal characteristics seemed plausible.

In 1944, Berkson introduced the logistic regression technique for continuous explanatory variables and its counterpart (the logit model) for categorical explanatory variables or explanatory factors [46]. The logit function is defined as follows:

$$logit(p) = log\left(\frac{p}{1-p}\right), \text{ for } p \in (0,1) \tag{1}$$

Suppose that p represents the probability of the success of a dichotomous phenomenon. In that case, the logit represents the natural logarithm of that possibility, which is understood to be the ratio between the probability of success and the probability of failure. The option takes values between positive real numbers and their logarithms along the entire real line. So, when we have a sample of size k, we can postulate

$$logit(p_i) = x_i'\beta, \ i = 1, 2, ..., k \tag{2}$$

where x_i' is a row vector whose elements are variables or explanatory factors observed in the i-th individual in the sample and β is a column vector of unknown parameters that must be estimated from the data.

McCullagh and Nelder showed that the logit model belongs to the family of generalized linear models [47] (see also [48]) when the response variables are dichotomous or binomial. They also developed the statistical details of the model, including the estimation of its parameters using the reweighted iterative least-squares method, its goodness-of-fit forms, and its hypothesis tests, among others.

In this work, we proposed logistic regression models to try to isolate the response variables of "mentioned as liking or not mentioned" and "mentioned as disliking or not mentioned" for each building or place from all responses, with the explanatory variables of gender, age, educational level, and the frequency of visiting the site.

2.3.2. Proportion Graphs and Logistic Regression Model

Proportion graphs were used to present the percentages of responses for the buildings and places with the most mentions.

A logistic regression model was proposed to study people's opinions, which used mentions of buildings and places as response variables (i.e., whether an interviewee mentioned it as a like/dislike (True) or did not mention it (False)).

The number of places that were mentioned positively was 150 out of an amplified sample of 1150 places, while the number of places that were mentioned negatively was 217 out of an amplified sample of 929 places. In both cases, the amplification of the sample was carried out by repeating the personal characteristics of the interviewee for each of their three mentions. Additionally, in both cases, any records with non-responses for any of the variables considered were removed.

2.4. Planimetry

To spatially locate each of the points mentioned by the respondents, a high-definition raster image of Ibarra was superimposed onto a map in .dwg format (Autodesk's AutoCAD 2022 software). This was then georeferenced using UTM coordinates (Universal Transverse Mercator, South American Datum, 1956). We drew a 100 m × 100 m grid and drew Cartesian axes along the photo's edges, which were graduated to the same measurement.

To evaluate the positive and negative opinions of places, the relative frequencies of each response were used, scaled to a base size of a 30 m radius in the georeferenced image. The location of each object as a point on the plane was assigned a different color.

To graph both variables together, smaller circles were superimposed onto larger circles to show whether there were more positive or negative mentions. The streets at the ends of the study area were marked, and arrows were added to indicate their directions.

3. Results

3.1. Descriptive Analysis of Opinions

3.1.1. Description of Positive Opinions

The interviewees mentioned a total of 150 different places within the historical landscapes of Ibarra. Figure 2 shows the percentages of the 12 most frequently mentioned places.
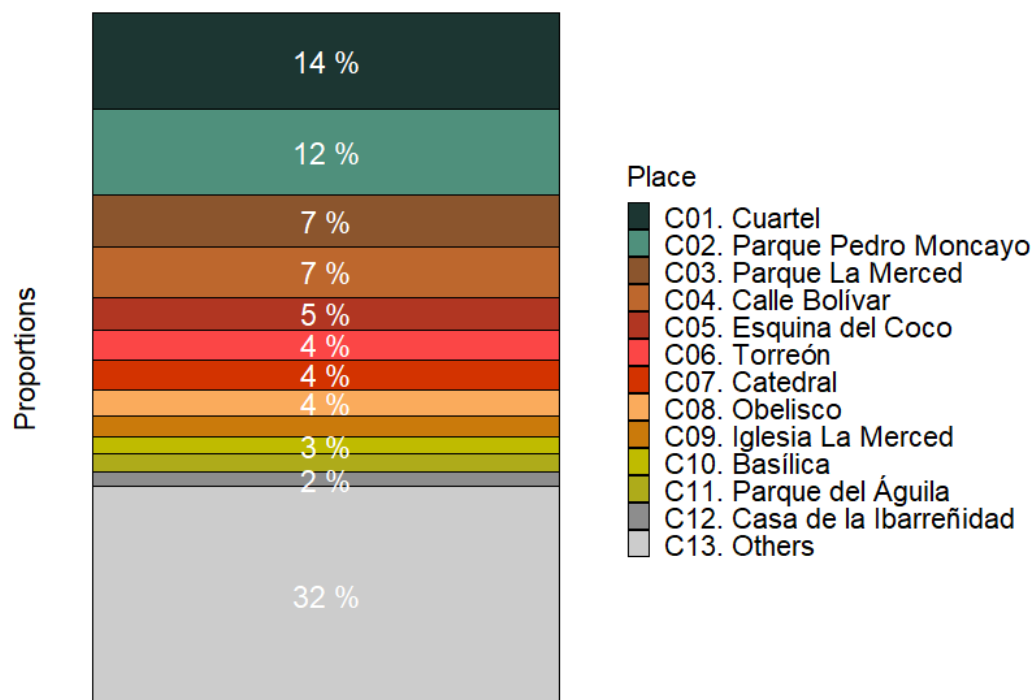

Figure 2. The proportions of positive mentions of places.

The three places that the interviewees liked the most were El Cuartel, Pedro Moncayo Park, and Bolívar Street (also known as La Merced Park) (Figure 3), which are located in the foundational nucleus of the city, with 14%, 12%, and 7% of the interviewees mentioning them, respectively. These percentages were calculated considering the amplified sample, allowing the same interviewee to mention several places in different orders. The natural beauty and proximity of these places were determined to be the reasons why people liked them.

Figure 4 shows a map of the places that were mentioned positively by the interviewees. Proportionally, the frequencies with which these places were mentioned were added to the map.

The mentioned places were all part of the heritage of the historical landscape. According to proximity of the identified points on the map (Figure 4), three distinct sectors were observed:

1. The foundational nucleus of the city, which is formed by the elements close to the Pedro Moncayo and La Merced parks;
2. To the south is the Esquina del Coco and Águila Square, which join at Bolívar Street;
3. To the southwest is the obelisk, which is near the train station.

These three sectors marked a sequence from the center of the city to the south, which could well be related to the frequency and intensity of the use of these spaces. Bolívar Street stood out as the place with the most positive mentions.

Figure 3. El Cuartel, Pedro Moncayo Park, and Bolívar Street.

To the north, Boyacá Park and Santo Domingo church were not mentioned with the same intensity as the other places and could be considered to constitute a fourth sector.

3.1.2. Description of Negative Opinions

The interviewees negatively mentioned a total of 217 different places in the historical landscape of Ibarra. Figure 5 shows the percentages of the 12 most frequently mentioned places.

The three elements that the interviewees disliked the most were the old Teodoro Gómez school, Bolívar Street, and Sánchez-Cifuentes Street, with 8%, 6%, and 5% of the interviewees mentioning them, respectively (Figure 6). As before, these percentages were calculated by considering the amplified sample. It can be seen from Figures 4 and 5 that there was a greater consensus regarding positive opinions than negative opinions. In the latter case, the dispersion of the places mentioned was greater.
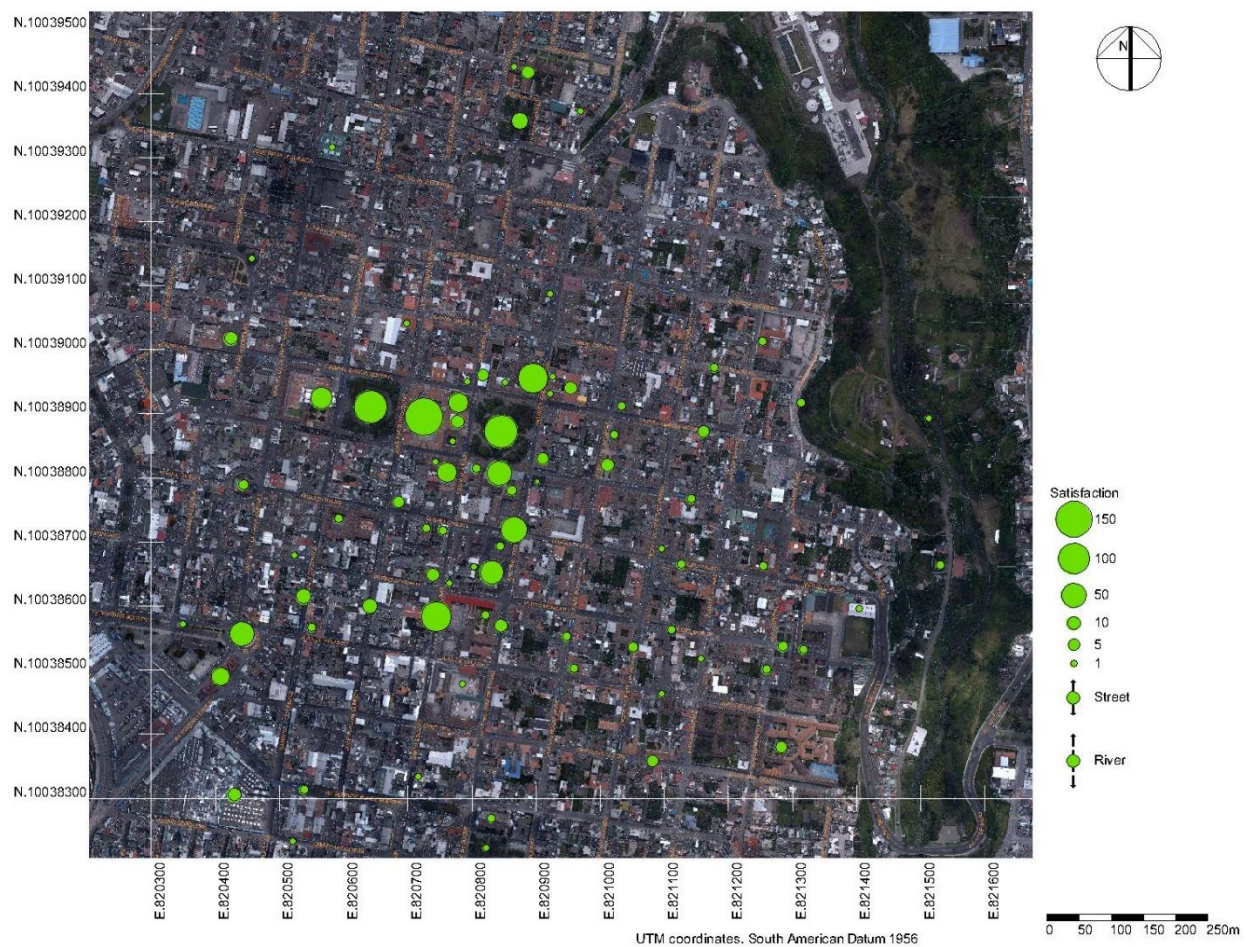
Figure 4. The planimetric locations of the places that the interviewees liked (larger circles demonstrate higher relative frequencies of mentions).
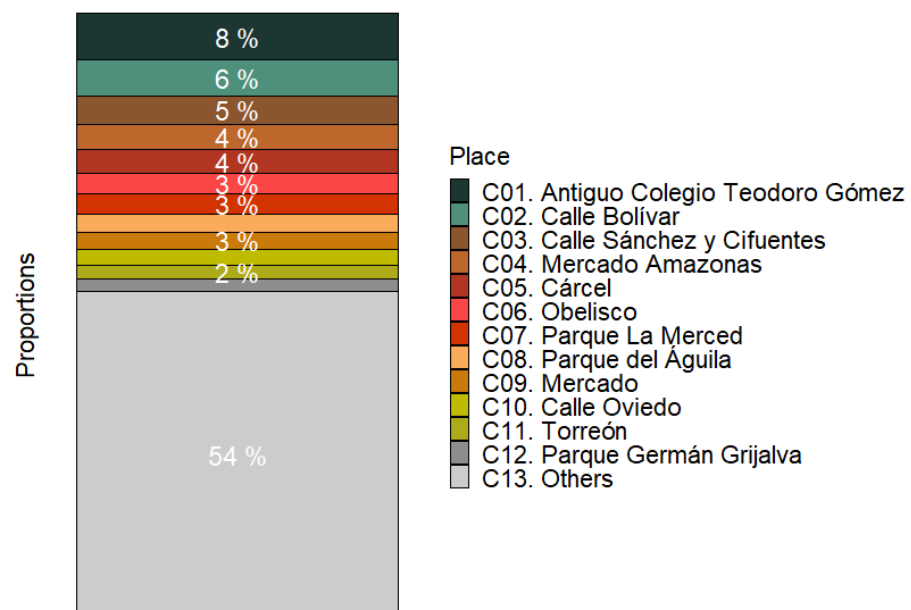

Figure 5. The proportions of negative mentions of places.

Figure 6. The old Teodoro Gómez school, Bolívar Street, and Sánchez-Cifuentes Street.

In Figure 7, the places that were mentioned negatively are indicated. As before, proportionally, the frequencies with which these places were mentioned were added to the map.

Although the elements were more dispersed, Figure 7 highlights four grouped sectors:

1. The central nucleus of the city (the old Teodoro Gómez school, the Torreón, the Municipality, and La Merced and Moncayo parks);
2. To the southwest is the obelisk and the Amazon Market;
3. To the northeast is the jail ("La Cárcel"), which is linked to the edge of the slope of the Tahuando River and is a predominantly residential sector;
4. To the northwest is the Santo Domingo market, which is linked to Boyacá Park to the north.

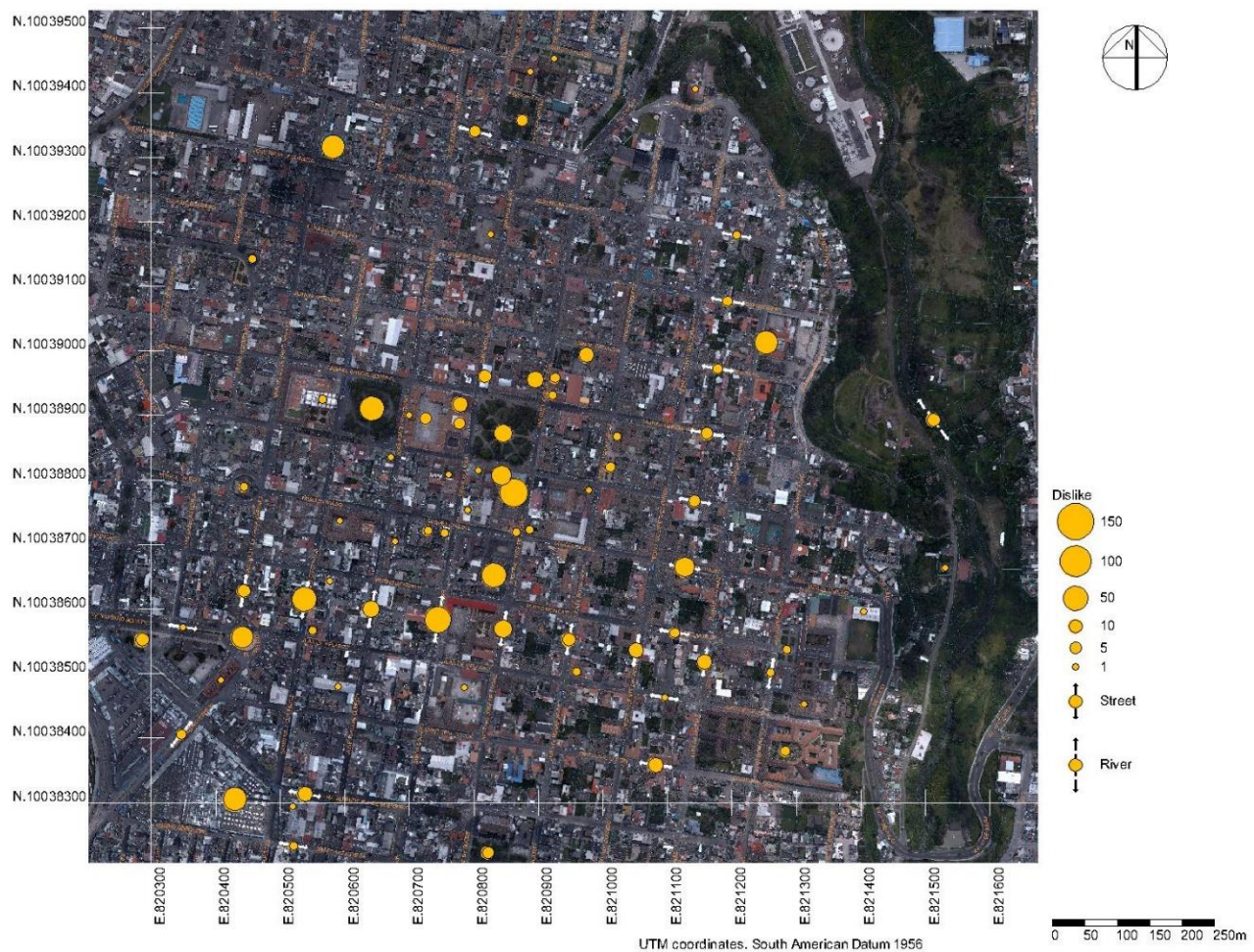These elements are concentrated in sites with institutional uses.

Figure 7. The planimetric locations of the places that the interviewees disliked (larger circles demonstrate higher relative frequencies of mentions).

All streets were identified on the map. Sánchez-Cifuentes Street runs from the obelisk to the church and La Merced Park. Sucre Street and Salinas Street run in a north–south direction, while Miguel Oviedo Street runs in an east–west direction. Miguel Oviedo Street also runs through the historical downtown area, starting from the western edge (Roundel "Cabezas Borja"), passing through the "Esquina del Coco", and ending at the eastern edge (San Francisco school) and the stairway to the slope of 17 de Julio. The largest number of disliked elements were concentrated along Sucre Street. The jail ("La Cárcel") is located on Salinas Street to the northeast.

3.2. Net Positive Opinions

The net frequency of the positive mentions of each place was calculated considering the numbers of positive and negative mentions.

Figure 8 shows the places with the most positive and negative mentions. The two circles for each place represent the frequencies with which they were mentioned positively or negatively, with the lowest frequency in the foreground and the highest in the background.

From the figure, it can be seen that the elements were mostly concentrated in the central, foundational area of the city. This first historical area was established by a previous heritage study [41]; however, in the figure, it appears as though the San Francisco school was not important (Figure 9).

1. El Cuartel, Pedro Moncayo Park, La Merced Park, and the cathedral stood out in terms of the number of positive mentions. However, opinions on La Merced Church and Ibarreñidad House were more negative. Within this central nucleus, the old Teodoro

Gómez school stood out in terms of the number of negative mentions. To the south, the "Esquina del Coco" received more positive mentions than negative mentions;

2. The Santo Domingo Market to the northwest and the jail ("La Cárcel") to the northeast received mostly negative mentions;

3. The train station and the obelisk to the southwest received mostly positive and negative mentions, respectively.
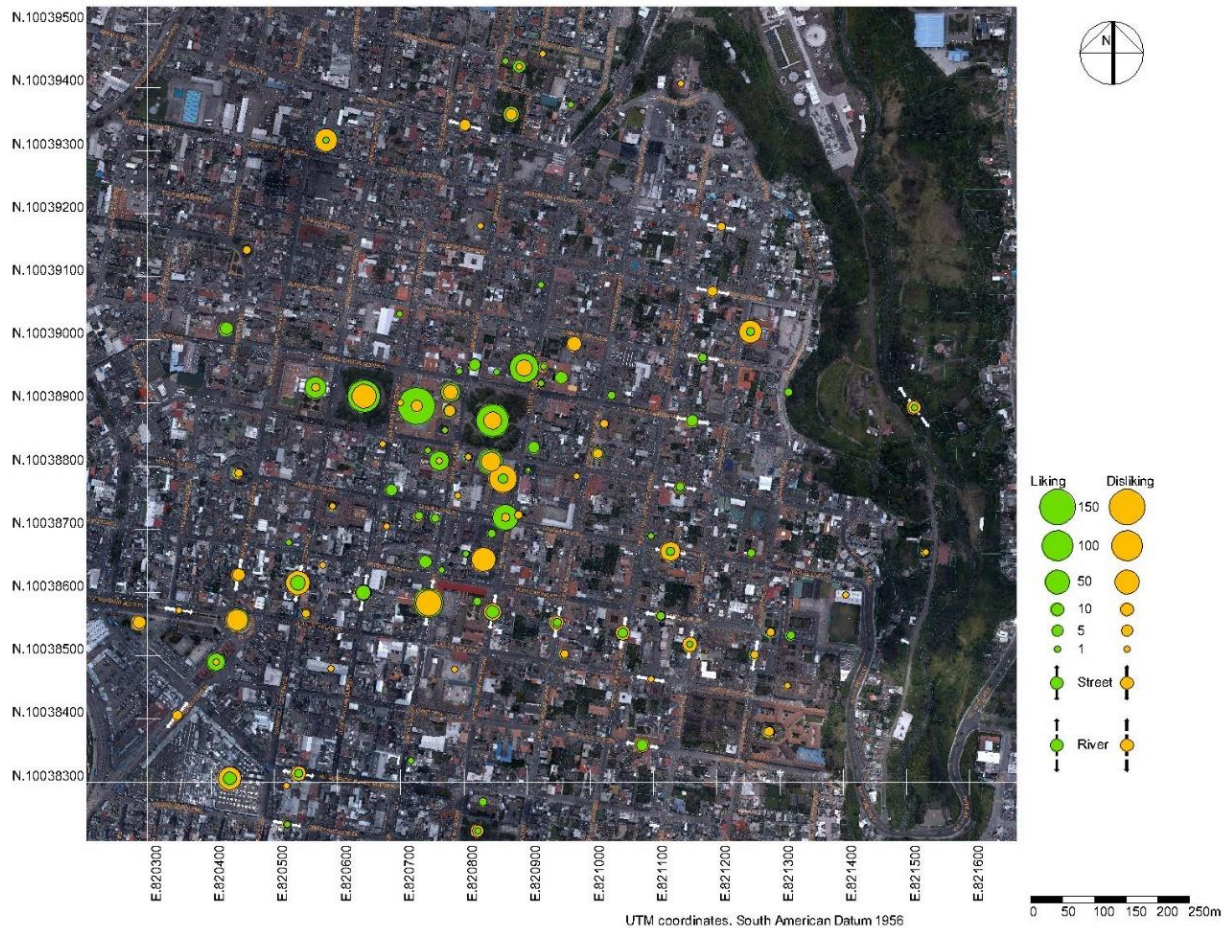

Figure 8. The places with the most positive and negative mentions among the interviewees (larger circles demonstrate higher relative frequencies of mentions).

As for the streets, Bolívar Street stood out as the most liked. Sánchez-Cifuentes Street, Oviedo Street, Germán Grijalva Street, Sucre Street, and Salinas Street were the most disliked areas within the study sector.

The map in Figure 9 shows the places and buildings that were the most liked and disliked among the interviewees.

3.3. Explanatory Analysis of Positive Opinions

For each of the 150 buildings or places that were liked, we attempted to fit a logistic regression model, dichotomizing the response variables as "mentioned" or "not mentioned". The probability of success p_{ij} corresponded to the probability that the i-th interviewee mentioned the *j*-th place positively. The explanatory variables selected in all cases were gender (Gender), age (Age), educational level (Level), and the frequency of visits to the sector (Frequency), i.e.,

$$logit(p_{ij}) = \mu + Gender_{ij}\beta_1 + Age_{ij}\beta_2 + Level_{ij}\beta_3 + Frequency_{ij}\beta_4 \qquad (3)$$

$i = 1, 2, \ldots, 1150; j = 1, 2, \ldots, 150.$

Only age was a quantitative variable, so the parameter β_2 was a scalar. Gender was a two-level factor (male or female), so the parameter β_1 was a representation of the parameters that accompanied each level. Educational level was a six-level factor (illiterate, can read and write, primary education, secondary education, university education, or postgraduate education), so β_3 was a representation of the parameters that accompanied each level. Frequency was a three-level factor (a little, quite a lot, or a lot), so β_4 was also a representation of the parameters that accompanied each level. The parameter μ represented an intercept.
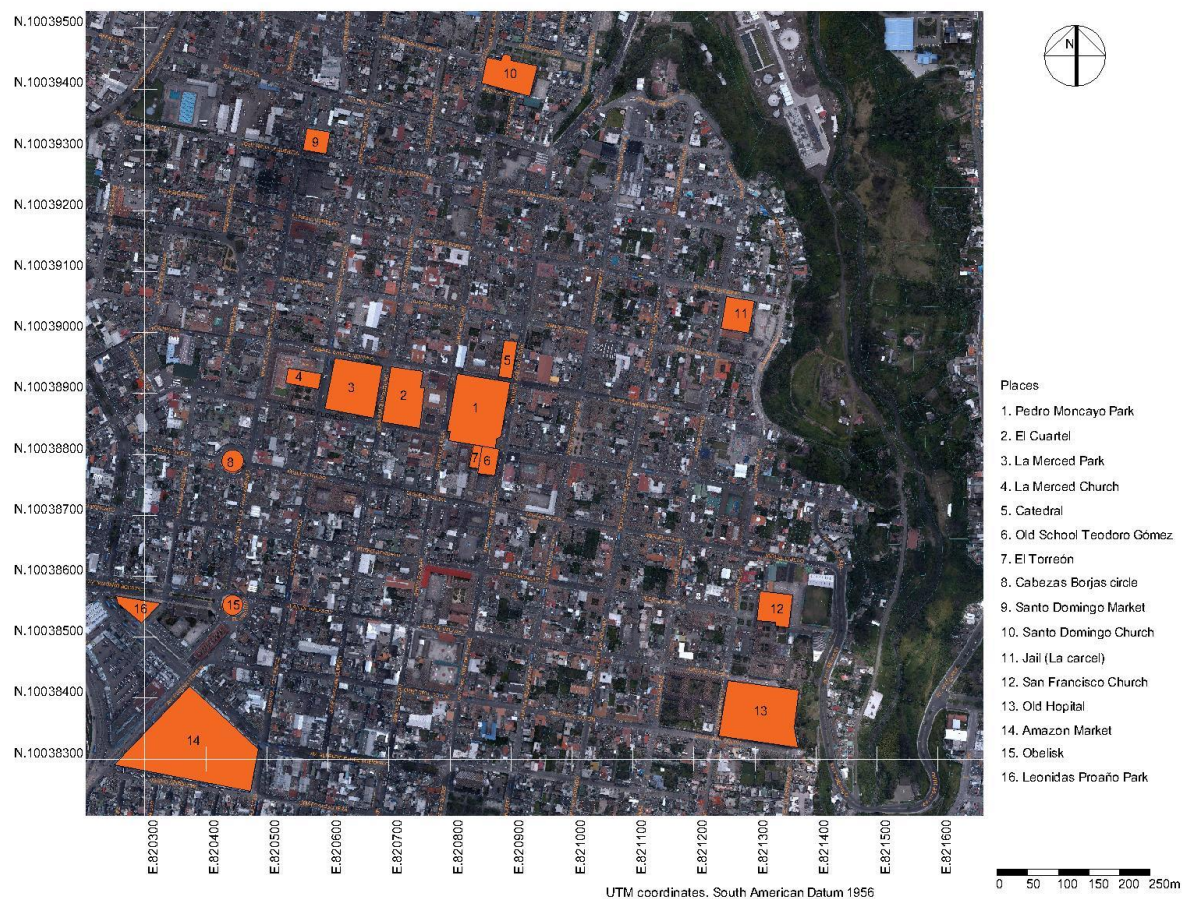

Figure 9. The places and buildings that were the most liked and disliked among the interviewees.

Only 12 out of the 150 positively mentioned places (8%) showed evidence of associations between the considered explanatory factors and the responses. For the rest, the fitted models were not conclusive. Table 1 presents the number of mentions received for each place, as well as the probability values associated with the estimated test statistics for each factor, which were calculated using the deviance test. Values of less than 0.1 were highlighted as significant (bold typeface), considering a confidence level of 90%, which was considered reasonable in this study.

Regarding the buildings and places for which the logistic regression models established associations, the considered personal characteristics were significant in the following numbers of places:

- Gender was significant in four places;
- Age was significant in five places;
- Education level was significant in two places;
- Frequency of visits was significant in three places.

In order of importance, age, gender, frequency of visits, and education level were the factors that most influenced positive perceptions of places.

Table 1. Positive mentions and probability values according to the considered personal characteristics.

Place	Mentions	Gender	Age	Level	Frequency
Bolívar Street	83	0.7416429	**0.0292015**	0.4441903	0.8351808
La Merced Park	81	0.8628450	0.4893984	**0.0650289**	0.9683314
"Esquina del Coco"	56	**0.0657850**	0.1754848	0.1495044	0.1942257
Águila Park	27	0.1416262	**0.0383923**	0.9390357	0.7279376
Ibarreñidad House	25	**0.0230201**	0.7701085	0.2145067	0.3100739
Municipality	21	**0.0009448**	**0.0927905**	0.9212920	**0.0688232**
Parks	15	0.8958459	0.6263178	0.9172531	**0.0243222**
Amazon Market	9	0.3999454	0.1323162	**0.0051522**	0.4088890
Gubernation	8	**0.0698998**	0.8883960	0.9436454	0.3407143
House of Culture	7	0.9483484	**0.0118852**	0.9738643	0.6938977
San Agustin Park	5	0.3028039	0.3634427	0.9376864	**0.0468278**
Santo Domingo Park	5	0.4086241	**0.0238938**	0.5796059	0.7864686

3.4. Explanatory Analysis of Negative Opinions

For each of the 217 disliked buildings and places, we also attempted to fit logistic regression models, dichotomizing the response variables as "mentioned" or "not mentioned". The probability of success p_{ij} corresponded to the probability that the i-th interviewee mentioned the j-th place negatively. The explanatory variables selected in all cases were again gender (Gender), age (Age), educational level achieved (Level), and the frequency of visits to the sector (Frequency), i.e.,

$$logit(p_{ij}) = \mu + Gender_{ij}\beta_1 + Age_{ij}\beta_2 + Level_{ij}\beta_3 + Frequency_{ij}\beta_4 \qquad (4)$$

$i = 1, 2, \ldots, 929; j = 1, 2, \ldots, 217.$

The characteristics of the explanatory variables were the same as those for positive opinions.

Only 22 of the 217 places (10.14%) showed evidence of associations between the considered explanatory factors and the responses. Table 2 presents the number of mentions received for each place, as well as the probability values associated with the estimated test statistics for each factor, which were calculated using the deviance test. As before, values less than 0.1 were highlighted as significant (bold typeface), considering a confidence level of 90%.

Table 2. Negative mentions and probability values according to the considered personal characteristics.

Place	Mentions	Gender	Age	Level	Frequency
Old Teodoro Gómez School	77	0.8866097	**0.0024428**	0.7303522	**0.0072908**
Bolívar Street	55	**0.0785330**	0.1869312	0.3509629	**0.0855646**
Oviedo Street	23	0.5743604	0.7984397	**0.0480603**	0.2813004
Torreón	19	**0.0193507**	**0.0075865**	0.2009983	**0.0699608**
Sucre Street	15	**0.0676320**	0.6716970	0.9360196	0.3390099
Streets	14	**0.0253150**	0.3562462	0.4202115	0.2437234
Esquina del Águila	14	**0.0922955**	0.3790603	0.5076561	0.7452506
Colón Street	10	0.4276690	0.7525072	0.5390799	**0.0418257**
La Merced	9	0.8858647	0.4555600	0.7361766	**0.0536881**

Table 2. *Cont.*

Place	Mentions	Gender	Age	Level	Frequency
Parks	9	0.8858647	**0.0775044**	0.1658753	0.7805286
CDP	9	0.5883539	0.9530894	**0.0283807**	0.2666959
Pérez Guerrero Avenue	8	0.3107308	**0.0409240**	0.9105563	0.5584130
Rocafuerte Street	7	0.1095277	**0.0453028**	0.1493349	**0.0853283**
García Moreno Street	7	0.1151545	**0.0946186**	0.3550165	0.2340110
Downtown	7	0.1151545	0.1869640	0.9520019	**0.0662332**
Maldonado Street	7	0.4573733	**0.0907178**	0.6540553	0.2565751
Cuartel	6	**0.0366411**	0.7813976	0.1682423	**0.0209531**
Houses	5	0.4198078	0.3989958	0.8965343	**0.0310402**
Sidewalks	5	**0.0031974**	0.9016575	0.1029840	0.4694090
Buildings	4	0.7495943	0.7064859	0.1802656	**0.0391396**
Pedro Moncayo Street	4	0.4744064	**0.0720332**	0.9868813	0.9342418
Heritage Houses	4	0.1804498	0.1468933	0.9488239	**0.0370756**

Regarding the buildings and places for which the logistic regression models established associations, the considered personal characteristics were significant in the following numbers of places:

- Gender was significant in seven places;
- Age was significant in eight places;
- Education level was significant in two places;
- Frequency of visits was significant in eleven places.

In order of importance, the frequency of visits, age, gender, and education level were the factors that most influenced negative perceptions of places.

4. Discussion

The hypothesis that we proposed was that identified or remembered elements could be represented on maps by considering the frequency of answers related to the personal characteristics of the subjects, especially familiarity with the place. We proposed drawing the frequency of answers as points on a map to find patterns regarding people's opinions of those places. This also allowed us to come up with suggestions that could help to improve the landscape [4,24].

Overall, our hypothesis was confirmed. The frequency of visits to a place was important for perceiving identified elements negatively, while age and gender were important for perceiving identified elements positively. Apparently, the educational level of the interviewees was less relevant. Although these results do not refute the hypothesis of Aguilar, who pointed out that "the aesthetic pleasure that the landscape grants is, without a doubt, an educational process that has all its references in culture. . ." [26], they added the elements of familiarity, meaning, sense, and attachment to the places [6,17,37]. From this perspective, people remember objects and spaces according to the type of daily interactions that they have with them [2,17], which could contribute to the integration of visual aesthetic values in multi-resource assessments [28]. Moreover, our results reaffirm those in [14].

Our study had two objectives, which are discussed separately in the following sections.

4.1. Identifying Liked and Disliked Elements and Spaces on a Map

The first objective was to identify the elements and spaces that were liked or disliked by our interviewees on a map, based on urban image theory [12,15]. We thought that representing these elements on a map could be useful to help local authorities to make

informed decisions [4]. Identifying these elements or spaces could also contribute to establishing sequences that could be used to improve the structure and orientation of microscale landscapes. People have daily interactions with the landscapes [2,5,17], which could be demonstrated on these maps. Certainly, our statistical analysis helped to determine points, patterns, and sequences [15] on the map that reflected the frequencies of positive and negative mentions.

To improve microscale connections [2,15] within that historical context, better public spaces must be designed [2,5,10,17]. In addition, the conservation and maintenance of heritage buildings must be improved to reinforce a sense of place and enhance the quality of life of inhabitants [4,6]. The patterns of positive and negative opinions highlighted routes and groups that helped us to visualize which elements did not fit within the spaces and what could be improved.

This first objective made it possible to identify the elements and spaces that people remembered the most and to locate those places on a map to visualize the concentrations of liked and disliked elements. From there, spatial sequences and patterns of places that require interventions could be interpreted. The historical landscape was consolidated within the central nucleus of the city, where actions are necessary to reduce the negative views expressed by people about the old Teodoro Gómez school, Bolívar Street, and Sanchez-Cifuentes Street, for example. The heritage of the first historical stratum (from 1606–1868) was established in a previous qualitative study [41]. However, the San Francisco area, a very important place that remains to this day, did not appear on our map. The frequency of mentions for this place (consisting of a church and a square) was very low.

Despite Ibarra having a respectable number of buildings with heritage value, these were not clearly identified by people and their meaning was very unclear. In this sense, improvements should be carried out on the streets that connect the buildings and squares in a more structured way through urban design on a microscale [2,15]. These types of actions could help to improve social cohesion in terms of relationships between people's knowledge and the elements and spaces that represent their cultures [5]. In addition, this could also positively contribute to wellbeing [6,8,17,21,25,33,37,38].

Our map helped us to identify patterns in four subsectors of the historical city. These patterns were concentrated in the foundational nucleus and the southwest, north, and northeast of the city. By focusing on the streets that present the greatest problems, it could be possible to improve the identified elements through specific actions.

The historical landscape in the foundational nucleus of Ibarra is the most important part of the city, and an inventory of its patrimonial buildings and places has been carried out [43]. Some sequences have been established by studying temporal layers [41]; nevertheless, objects that do not fit in given places could help to improve them.

4.2. Elements and Places That Do Not Fit

The second objective was to understand the associations between identified elements and spaces and the personal characteristics of the interviewees. The value of place attachment is in sustaining the attraction to and meaning of places; therefore, it is important to identify elements and spaces that do not fit in a given place [6,15,19,36,37,40], especially within places with which people are familiar. This second objective of the explanatory analysis of people's opinions on historical urban landscape was ordered in terms of valence (from positive to negative) [17,25]. This was important because negative perceptions demonstrate that elements and spaces do not fit in that place. Additionally, it helped us to understand the positive and negative opinions of the interviewees in relation to their personal characteristics. These results could contribute to urban design in wellbeing-oriented studies by providing quantitative techniques for these approaches [13,18,36,37].

We used logistic regression models and inference to study the significance of each characteristic.

Age and gender were significant for positive perceptions, but this finding was not conclusive as the answers were more dispersed. In the case of negative perceptions, we

found that the frequency of visits was the most influential factor, implying that knowing a place, being familiar with it, and having a certain sense of attachment to it are important [6,14,17,26,32]. However, in this case, there was greater agreement on negative opinions among the people who frequented the places. Therefore, it was very important to include positive and negative measures [17,25].

4.3. Priorities for Authorities to Improve the Urban Structure in Ibarra

Deteriorated elements should be identified and improved. In our case, people's negative opinions provided us with more important information about historical landscape. In our study, people were more in agreement about elements and spaces that they disliked.

Although unpleasant, identified negative elements and spaces could provide information that could be used to manage places [4]. Maintenance, conservation, or improvement actions could all be developed from this type of study.

On the other hand, decisions to intervene in the historical downtown area can be made by municipal, regional, or national authorities, as well as private sector entities. In any case, it is logical to assume that there are at least two objectives to consider when proposing investment:

1. Mitigating the public's negative perceptions of historical landscape;
2. Strengthening the public's positive perceptions of those landscape.

These two objectives are not necessarily contradictory unless the availability of funds is limited. This means that given sufficient funds, both could be addressed at the same time. However, it is otherwise reasonable to assume that mitigating negative perceptions is more important than enhancing positive perceptions (which, in any case, must be preserved via adequate maintenance policies) [4,17]. Asking the people who frequent these places gave us important information about the priority actions required to improve them.

For the landscape under study, we assumed that investment would be made in the places and buildings that the interviewees mentioned negatively; however, how do we decide which places should receive investment first?

The first way to address this question was to consider the frequency of negative mentions in descending order. In Figure 5, we identified five priority areas for investment to mitigate negative perceptions among citizens [4,17]. These areas were as follows: the old Teodoro Gómez school, Bolívar Street, Sánchez-Cifuentes Street, Amazon Market, and the jail.

This list was compiled from the opinions of all those interviewed, without considering their gender, age, educational level, or the frequency of their visits to the place. Therefore, it would be reasonable to consider validating this list in future studies by taking these variables into consideration in the indicated order of importance.

On the other hand, in Figure 2, we identified five priority areas for investment to promote positive perceptions. In descending order, these areas were as follows: El Cuartel, Pedro Moncayo Park, Bolívar Street, La Merced Park, and "Esquina del Coco". Again, it would be worth validating this list in future studies by taking into consideration the selected explanatory factors. In any case, our results provided the order of priority for elements and spaces that need to be maintained or improved, even if they were only considered due to their proximity on the map.

This study could be applied to other historical or natural landscapes to studying the people's opinions on specific and significant places. Negative measures must also be included to establish priority areas within the places and the reasons why people do not like them [44].

5. Conclusions

A historical landscape is a place with elements and spaces that are generally significant to people. These buildings and public spaces (i.e., streets and squares) are landmarks that can be used to configure mental images and contribute to the historical sense of the places. This idea is central to cultural memory. People identify with landmarks because they give

meaning to a place. Consequently, people feel place attachment when they have a positive perception of a place. Although these elements and spaces are important parts of registered heritage, in our study, some elements or spaces were identified because there was greater agreement among the negative opinions. Therefore, to improve historical urban landscapes, it is necessary to incorporate positive and negative measures in their evaluation. This is because finding what does not fit in a place is important for making informed decisions.

Some historical elements are ignored by people because they simply do not remember them. In this sense, we think that it is important to consider multiple ways of studying historical landscapes. Every study must contribute to the technical visions for the landscapes.

To improve the lack of criteria that can be used to intervene in historical urban landscape in Ibarra's city, we identified the elements and spaces that people liked and disliked on a map. This historical landscape is appreciated and significant for citizens, who showed interest when they were surveyed. Both the descriptive analysis and the applied logistic regression model gathered important data for the city and the institutions in charge of its heritage. This study provided data that can be used to improve heritage management, including establishing priorities and places to improve; however, this depends on the will of the authorities and institutions in charge. Household surveys could be conducted to establish who often people frequent certain places as it is easier to locate respondents for this type of survey.

Finally, as this research was carried out on a microscale, specific projects could be undertaken to propose urban design options involving different intervention scenarios, as well as how those designs may be accepted or not by the people who frequent the places.

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