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EDITORIAL

Editorial

ANA ZAZO MORATALLA ¹, ISIDORA TRONCOSO GONZÁLEZ ²

A Strategy of Metropolitan Systems for the Metropolitan Area of Concepción (ESAL25)

Food and territorial planning has been proposed over the last decade in European, North American, and Latin American cities as a useful tool to promote citizens' health and food and nutritional security. It also encourages the sustainability of the metropolitan agroecosystem and regenerates resilient and healthy links between the city and local agricultural and rural territories in the face of diverse global and local scale phenomena.

In the current context, medium and long-term food production and its access have become a challenge on a global scale. The climate crisis has worsened rapidly in recent years and its consequences are linked to a potential 80% increase in food prices. This scenario becomes even more critical if it is considered that population growth, mainly urban, will be such that by 2050 it will be necessary to increase food production by 70%. In addition, phenomena such as land grabbing, deforestation or industrial production, and food commodification, make it even more difficult to provide answers to address this challenge. At the same time, the repercussions of this global production model are having an impact on both people's health and territorial and ecosystem health.

In Chile, the agricultural production model has become polarized, oriented, on one hand, towards an export-focused industrial model, with high technification and significant foreign investment and, on the other, towards a small-scale agricultural model, focused on local and national supply, with low technification and based on peasant and indigenous family agriculture. At the same time, the national agriculture policy has focused on positioning Chile as a global counter-station agri-food power, while at the micro-scale it has focused on supporting the commercialization of local production. However, these local support actions have not been carried out under an integrated food and territorial planning that can solve the existing problems in the urban area, while strengthening its ties with rural areas.

Food and nutritional insecurity, understood as the lack of physical and economic access to healthy food for permanent consumption, has also reemerged on the Chilean public agenda in recent years after several decades of being disregarded as a threat. According to the State of Food Insecurity Report (SOFI 2020) of the United Nations' Food and Agriculture Organization (FAO), 15% of the Chilean population (2.9 million people) has some kind of moderate to severe food insecurity, which implies that there is no guarantee regarding access to a nutritious, varied, balanced and permanent diet. Moreover, households with vulnerable members (minors under 18 and older adults) are the ones that do not have access to enough food to cover their needs. A reflection of this problem is the malnutrition of the Chilean population, where 31.2% of the population suffers from obesity, 39.8% are overweight, and 12.3% have suspected diabetes.

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Figura 1, 2 Boca Sur. Fotografía de Valerià Paül, marzo 2022.

On the other hand, Chile has been exposed to different natural, socio-political, and sanitary crises and emergencies in the last decade that have highlighted the need to strengthen food resilience in our cities and territories through the diversification of the urban food system and the strengthening of local food systems to ensure a strategic and sustainable supply.

In the Biobío Region, 35.5% of the population suffers from obesity, which is above the national average. To counteract this, almost all the communes have municipal instruments dedicated exclusively to improving the nutritional status of their inhabitants. However, none of them is the result of a communal policy that addresses food as an integral system from the production to access to healthy foods, essential for reducing obesity in the region.

Small-scale regional agricultural production, apart from the problems inherent to the agricultural sector, faces serious territorial conflicts related to water, soil degradation, and biodiversity loss. For water, as in much of the national territory, the region is facing a significant water shortage resulting from a long period of drought explained by anthropogenic causes, a historical regulation of water that has allowed the privatization of its access, and the aggressive spread of forest monoculture. The presence of the forestry industry is widespread in the Biobío Region, meaning that more than half of the regional surface is covered by monocultures of exotic species. The industry's productive model has had a major impact on land use, generating direct and indirect consequences on local food production. With regard to soil degradation, this has led to one-third of the communes being in a state of moderate to severe desertification. In turn, the use of agrochemicals and logging, linked to monocultures (both agricultural and forestry), has contributed to a loss of biodiversity for the regional flora and fauna, altering the health of ecosystems.

Despite the critical scenario, recent studies have shown that in the last decade, the AMC has seen a regeneration of local food systems that connect it with the regional scope. These systems are contributing to a transition to more sustainable production, improving access to healthy and nutritious, sustainable, fair, and local food, and diversifying the urban food system. This drive is based on the multiple efforts deployed by regional territorial actors. However, these proposals need to be visible and connected in a wider collaboration network to increase their impact. Their development would improve both the health of the AMC's territory and its citizens.

In the current context, the Local Food Systems Strategy of the Metropolitan Area of Concepción (ESAL25), as an outreach project of the University of Bio-Bio (UBB2195), is working with relevant actors within the system to position food as a transversal axis in the local political agenda and in developing a governance model that seeks its visibility and strengthening. This implies reflecting together on how to produce, distribute, market, access, and consume healthy, sustainable, local, and fair food, but also how we organize, protect, and plan our territory.

The end goal of ESAL25 is to make visible, promote, and regenerate the local food systems that supply the Metropolitan Area of Concepción (AMC), from a regional level, so that they contribute to:

- Improving the population's health and food and nutritional security.
- Promoting the sustainability of the metropolitan agroecosystem in the environmental, social, and economic spheres.
- (Re)generating resilient and healthy ties between the city and local agricultural and rural territories.

The biggest challenge of this strategy at a metropolitan scale is not its development, which entails an intense diagnosis of the operation of each local food system to find its strengths, weaknesses, threats, and opportunities, and based on them, to present proposals that allow their strengthening and visibility. ESAL25's biggest challenge is to generate a solid governance model that allows it to provide continuity over time. This model should be led by an institutional entity capable of giving it that sustainability. It should be handled and promoted by civil society, companies in the sector, and institutional agents on all scales, and should permeate communal public policy so that each municipality develops its intersectoral food strategies, based on the general guidelines, but adapted to the specific realities of each commune

AGRI-FOOD CHARTER OF THE METROPOLITAN AREA OF CONCEPCIÓN AND BIOBÍO REGION.



HOUSING TYPOLOGIES, NEIGHBORHOOD PERCEPTIONS, AND NEIGHBORHOOD SOCIAL TIES¹

AN EXAMINATION OF THE MICHAIHUE NEIGHBORHOOD, METROPOLITAN AREA OF CONCEPCIÓN, CHILE.

EXPLORACIONES SOBRE EL BARRIO DE MICHAIHUE, ÁREA METROPOLITANA DE CONCEPCIÓN, CHILE.

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A partir del estudio de caso realizado sobre el barrio Michaihue, cuyo origen se produce por viviendas sociales progresivas en extensión y otras en altura, analizamos la posible incidencia que la tipología arquitectónica puede tener en la percepción declarada de preferencia y predilección barrial, entendiendo estos elementos como una base positiva para la generación de vínculos sociales vecinales. Metodológicamente, analizamos y contrastamos las respuestas de un CENSO de viviendas y hogares, además de un levantamiento de redes personales aplicado a vecinos propietarios de ambas tipologías. Nuestros hallazgos demuestran que, a igual contexto urbano y atributos individuales, la tipología habitacional marca diferencias al momento de expresar preferencia por vivir en su barrio y si optaría por quedarse o no en él. Sin embargo, la evidencia no nos permite afirmar si esto afectaría las dinámicas de producción de vínculos sociales vecinales. Finalmente, exponemos que una tipología arquitectónica “progresiva”, es decir, que permite la participación del propietario en su modificación-expansión, da mejores condiciones para una positiva percepción del barrio, lo que por sí solo no necesariamente altera las dinámicas de creación y rubrica de redes sociales vecinales.

Palabras clave: vivienda progresiva, apego barrial, redes sociales vecinales

Using a case study conducted in the Michaihue neighborhood, the result of progressive large-scale and high-rise social housing, the possible impact that architectural typology can have on the declared perception of neighborhood preference and predilection is analyzed, understanding these elements as a positive basis to generate neighborhood social ties. Methodologically, the responses to the dwellings and households' CENSUS were analyzed and compared, alongside a review of personal networks applied to neighbors who own both housing typologies. The findings show that, given the same urban context and individual attributes, the housing typology marks a difference when expressing a preference for living in their neighborhood and whether or not they would choose to stay in it. However, the evidence does not allow stating whether this would affect the dynamics of neighborhood social ties production. Finally, a “progressive” architectural typology is presented, that allows the owner to participate in its modification-extension, providing better conditions for a positive perception of the neighborhood, which in itself does not necessarily alter the dynamics behind the creation and outline of neighborhood social networks.

Keywords: progressive housing, neighborhood attachment, neighborhood social networks

I. INTRODUCTION

In recent decades, the importance of space in forming social ties has been observed (Talen, 1999; Houghton, 2005; Adger et al., 2011; Bott, Ankel & Braun, 2019; Small & Adler, 2019) and, particularly, the relevance of strong ties at a local level, consolidating a specific idea of community (Wellman & Leighton, 1979). However, recently, importance has been given to the characteristics of the built environment as a generator of a relational scenario (Blokland, 2017) that can frame social practices (Dovey & Wood, 2015) and form links with different intensities (Valentine, 2008). This also allows building an idea of community, based on urban practices between neighbors and acquaintances on a neighborhood scale (Blokland, 2017). These types of ties may be weaker, but they also constitute practices and daily encounters of recognition that contribute to the sense of belonging, to neighborhood cohesion, and are related to the characteristics of the built environment (Señoret & Link, 2019; Link et al., 2022a). In this sense, there is a relative consensus that the configuration, composition, and spatial distance, at different scales, are elements that must be considered to understand contemporary social dynamics and urban practices (Small & Adler, 2019).

Although the discussion has focused greatly on the neighborhood scale, there has been little progress in dimensioning the scope that architectural typologies can have on certain perceptions about the neighborhood, which, in turn, can affect the predisposition to neighborhood relations. This leads to the research questions asked here, namely, does architectural typology affect the declared perception of predilection to live in the neighborhood, stay there, or leave it? and can this affect the generation of neighborhood social ties?

The hypothesis is that not only can the neighborhood's socio-material conditions mediate in neighborhood attachment and the probability of neighborhood social interaction, but also the architectural typologies the neighborhood has, which, by influencing a good or bad neighborhood perception, can stimulate or inhibit the formation of ties and meeting and recognition practices. In this regard, it is proposed that, in the context of neighborhoods produced by the housing policy, where residents do not choose the neighborhood under equal urban and social conditions, progressive residential typologies, i.e., those that allow modifications or extensions by their owners, would generate a greater declared perception of preference for living and staying in the neighborhood, compared to those owners of

“finished” typologies, and with it an expected greater neighborhood attachment and predisposition to capitalize on neighborhood social ties.

As for the methodology, this involved two types of data collection. The first one was based on a standardized household Census where two key questions were analyzed, (i) Do you like living in this housing complex?; and, (ii) would you leave or stay in this housing complex? The second much more limited, selective, and exploratory survey, saw personal network interviews conducted with residents of both typologies, whose perceptions about neighborhood preference and predilection were different. With the data collected, and understanding that the neighborhood shares the same problems and structural characteristics of segregation, lack of urban amenities, building obsolescence, and stigmatization, among others, the answers to the questions were compared with the attributes of the respondents and residential typologies.

Based on the findings of this work, and in line with what was found by Link et. al (2022b), it is proposed that “progressive” architectural typologies, namely, those that can be modified and adapted by each owner, can constitute a spatial resource that, in addition to other social and urban strategies, would help foster positive perceptions regarding the preference and predilection for living and staying in the neighborhood. From this, better conditions can be produced to capitalize on the opportunities that the built environment generates for building neighborhood social ties, which promotes more cohesive, active, and resilient neighborhood environments for the social problems they usually face.

II. THEORETICAL FRAMEWORK

Social capital is a concept with a strong spatial and geographical component, since social interactions are strongly determined by their time and place (Adger et al., 2003). In addition, the form of social capital, in its interaction with other capitals (Bourdieu, 1986), is interdependently related to the space (Bourdieu, 1999). Specifically, empirical research suggests that social capital is crucial when other forms of capital, such as financial, physical, human, and symbolic, are limited or restricted (Braun & Aßheuer, 2011).

This has involved an extensive effort to understand how space frames social practices, where social living divisions and hierarchies are evident in how the space is divided, thereby promoting or inhibiting the forms of meeting

(Dovey & Wood, 2015). Such a comprehensive and dialectical articulation between physical space and social space is a challenge to understand the role of the built urban environment in shaping biographies, personal networks, and urban communities. As Soja (2009) suggests, a multiscale view of the geographical space is needed to locate these socio-spatially generated phenomena and processes.

This need of understanding the role of physical space in the formation of social ties and sociability practices at different scales has focused on the configuration of the space, its composition, and proximity (Small & Adler, 2019), especially in metropolitan urban contexts. In these, these ties tend to diversify, expand, and relocate, which configures new forms of interdependence and solidarity (Wellman & Leighton, 1979; Ascher, 2004; Simmel, 2014 (1908).

In this context, a certain consensus has been established in recognizing the relevance that urban forms and spatial structures have in the generation or inhibition of opportunities for co-existence, social contact, and the configuration of local social networks (Houghton, 2005; Adger et al., 2011). Thus, the diversity, quantity, variety, and spatial configuration of land uses (Wickes, et al., 2018) and public spaces (Lelévrier, 2013) give rise to the encounter and exchange of experiences through face-to-face communication (Leitner & Sheppard, 2018). Small and Adler (2019) highlight this role of space in the formation of ties from three dimensions on different scales: the spatial configuration, the composition of space, and distances from different everyday activities. Thus, space plays a role in the forms of the community, understood through the social ties between its residents (Wellman & Leighton, 1979).

Neighborhood perception; preference and predilection

The formation of local social ties and cohesion at a neighborhood level is also influenced by place attachment and the local relationships that are built there (Wood & Giles-Corti, 2008; Mount & Cabras, 2015; Wickes et al., 2018; Otero et al., 2021; Link et al., 2022a). In this sense, practical and symbolic dimensions of neighborhood social cohesion are distinguished, where the former is associated with local communities with strong ties and everyday practices, while the latter is related to reputation, privilege, and residential choice (Méndez et al., 2020). Both forms of neighborhood cohesion are related to the characteristics of the built environment, and the design and layout of the neighborhood (Hipp, 2010; Greene et al., 2014; Link et al., 2015; Wang & Vermeulen, 2021).

The accumulated evidence is strong in connecting the social and physical dimensions of neighborhoods with the generation of place attachment (Lin & Lockwood,

2014). In this way, place attachment can trigger a sense of community, social trust, solidarity, and self-efficacy, encouraging active residents to both defend or manage the change of their neighborhoods (Drury & Reicher, 2005) and to seek adaptive solutions in situ to common problems (Marshall et al., 2012; Fong et al., 2019). Thus, the social and physical dimensions of neighborhoods affect the production of local social ties and neighborhood cohesion (Peters et al., 2010; Dai, 2011; Zhu et al., 2012; Krellenberg et al., 2014), leading to sustained attention on urban interventions, planning, and policies focused on constituting, promoting, and transforming these neighborhood dimensions (Hartig et al., 2014; Kelly et al., 2022; Akers et al., 2019; Cooke, 2020; Ulmer et al., 2016). Therefore, attachment increases the predisposition to reside in the neighborhood and vice versa (Lu et al., 2018), denoting a positive relationship and subjective perception of the connection of residents with the places where they live (Marshall et al., 2012; Lu et al., 2018).

III. CASE STUDY

The Metropolitan Area of Concepción, also known as Greater Concepción, is an urban system comprising 12 communes, which together are home to more than one million people. The neighborhood in the study is located in one of these communes, San Pedro de la Paz. This neighborhood has been planned and consolidated as an underprivileged area, mainly inhabited by poor and vulnerable populations as a result of the concentration of housing policy solutions (Figure 1).

The studied housing estate includes a high-rise housing complex called Michaihue 716, and the La Estrella neighborhood. Both were housing solutions generated from a public policy characterized by progressive housing, where only a kitchen and one bedroom were provided, leaving the rest in the hands of each resident. The estate also covers a third area, which was the neighborhood of Michaihue 600. This is being demolished and has no regular occupants, but has been taken over by informal occupants and is perceived as a barren and problematic site.

In 1995, official settlement began in the sector with the construction of housing in the La Estrella neighborhood, led by the San José de la Dehesa Foundation. Originally, 3 types of housing were built, with surface areas of 24 m², 36 m², and 48 m². These were mainly wood-built and did not include a bathroom within the architectural project. The last houses built in La Estrella were built using the DFL 2 subsidy and delivered in 2005. These were intended for families from Candelaria, Michaihue histórico, and Boca Sur (all from the immediate surroundings). There are a total of 261 homes in the La Estrella sector.



Figure 1. Location of the Michaihue Neighborhood, Metropolitan Area of Concepción Source: Prepared by the authors.

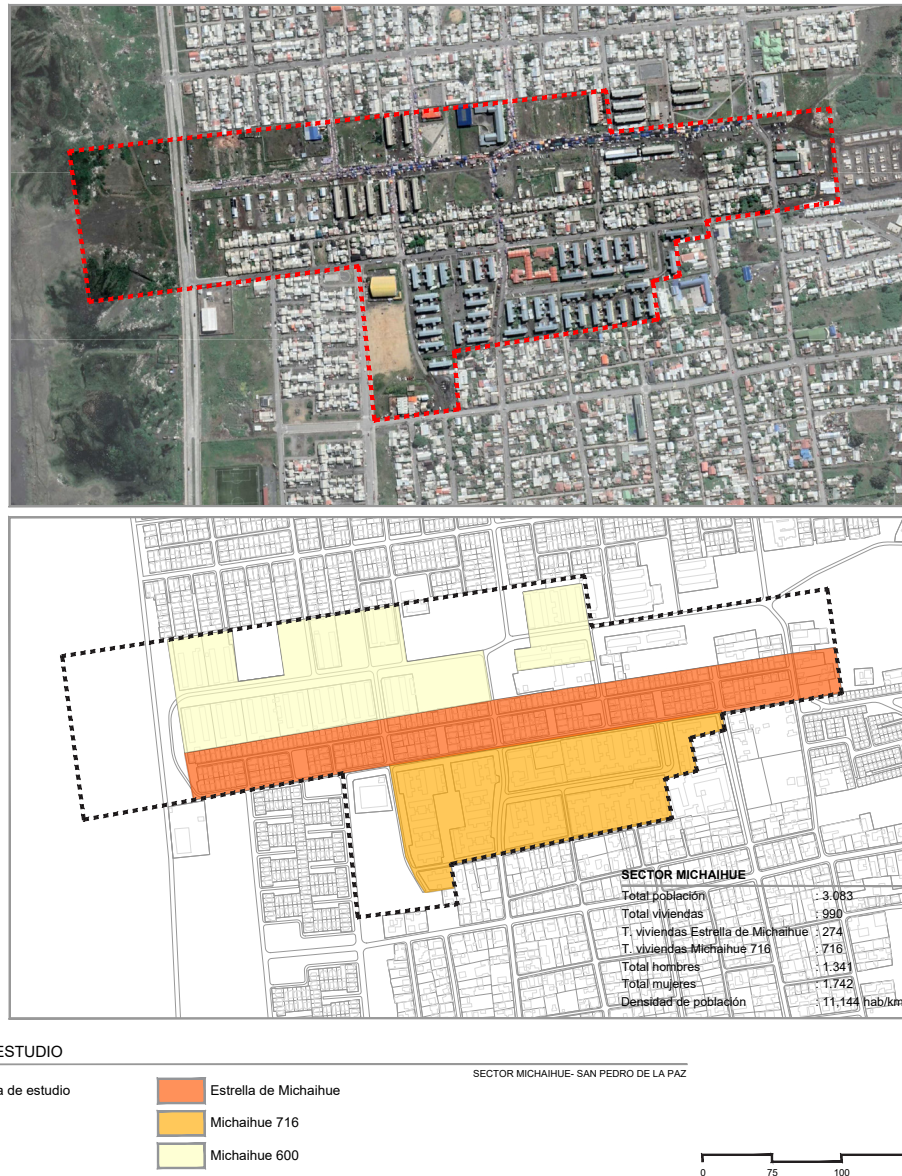


Figure 2. Aerial photography and cartography of the intervened neighborhood, San Pedro de la Costa Sector. Source: Google Earth and the preparation by the authors

At the end of the '90s, the Michaihue 716 blocks were built, a set of condominiums with 44 blocks and 716 apartments. Each of them with a 45 m² surface area (Figures 2 and 3). The construction used reinforced masonry, with confined and framed concrete, the mezzanine slabs comprising a concrete slab, and the stairwell with a concrete slab and metal structure, both in structural and non-structural elements.

The inhabitants of the complex are 56% women and 43% men. When comparing the communal data provided by the

Population and Housing Census of 2017, a significant difference can be seen, because the Masculinity index is 91.4 for the commune of San Pedro de la Paz, while for the estate it is 77.4.

With regard to age, the largest group of people is in the 15 to 29-year-old range with 29%, and the lowest percentage is in adults over 65, representing 7.21%. When comparing the information with communal data, the age distribution is generally homogeneous, but



Figure 3. Left, census taker and visit to the La Estrella neighborhood. Right, Michaihue 716 (in the background) and La Estrella (in front on both sides of the street) complexes. Source: Author's archive.

differences are highlighted in the 15 to 29 segment, where the population of the estate has 29.37% and the commune 22.77%. On the other hand, the 30 to 44 segment represents 16.67% and it is 23.06% at a communal level (Source: Housing and Population Censuses 2002, INE; Housing and Population Censuses 2017, INE)

The income level of the study group is low, as 79.1% of people receive less than the Minimum Wage. On the other hand, the entire sector has an advanced deterioration of buildings, their structures, finishes, and facilities. Public spaces are substandard, poorly maintained, poorly lit, and prominently avoided by residents.

IV. METHODOLOGY

This research used two types of data collection from primary sources. The first, based on a standardized household census, conducted during 2020, covered 80% of the 990 residences in the neighborhood (716 Apartments., and 274 housing units), or 792 units, all owned. From this, two questions were analyzed, i) Do you like living in this housing complex? and (ii) If you could choose would you leave or stay? The second survey, much more limited and selective, included ten interviews conducted with residents of both typologies and with different declared perceptions, which allowed building and analyzing their personal neighborhood networks.

Finally, both surveys, but especially the first one, were analyzed by individual attributes of age, time of residence, gender, and architectural typology of the residence, differentiating between progressive housing with extensions and high-rise housing.

V. RESULTS

In concrete terms, 98.7% of the cases state being less than four blocks from public transportation (bus stops or Biotren stations). The same applies to 94.3% of cases for retail services (shops, hairdressers, bakeries). However, 82% stated it was unsafe to walk at night, and 85.1% mentioned the daily consumption of alcohol and drugs in the neighborhood's public spaces.

The social composition of the neighborhood is quite homogeneous and the levels of trust and social control tend to be high, which is evidenced by the fact that about 82% of respondents believe that their neighbors are honest and trustworthy. In addition, 81% of respondents rate the participation rate in neighborhood organizations as high.

For the first question, "Do you like living in this housing complex?", the answers were divided into 50.4% NO, and 49.6% YES (Figure 4). However, when broken down by typology, in Michaihue 716 (high-rise typology), the perception was less favorable compared to La Estrella (progressive extension typology). In the former, with a

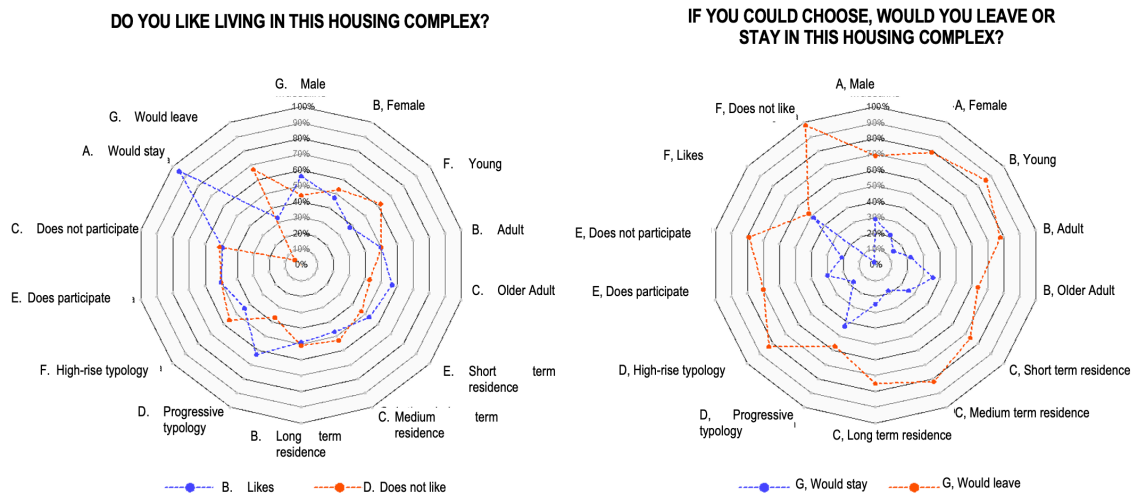
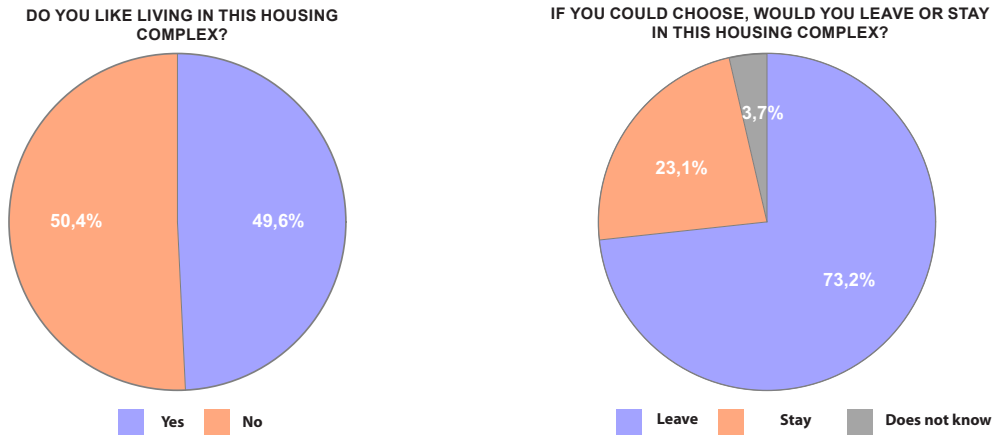


Figure 4. Percentages of positive and negative answers to the questions - Do you like living in this housing complex? And if you could choose, would you leave or stay in this housing complex? Source: Own preparation, based on data from the Housing Diagnosis and Housing Structure Census, Ministry of Housing and Urbanism, 2021.

Figure 5. Percentages of positive and negative responses broken down by gender, age, time of residence, housing typology, and participation in local social organizations. Source: Preparation by the author, based on data from the Housing Diagnosis and Housing Structure Census, Ministry of Housing and Urbanism, 2021.

total of 573 residences surveyed, 319 cases, or 55.7%, do not like living in the sector. As for La Estrella, 63.1% of the respondents (137) say that they do like living there (Figure 5).

With the second question, "If you had the choice, would you leave or stay in this housing complex?," the gap was much more marked. 73.2% of the residents surveyed would leave and only 23.1% would stay. When disaggregated by typology, 43% of La Estrella's residents would like to stay, and 17% in Michaihue 716. (Figure 4 and Figure 5).

On cross-referencing the results of the Census and these two key questions with the individual attributes - age, gender, and time of residence - the results show an expected relationship between both questions, but also important differences that are accentuated depending on the attributes of the interviewees. However, the changes considered the most significant are due to the residence typology of the interviewed owner (Figure 5 and Figure 6).

In response to the question "Do you like living in this housing complex?," 56% of the male owners answered YES and 44%, NO. For the female owners, this changes slightly,

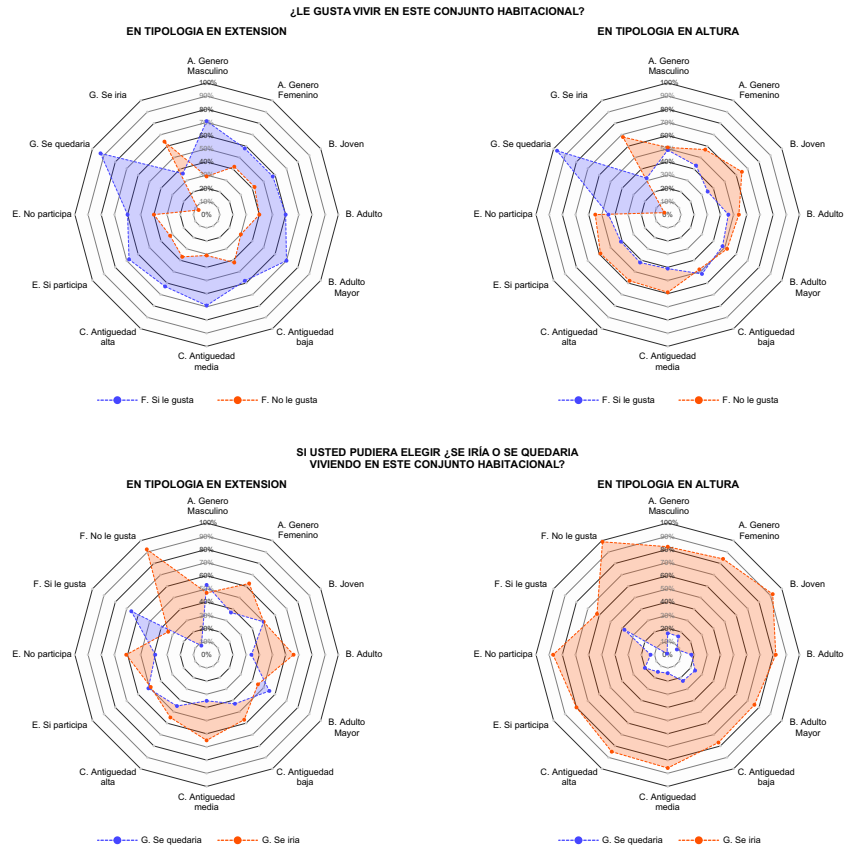


Figure 6. Percentages of positive and negative responses broken down by residence housing typologies in the censuses. Source: Preparation by the author, based on data from the Housing Diagnosis and Housing Structure Census, Ministry of Housing and Urbanism, 2021.

with 52% YES and 48% NO. In the age ranges there is a greater difference, since 62% of young owners respond negatively, adults do so with 50%, and older adults 42%.

This could be explained by the length of residence, but when disaggregated by this factor, no significant differences are observed between the analyzed sections (long time of residence, 1949-1984, medium 1985-1997, short 1998-2020), always hovering around 50% disapproval. It also does not seem to affect whether the respondent participates in local social organizations or not, since in both cases disapproval remains at 50%. Where there is a significant differentiation is the residential typology of the respondent. The positive response of owners of progressive extension typologies reaches 62%, while the response of owners of low-rise typologies is 42%. It should be noted that almost all those who state that if they could choose whether they would stay or leave the neighborhood, replied that they do like living there (Figure 5).

As for the reasons why they do not like living in this housing complex, these were mainly insecurity, crime, traffic, drug use, and street fights, with 19.5%. Second, much further back, conflicts with neighbors are indicated (8.8%), and in third and fourth place remoteness from the workplace, from their kids' educational establishments, and an insufficient or no local family support network is seen.

In the second question, "If you could choose, would you leave or stay in this housing complex?", leaving is 10% higher for women than men, reaching 80% vs 70% respectively. By age, the desire to leave is high in young people (up to 24 years old), with 86%. In adults, this rate drops to 78% (over 24 and under 65 years) and 64% in older adults (over 65 years). By length of residence, the option to leave is always over 70%. As for typology, for high-rise, the option to leave reaches 82%, while in the progressive extensions, it drops to 58%. As for participation in local social organizations, in those who participate, the

Percentage of the 400 contacts provided			
Relatives	Friends	Neighbors	Work/study colleagues
37%	20%	18%	12.5%

Of the contacts who are neighbors, relationships are qualified as			
Unimportant	Important	Not important at all	Very important
46%	42%	7%	5%

Of contacts with neighbors, the frequency of contact is			
At least once a week	Every day	At least once a month	Once a year or never
52%	34%	7%	7%

Table 1. Summary of the statistical results of the Social networks analysis. Source: Preparation by the authors, based on interviews held with neighbors of the neighborhood, 2021.

desire to leave falls by 10% (70%) compared to those who do not (80%). Finally, of all those who answered that they do like the neighborhood, only 48% declare that if they could choose, they would stay.

When breaking down the answers by residential typology, this explains a 20% increase in the perception of predilection for living in the neighborhood among owners of progressive typologies. However, this increase does not show significant changes by owner gender (Figure 6).

From the point of view of age, this 20% increase meant going from 36% to 58% in young people, from 46% to 60% in adults, and from 48% to 70% in older adults. In terms of length of residence, the progressive typology homeowners mark an increase compared to high-rise owners, going from 52% to 60% in those of short-term residence, from 40% to 70% for medium-term residence, and from 42% to 62% for long-term residence. The same trend is evident in those who participate in local social organizations, which change from a positive preference of 40% among those from high-rise typologies to 68% in those with progressive extension, and among those who do not participate, from 46% to 60% (Figure 6).

In the second question, in the case of high-rise owners, personal attributes are almost irrelevant. The option of leaving versus staying never drops below 78%. However, significant changes can be seen in the progressive typology, as is the case of male owners, older adults, and those who take part in local social organizations, where the option to stay took precedence. The highest scores regarding the option to leave are seen among the female owners, the adults, and those of medium and short-term

residence. There is also a greater relationship between the preference to live and the option to stay.

Once the Census was analyzed, an exploratory exercise was conducted interviewing neighbors living in the high-rise (Michaihue 716) and progressive extension (La Estrella) typologies. Each stated both positive and negative perceptions of preference and predilection for the neighborhood. With these interviews, their personal networks are raised and analyzed. In general terms, from the contacts reported by neighbors (400), 37% were relatives, 20% were friends, 18% were neighbors, 10% coworkers, 7% a member of some group they belong to, 3% a member of the household, and 2.5% classmates.

Of the contacts, 38.3% live in the same neighborhood, of these, 43% communicate at least once a week, 30% communicate every day, 19% communicate at least once a month, 5% less than once a year, and 4% never. Another important piece of information is that of the meeting places mentioned by the neighbors, 59% of the contacts usually talk at their residence, 16% in the neighborhood's public spaces, 11% in the workplace or place of study, 10% in another type of place, 4% in another person's house, and 1% in a bar, cafe, restaurant or mall. And of the contacts with whom one spends time with in the neighborhood public space, 75% are neighbors, 13% are members of a group they belong to, 6% are friends, 5% are relatives, and 2% are classmates.

Of the contacts who are neighbors, 46% are considered unimportant relationships, 42% are considered important, 7% are not important at all, and 5% are very important. Of these contacts with neighbors, 52% have a contact at least once a week, 34% every day, 7% at least once a month, 4%

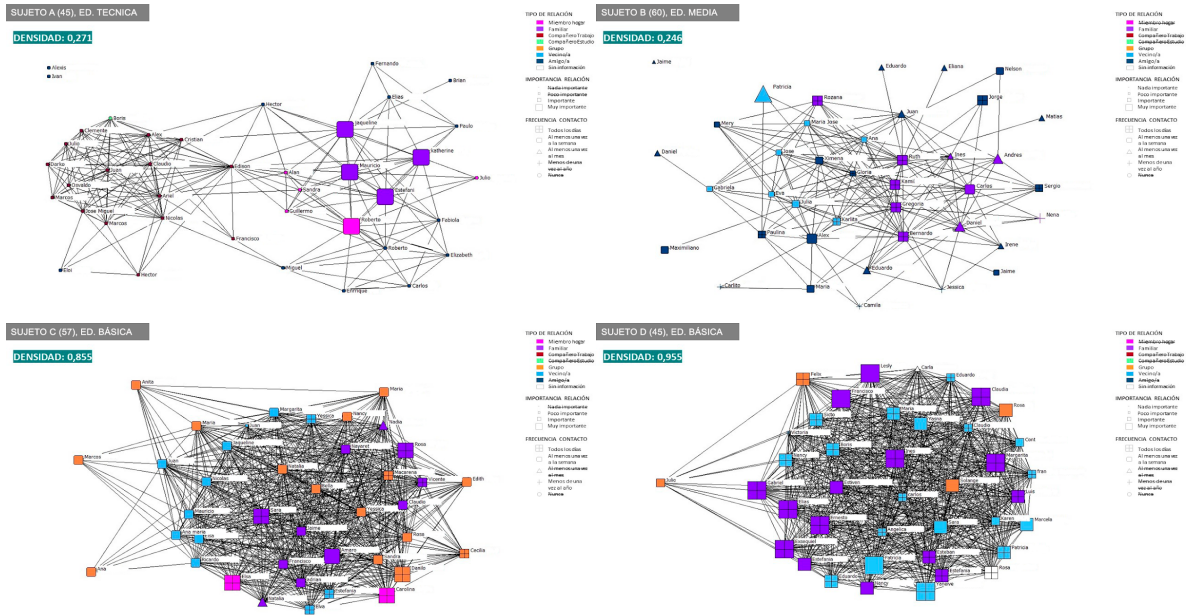


Figure 7. Analysis of social networks, more and less dense networks. Neighbors from La Estrella (left) and Michaihue 716 (right). Source: Preparation by the authors, based on interviews held with neighbors of the neighborhood, 2021.

never, and 3% once a year. Versus family members: 37% once a week, 33% every day, and 21% at least once a month. Versus friends: 42% once a week, 17% every day, and 30% at least once a month. (Table 1)

Finally, the two densest networks (>0.8) are those with the highest proportion of neighbors and also with the highest proportion of contacts of a group to which they belong. Both informants were women, between 45 and 57 years old, with a basic education level and participants in local social organizations, with similar declared perceptions of neighborhood preference and predilection, but owners of different residential typologies. In the two less dense networks (0.3>), it is similar, here the higher educational level compared to the sector's average and the non-affiliation to local social organizations are striking, but again these belonged to different residential typologies (Figure 7). Although the sample is not statistically significant, its results are consistent with a configuration of personal networks strongly determined by individual structural aspects, such as educational level, relativizing the weight of the neighborhood's spatial attributes and also of what can affect the architectural typological scale.

When the results are differentiated by residential typology, neighborhood preference and predilection, no appreciable differences were seen in the participation of neighbors in the social networks surveyed. Thus, and even though

several issues remain to be explored, these results limit or at least call into question the extent of the findings found in the first section. That is, although the results of the first section show that the architectural typology would affect the stated perception of preference and predilection for the neighborhood, thus assuming a greater place attachment, the relationship that this has in building neighborhood social networks and neighborhood cohesion needs to be examined further, beyond what is imposed by the personal conditions of the residents and socio-materials of the neighborhood.

VI. DISCUSSION

Place attachment and neighborhood ties are crucial for strengthening collective responses to adversities (Marshall et al., 2012; Bott et al., 2019; Bonaiuto et al., 2016; Clarke et al., 2018; Waters & Adger, 2017) and both are recognizably mediated both by the neighborhood, its spatial configuration, social and functional composition (Wellman & Leighton, 1979; Bashar & Bramley, 2019; Small & Adler, 2019; Pinchak et al., 2021), and by the personal attributes of its residents (Small & Adler, 2019). However, the empirical findings here suggest that the architectural-residential typology would also have an impact, at least in terms of the stated perceptions, both on preference for living in the complex, and on the predilection for staying there, and with this, an expected increase in the

sense of attachment to the neighborhood.

In particular, it was found that those neighbors who owned progressive architectural typology solutions, and where they had participated in their extension and transformation, showed a greater and more interrelated stated perception of preference for living in the neighborhood and choosing to stay in it, compared to the owners of architectural typologies whose design and spaces were invariable. This greater preference and predilection allowed assuming a greater place attachment and willingness to collaborate on common problems. However, it cannot yet be said that this necessarily generates a greater predisposition to making everyday face-to-face meetings, a different dynamic compared to the formation of neighborhood social capital and neighborhood cohesion, namely, that escapes the conditions and limitations defined by the personal and socio-territorial attributes of the neighborhood.

The findings also do not escape historical differentiations in social housing approaches in Chile and their consequences on the possibilities of interaction and recognition in the neighborhood space (Link et al., 2022a; Link et al., 2015). Nor can they ignore the impact that the difficult understanding of the rules governing the administration of common property has had on the typologies of high-rise complexes, triggering complex neighborhood coexistence (Bustos-Peñañiel, 2020). Both conditions could effectively affect the stated perception of preference and predilection to stay or leave the neighborhood, although as was explained, the case in question presented a generalized positive perception regarding the neighbors, but also a generalized perception of insecurity of their public spaces.

Thus, the differences between architectural typologies in general and progressive ones in particular, by themselves would not necessarily change the influence of the conditions and limitations imposed by the personal attributes of their owners, the social and urban ones of the neighborhood, or the structural inequalities of their environment, regarding the dynamics of generation and density of neighborhood social ties. Notwithstanding this, the findings do allow commenting that, together with other interventions, the architectural scale and residential typology, can contribute to the configuration of relational environments that motivate place attachment, and with this, reinforce the positive predisposition to produce neighborhood social ties.

VII. CONCLUSIONS

This work is introduced in a discussion that is mainly based on the scales of the city and the neighborhood, proposing

that the architectural scale is also significant, and the choice of housing solutions based on progressive and adaptive typologies is particularly so. Where the owner was a constant and active participant, would influence their stated perceptions of preference and predilection for the neighborhood and with it an expected greater attachment to it, giving a better predisposition to overcome obstacles and capitalize on the opportunities that the neighborhood gives to build neighborhood social ties.

This is especially important in a context marked by a housing policy where there is practically no participation in the residential, locational, and typological choice of neighborhood, housing, and its characteristics. However, further study must be made if this potential different predisposition to capitalize on neighborhood personal networks and generation of neighborhood cohesion, can go beyond the socio-material conditions of the neighborhood in question. Household surveys and the mapping of personal networks support an important part of the hypothesis and corroborate how the architectural typology can affect favorable perceptions, in terms of preference for living in the neighborhood and predilection for staying there, showing a greater attachment in itself, without necessarily escaping the structural urban conditions of the neighborhood. In any case, the evidence reported here continues to make plausible the idea that, along with the scale of the neighborhood, the use of a progressive typology, in the short and medium term, could support other types of interventions and favor the generation of neighborhood social ties, improving local response capacities to common problems.

In light of the findings, it is possible to suggest that housing policies should pay attention to the neighborhood's structural urban conditions, such as location and social composition. Likewise, it must also incorporate the issue of housing typology, not only in terms of surface area, density, and diversity, but also in its ability to be modified, expanded, adapted, and appropriated by its owners, thereby moving away from invariability and standardized extensions. This is a greater challenge if one thinks that the social housing public policy strongly tends toward densification and high-rise architectural typologies.

Finally, it must be recognized and mentioned that faced with the impossibility of empirically understanding all the aspects of socio-spatial practices in a given city, this case study, which is more limited and circumscribed, becomes relevant, especially in terms of the influence that the typological scale of architecture can have on neighborhood perceptions and personal predispositions to capitalize or not on the opportunities that this can generate for building neighborhood social ties, particularly in a socially disadvantaged urban neighborhood of southern Chile.

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THE PRODUCTION OF SOCIO- SPATIAL INJUSTICE TOWARDS THE ROMANI POPULATION DURING THE FRANCO REGIME:

THE NEIGHBORHOODS OF LO CAMPANO AND LOS MATEOS IN CARTAGENA (SPAIN)

LA PRODUCCIÓN DE LA INJUSTICIA SOCIOESPACIAL HACIA EL PUEBLO GITANO DURANTE EL FRANQUISMO: LOS BARRIOS DE LO CAMPANO Y LOS MATEOS EN CARTAGENA (ESPAÑA)

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Un 62,8% de la población gitana en España vive en asentamientos segregados del núcleo urbano, barrios periféricos o de segundo crecimiento, lo que es muestra de la persecución y discriminación histórica del pueblo gitano. El antigitanismo se ha territorializado mediante la eliminación de la autonomía y las formas de autoproducción del espacio, siendo la planificación urbanística y las políticas de vivienda un elemento clave en la materialización de su segregación urbana, con especial importancia durante el régimen franquista. La identificación del pueblo gitano como un elemento sobrante en el espacio urbano se lleva a cabo mediante procesos de expulsión de la vivienda autoproducida cuyo objetivo es el realojo en barriadas periféricas de vivienda social. El presente artículo analiza a través de dos estudios de caso en los barrios de Lo Campano y Los Mateos en Cartagena (España) el proceso de producción de injusticia socioespacial contra el pueblo gitano durante el franquismo, utilizando como marco analítico la definición de justicia social de Nancy Fraser (1996) y la teoría de la estructuración de Giddens (1984). Los resultados obtenidos señalan el papel de la planificación urbanística y las políticas de vivienda en la producción de la injusticia socioespacial, conformando un ejercicio de necropolítica urbana y de vivienda contra el pueblo gitano.

Palabras clave: Antigitanismo, injusticia socioespacial, planificación urbanística, necropolítica.

62.8% of the Romani population in Spain lives in settlements that are segregated from the urban center or in peripheral neighborhoods, a sign of their historical persecution and discrimination. Anti-Romani sentiment has been territorialized by eliminating autonomy and means of self-production of space, with urban planning and housing policies being a key element in the materialization of their urban segregation, particularly during the Franco regime. Identifying the Romani as a surplus element in urban space led to their expulsion from self-produced housing, relocating them to peripheral social housing neighborhoods. Through the case studies, this article analyzes the Lo Campano and Los Mateos neighborhoods in Cartagena, Spain, the production of socio-spatial injustice against the Romani during Franco's regime, using Nancy Fraser's (1996) definition of social justice, and Giddens' (1994) structuration theory, as an analytical framework. The results obtained point to the role of urban planning and housing policies in the production of socio-spatial injustice, forming an exercise of urban and housing necropolitics against the Romani people.

Keywords: Anti-Romani, socio-spatial injustice, urban planning, necropolitics.

I. INTRODUCTION

Antigypsyism is a “persistent and historically constructed system of habitual racism against social groups identified under the Gypsy stigma” (Alliance Against Antigypsyism, 2017, p. 5) seen throughout the world, with Gypsy communities being subject to discrimination and marginalization in many countries.

In Spain, antigypsyism is especially relevant, since it is one of the European countries with the largest Romani population and where this discrimination is most visible. 62.8% of the Romani population in Spain live in settlements in the periphery segregated from the urban center, and 37.1% of their dwellings are overcrowded (Fundación Secretariado Gitano, 2015). Similarly, insecurity in housing tenure and vulnerability against expulsion and gentrification processes are more commonplace in Romani communities than in others. Between 2013 and 2018, the percentage of the Romani population who own housing has fallen from 50.5% to 24.3%, while in the non-Roma population, it only dropped from 75.7% to 74.1% (Pedreño et al., 2019, p. 32).

Research on Romani neighborhoods in Spain focuses on their different historical origins: urban planning, eviction and rehousing actions, construction of social housing, or self-production of housing and space by the communities themselves (Botana Iglesias, 2022; Río Ruiz, 2014; Río Ruiz, 2020; Saavedra, 2021; Tomé Fernández, 2021). These studies point to the constant presence of antigypsyism in public policies and institutional action as a source of the urban segregation that communities currently suffer. Therefore, it is necessary to continue to look further into the analysis of these processes to confront the reparation of the historical and urban footprint of antigypsyism and reverse the segregation and exclusion processes that Gypsy communities have been subject to.

Thus, the purpose of this article is to analyze the extent to which planning instruments and public housing policies have contributed to generating and reproducing socio-spatial injustice, using an analysis framework based on the three-dimensional notion of social justice of Nancy Fraser (1996) and the structuring theory of Giddens (1984).

To do this, the analysis of two Romani neighborhoods in the city of Cartagena (Spain), with different historical origins, is proposed. While one emerges from self-built housing and resistance to eviction processes during the Franco dictatorship, another is the product of social housing neighborhoods built by the regime’s institutions. The difference between the historical production processes of the two neighborhoods allows for their comparison, and from this, a better understanding of how

the action mechanisms of the institutions are configured, what the resistances built by the communities has been like, and the future possibilities.

II. THEORETICAL FRAMEWORK

The Origin and Evolution of Antigypsyism in Spain

The historical persecution of the Romani in Spanish territories began in the 15th century and persisted during the following centuries with repressive measures against their mechanisms of autonomy, such as the prohibition of leaving their homes or the restriction of localities where they could settle, with the aim of eliminating nomadism, self-managed trades, and formulas of family and community cooperation (Cortés et al., 2021; Filigrana, 2020; Jiménez & Agüero, 2020).

During the Franco dictatorship, the social housing policies, developed since 1939 by the National Housing Institute under the autarchy framework, set the elimination of slums as an objective through policies for rehousing and the construction of neighborhoods and housing estates, although it was always incomplete (Tomé Fernández, 2021). The approval of the Law on the Land and Urban Planning System in 1956, laid the foundations for the urban development of Spanish cities through figures such as the General Urban Planning Plan, which brought a substantial change in the economic system of Franco’s regime towards an open-ended and financialized model, turning urban development and real estate speculation into the basis of the Spanish economy (Betrán Abadía, 2013; Fernández Carbajal, 2003). This dynamic drove expulsion and rehousing processes in social housing neighborhoods, which to this day “are still the poorest districts of their respective cities” (Tomé Fernández, 2021, p. 235), forcing the transformation of the social and community uses of the rehoused Gypsy populations.

After the Franco dictatorship, 75% of the Romani population continued to live in self-built settlements (Vázquez, 1979). The neighborhood remodeling policies in democracy focused on *in situ* rehousing processes for the working population residing in self-built settlements, marked by major neighborhood participation and good results (Castro & Molina, 1996). Romani communities were excluded from these processes and consigned to rehousing policies in the urban periphery without a right to own the homes (Álvarez de Andrés, 2020). In fact, this strategy of eliminating self-produced settlements generated exclusion and segregation, as it followed the dynamics of real estate speculation of cleared spaces, spatializing antigypsyism through housing policies (Río Ruiz, 2014; Saavedra, 2021; Tomé Fernández, 2021).

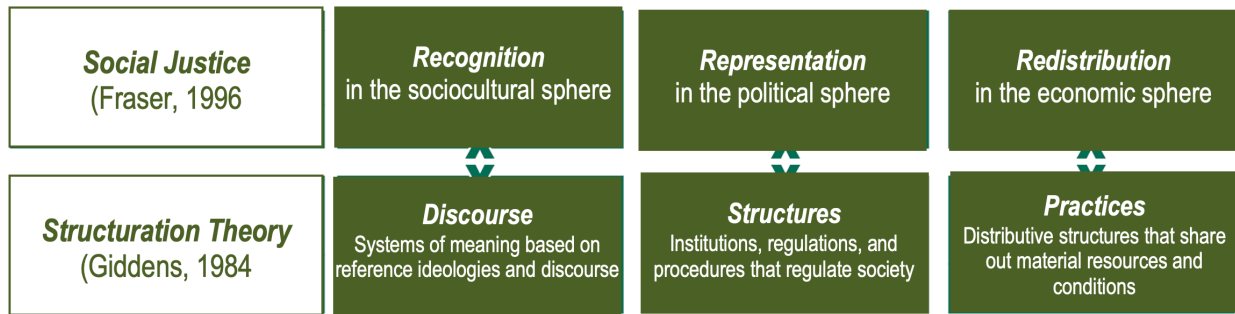


Figure 1. Interrelation between Fraser's (1996) social justice and Giddens' (1984) structuration theory. Source: Preparation by the authors.

Antigypsyism as Housing Necropolitics

Faced with this reality, Romani activism in Spain points to antigypsyism and its practices as a constant attempt to eliminate the Romani's resistance to participate socially, economically, and workwise in the capitalist system (Cortés et al., 2021; Filigrana, 2020; Jiménez & Agüero, 2020).

This attack has focused on the residual forms of self-production of space in countries of the Global North as dissident territories that slow down the process of capital accumulation (Lopes de Souza, 2012), thus forming a necropolitical process. In this sense, necropolitics, a term coined by Achille Mbembe (2003), refers to state policies and practices that seek control and domination over the life and death of certain human groups, often populations considered as "disposable" or "superfluous". Therefore, necropolitics manifests itself in the marginalization and violence against Romani communities and is reflected in their identification as a surplus element in the urban space.

We are thus faced with "housing necropolitics" (Álvarez de Andrés, 2020), that is policies that enable and force the disappearance of the self-managed forms of these "unprofitable" communities. This highlights both the cruelty of the capitalist system and its inequalities (Mbembe, 2003; Valverde Gefaell, 2015), and the unviability of the dominant social, political, and economic model (Procacci, 1991). The increasing commodification and financialization of housing since the 2008 crisis (Rolnik, 2018; Harvey, 2012) has also fostered access to "informal" housing, given the impossibility for an increasingly large majority to access the "formal" market due to the gap between housing prices and wages (Álvarez de Andrés et al., 2019), increasing the vulnerability to these necropolitical processes.

Socio-spatial Injustice as a Three-dimensional Phenomenon

All these factors of housing necropolitics generate a constant and historical denial of social justice towards the Romani, a concept used here following what Nancy Fraser (1996) defines through three elements:

- *recognition*, which refers to the assessment of the identity and cultural differences of social groups;
- *representation*, understood as political inclusion and the active participation of social groups in decision-making; and
- *redistribution*, in the sense of addressing the equitable distribution of economic and material resources needed for their development and well-being.

This three-dimensional analysis allows abandoning a partial understanding of justice in a more punitive, judicial, and criminal nature, in addition to serving as a starting point for new solutions that manage to transform the social injustices suffered by the Romani (Daróczy et al., 2021). This article uses the same framework, focusing both on the spatial and urban character of injustice and on its historical production through the denial and exclusion of communities in these three dimensions, therefore speaking of socio-spatial injustice.

In addition, to reinforce this three-dimensional approach, the structuring theory is included in the analysis (Giddens, 1984), specifically the division of social practices between *systems of meaning*, based on the reference discourses and ideologies; *authority structures*, i.e., the rules, institutions, and procedures that organize society; and *distributive structures*, that distribute the material resources (Healey, 2006).

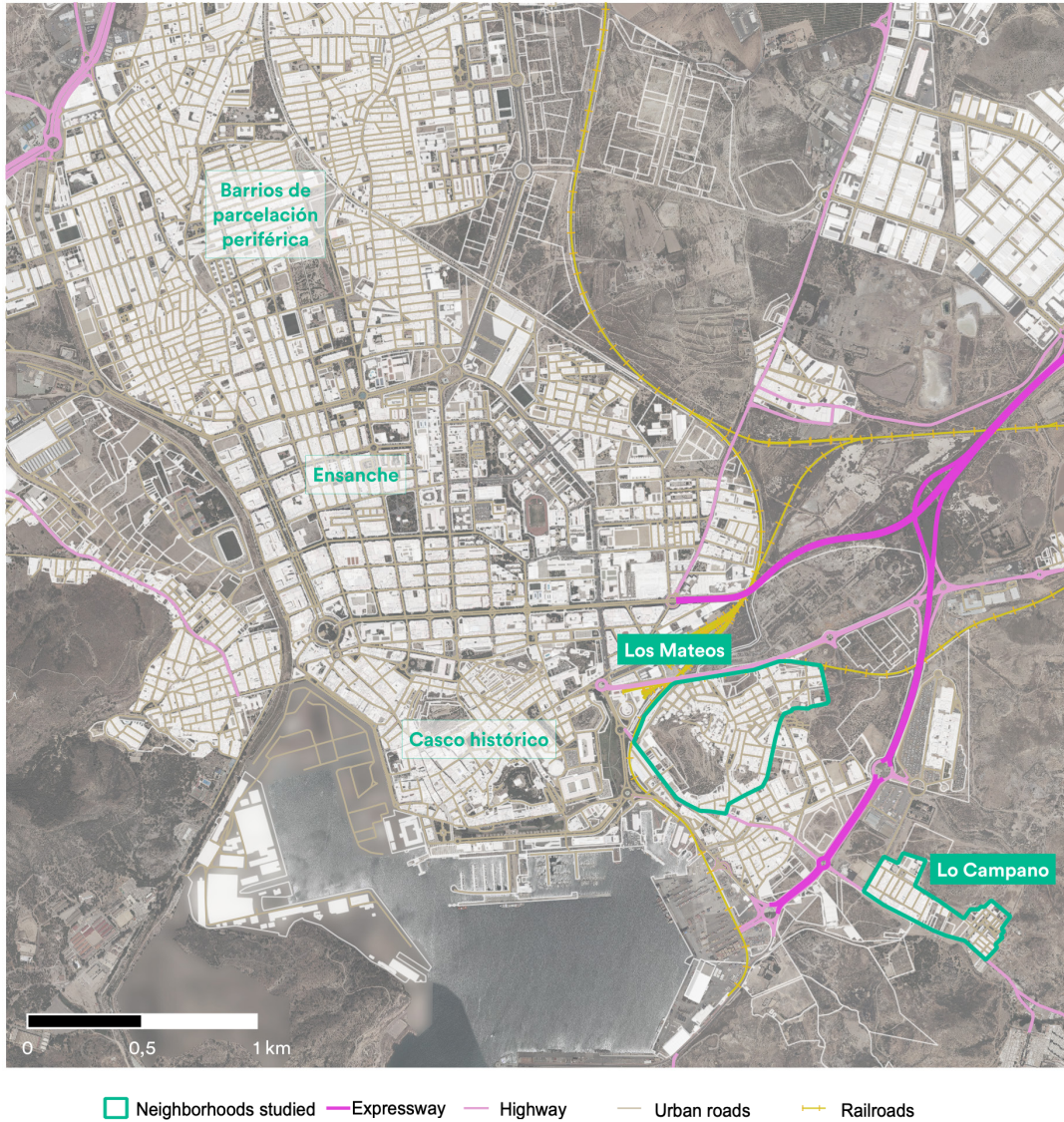


Figure 2. Location of the analyzed neighborhoods in the city of Cartagena. Source: Preparation by the authors.

III. METHODOLOGY

To analyze the historical production processes of neighborhoods, Fraser’s concept of social justice (1996) has been connected with Giddens’ structuration theory (1984). The combination of both frameworks links the *discourses* with *recognition*, the *structures* with *representation*, and the *practices* with *redistribution*. Thus, the theoretical framework becomes one for analysis and allows studying to what extent and with what tools the systematic persecution of the Romani has led to a

situation of denial of socio-spatial justice through the role of urban planning and housing policies.

Starting from the case study method (Yin, 1994), the neighborhoods of Los Mateos (01) and Lo Campano (02), in the city of Cartagena, have been selected as the focus of the research. Both neighborhoods have a large presence of Romani housing, with 220 houses in Los Mateos and 100 in Lo Campano (Fundación Secretariado Gitano, 2015), along with similar levels of socio-economic exclusion (Cartagena City Council, 2021) and spatially close locations, although segregated from the urban center by large barriers (Figure 2).

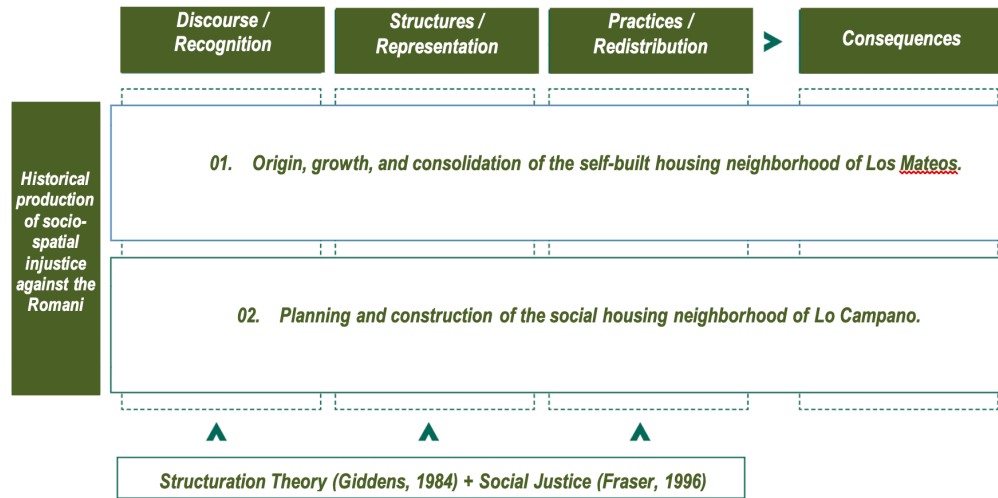


Figure 3. Analytical framework: Analyzed processes. Source: Preparation by the authors.

Municipal Archive of Cartagena (AMC)		
Code	Year	Content
CH02618/00009	1924	Relationship of the families that live in Castillo and the Cabezo de los Moros caves
CH02038/00015	1955	Construction project of Charity Homes on the road to the cemetery
CH01022/00001	1956	Letters to the Mayor, requesting housing in the new projects
CA26299/00001	1961	Statutes of the Francisco Franco Housing Board
	1961-1967	Annual activity report of the Francisco Franco Housing Board
	1969	Construction project for 40 subsidized homes in Lo Campano's San Isidoro neighborhood
	1971	Construction project for 32 subsidized homes in Lo Campano's San Isidoro neighborhood, Cartagena

Figure 4. List of archival documents cited in the text. Source: Preparation by the authors.

However, how each one was shaped makes them substantially different. While Los Mateos is a neighborhood of self-built housing, Lo Campano is the result of a social housing neighborhood planned by the Franco regime, precisely to relocate the population that lived in caves or self-produced housing. The study of the processes in the two neighborhoods makes it possible to identify similarities and differences between both models of space production (Figure 3).

The information related to the case studies comes from the archival consultation of urban planning documents and projects (Figure 4), mainly in the Municipal Archive of Cartagena (AMC, in Spanish), in addition to newspaper libraries and historical orthophotos. Compiling this documentation has enabled a critical review through a qualitative approach, whereby three main agents, whose *discourse*, *structures*, and *practices* must be studied in particular to specify their role in shaping the process: the State, the Market, and, finally, the communities themselves.

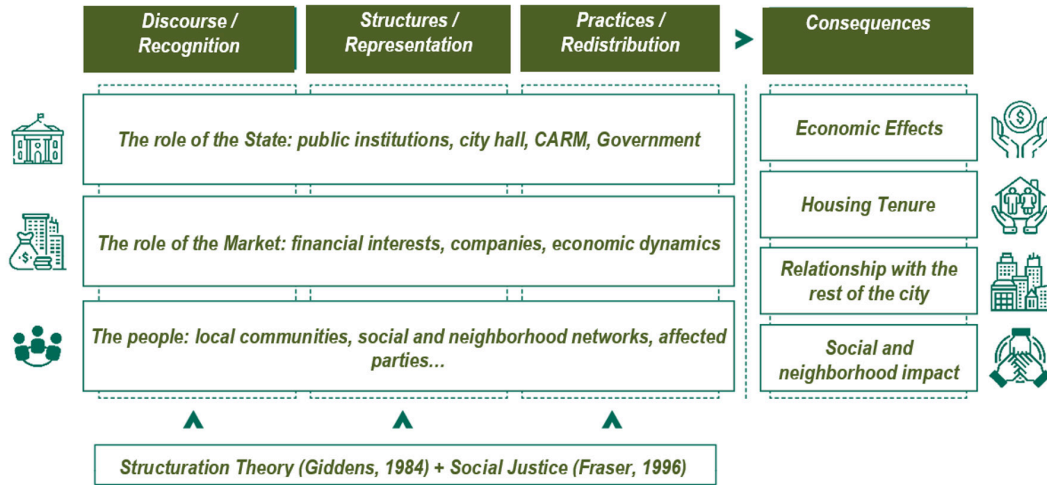


Figure 5. Analytical framework: agents and consequences studied. Source: Preparation by the authors.

Finally, the *consequences* generated by these processes are analyzed, dividing the lines of study into four (Figure 5). In each section, the impact of each element (positive, negative, or absent) has been assessed using a color code (green, red, or gray), assuming the well-being of the population as the base criterion for impact assessment.

IV. RESULTS

The historical production of socio-spatial injustice in Los Mateos and Lo Campano

In the analyzed period, the urban and housing policies in the city of Cartagena focused on three aspects: the “eradication of slums”, the expulsion of the working classes from the historic center, and the construction of social housing. These elements are present in the origin and development of the two neighborhoods studied, with this section presenting the results of the research on these processes.

Description of self-production of space in Los Mateos

Although historical records show the presence of self-produced settlements, such as the 1924 document “List of families that live in Castillo and the caves of Cabezo de los Moros” (AMC, CH02618/00009), which indicates the presence of self-built houses inside the abandoned defensive bastion and in the caves on the slopes, it would be with the great demographic growth of the city during the 50’s that self-built housing skyrocketed, also highlighting the extensive presence in the Cerro de los Moros caves and other nearby areas, such as the Lo Campano area.

The many letters addressed to the Mayor of Cartagena asking for housing in the summer of 1956, which are available at the Cartagena Municipal Archive (AMC, CH01022/00001) are an example of this. All the letters have a similar structure, first describing the location and condition of the home where the senders reside, and then requesting access to one of the new “Charity Homes” that the city council was going to build. It highlights the presence of cave dwellers, self-built homes, “cheap houses” from the 20’s and 30’s in poor condition, or people who sublet rooms in the working-class neighborhoods of the historic center.

Despite the insufficient construction of social housing by the Franco regime, as will be seen in the following section, the City Council evicted and dynamited the caves on the western slope of Cerro de los Moros (the closest to the urban center) in 1969. Despite this, the neighborhood of Los Mateos continued to grow and consolidate on the eastern slope over the following decades, largely through self-production. The orthophotos of 1956 and 2019 are compared in Figure 6, where the disappearance of self-built houses on a western slope and the densification of the neighborhood on the opposite slope can be observed.

Description of the planning and construction process of the Lo Campano neighborhood

The growing demand for housing in Cartagena throughout the 50’s led the City Council to start building social housing in the city, following the state-level initiatives of the National Housing Institute. The construction of the neighborhood began with the aforementioned “Charity Homes” Sheltered Housing Project, written down in



Figure 6. Orthophotos of Los Mateos in 1956 and 2019. Source: National Plan of Aerial Orthophotography.

1955 (AMC CH02038/00012). This project planned the construction of 147 single-family homes in Lo Campano, of which less than half would be built.

Alongside this, and following the Land Law of 1956, work began on the preparation of the General Municipal Planning Plan of Cartagena, approved in 1961 which, apart from planning urban growth, ordered the expropriation and demolition of the Molinete neighborhood in the historic city center. This elimination

was framed within the expulsion process of working-class neighborhoods from the historic center, which for Molinete was associated with the presence of an “immoral” population and activities in the eyes of the Franco regime (Viedma-Guiard, 2021), among which were the Romani. Therefore, this new demand was added to the already existing need for housing due to demographic growth. The result was projects that pushed the working classes from the historic city to the periphery.

Faced with these residential needs, the City Council approved, in 1960, the creation of a body that would manage housing construction, creating the Francisco Franco Housing Board. The Statutes of the Board of Trustees stated as an objective:

“erasing from the current reality the shame that many extremely modest families are still housed in the *subhuman environment* of caves and shacks, denying those inhabiting them the great dignity naturally endowed by God, or in other authentic slums whose narrowness imposes promiscuities that constitute very serious dangers of a *moral* and educational nature” (AMC CA26299/00001, Statutes, p. 2)

The annual reports of this organization for 1961-1967 (AMC CA26299/00001) show the procedures followed to build social housing and the progress of these projects. The first project consisted of 110 houses which, together with those built in 1955, expanded the village of Lo Campano to accommodate the population of the nearby caves (AMC CH02038/00015). The project was developed by the municipal architects and assigned to trusted contractors of the municipal council, delivering the houses in May 1962.

In the following years, the reports of the Board of Trustees make the need to build more housing to accommodate the expelled population clear, proposing the construction project of an “Absorption Village that has to consist of 1,010 homes and be called Cabezo del Molino, to house the inhabitants of Molinete and the Caves of Cabezo de los Moros” (AMC CA26299/00001, 1963 Report, p. 1). However, the reports of the following years show the impossibility of fully implementing this project, leaving just the partial and insufficient extensions of the Lo Campano neighborhood in 1969 and 1971.

Meanwhile, the expropriation and demolition of the Molinete neighborhood took years due to the resistance of the neighbors to abandon it and the lack of alternative housing. Finally, in 1974, “the demolition of the *waste* of that area (...)” began, changing from being a *blemish* to one of the most beautiful places in the city” (El Noticiero, 1974).

Consequently, while the population was expelled from the historic center and the self-produced housing areas, the institution responsible was unable to provide sufficient housing for the entire expelled population. The construction of social housing in Lo Campano was therefore nourished in part by this relocated population, while the rest of the population had to find other rehousing options. Despite the lack of official sources, the oral testimony of neighbors and neighborhood associations seem to indicate that part of the families currently living in Los Mateos come from these expulsion processes.

Consequences of the analyzed processes

The urban growth of the city of Cartagena during the second half of the 20th century was taken from the historic center to the north, linearly shaping the urban space towards the interior due to the presence of the port to the south, and industrial spaces, railway infrastructures, military areas, and geographical features to the east and west (see Figure 2). Consequently, the neighborhoods of Lo Campano and Los Mateos were isolated in the southeast, with a large number of infrastructures and physical barriers separating them from the rest of the city.

The *PGOU* of 1987 proposed the drafting of a Special Interior Reform Plan (PERI, in Spanish) for the surroundings of Castillo de Los Moros in Los Mateos, in what it defined as a “marginalized area of the city with notable health deficiencies” (The City Council Cartagena, 1987). Faced with this problem, the idea was to “liberate this building area by moving it to the neighboring urban areas,” thus expelling the population from the self-produced housing units that were located on the slopes of Castillo. Although this expulsion has not taken place, attempts to demolish these houses have continued over the following decades.

In recent decades, the exclusion of these neighborhoods has been aggravated by the emergence of new external threats, with new attempts to expel self-produced housing and the development of more infrastructure around the neighborhoods, thus increasing the isolation and pressure on these communities.

This entire production process of socio-spatial injustice in the neighborhoods of Lo Campano and Los Mateos has resulted in a situation of social, urban, economic, and institutional exclusion. The average annual income per household in these census sections is between €16,000 and €19,000 compared to the €31,411 municipal average (National Institute of Statistics, 2021). The unemployment rate registered in Los Mateos and Lo Campano is 33.73% compared to the municipal 13.43% (Cartagena City Council, 2021, p. 46) and 18.94% of the population over the age of 16 is without studies (Cartagena City Council, 2021, p. 137).

In addition, the overcrowding in both neighborhoods, the lack of services and insecurity in the tenure of self-built housing in Los Mateos, the low maintenance of social housing in Lo Campano, and poor communication with the rest of the city, especially in this second neighborhood (Cartagena City Council, 2021, p. 58), should be noted as other examples of this exclusion. Similarly, social discrimination and the lack of access to employment alternatives derived from the stigmatization of these neighborhoods have kept subsistence economies in place through activities such as drug trafficking.

The neighborhood fabric, faced with exclusion and increased urban pressure, has been activated to form resistance in defense

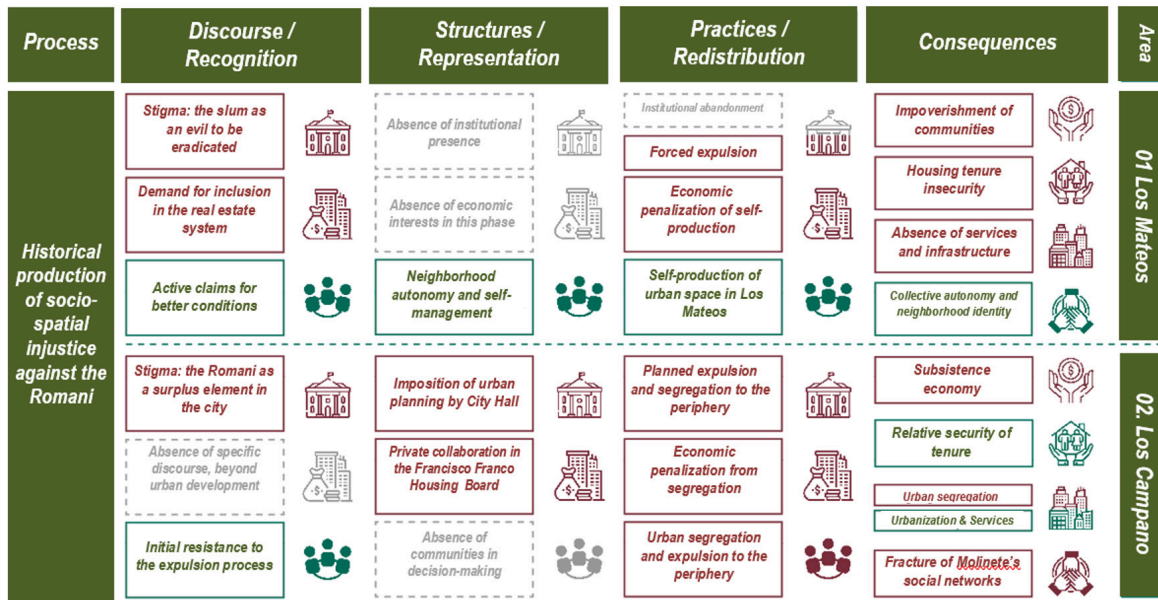


Figure 7. Discussion of the results. Source: Preparation by the authors.

of their right to the city, although there are differences that stand out. Even though there are neighborhood and social associations in the two neighborhoods, the mobilization of the Los Mateos neighborhood against urban segregation by railway infrastructures (Sanchez, 2021), the stoppage of eviction attempts of self-built housing around Castillo de Los Moros (González, 2015), and the neighborhood organization in the face of expulsion attempts by new urban planning instruments (Ribelles, 2016) stand out. On the contrary, in the neighborhood of Lo Campano “a low level of citizen participation and a disarticulation of the associative fabric” has been seen (Cartagena City Council, 2021, p. 185).

V. DISCUSSION

The results of the research, summarized in Figure 7, applying an analytical framework based on Fraser’s notion of social justice (1996) and Giddens’ structuration theory (1984), are discussed below.

Production of socio-spatial injustice in the self-built neighborhood of Los Mateos

Institutional and economic discourses have penalized the self-production of space through *negative recognition* and the stigmatization of slumdom, although they hide behind hygienist or moral arguments. For their part, the population has kept in their *discourse*, a *self-recognition* as a community and of

resistance to eviction, in addition to actively participating in the claim for decent housing conditions.

As for the *structures*, the absence of institutional and economic agents in the neighborhood contrasts with the existence of community autonomy and self-management networks, which are temporarily maintained despite expulsion attempts.

The *practices* observed show a generalized institutional abandonment in the self-produced areas until the arrival of new expulsion cycles that increase *negative redistribution*, which generates practices of resistance and cooperation made by the population through neighborhood mobilization.

The production of socio-spatial injustice in the rehousing process of Lo Campano

The institutional *discourse* has pointed to the working classes, especially the Romani, as a surplus element in the city through a *negative recognition*, while the communities themselves have presented a *discourse* of initial resistance to the expulsion processes, with *self-recognition* as housing applicants to the relevant institutions.

The existence of authoritarian *structures* has been seen through the imposition made for urban planning and the resulting forced eviction of the neighborhoods of the historic center and self-built housing, which happened without the *representation* of the communities in the process, but where the private sector did so through collaboration with the Board of Trustees.

Urban planning *practices* were materialized in the expulsion to the periphery and the dispossession of housing, with the negative consequences in the *redistribution* this has generated through penalization by the socio-economic system.

Economic, residential, urban, and social consequences

Communities have been impoverished and penalized for being outside formal circuits and, in addition, stigmatized for maintaining subsistence economies, especially through drug trafficking.

The urban planning of Lo Campano has provided its neighbors with greater security in *housing tenure*, although the progressive deterioration and reduction of the social housing stock is harming them. On the contrary, self-production housing in Los Mateos has generated great insecurity in tenure as it is not legally recognized, and is also threatened by new attempts at expulsion through urban planning.

As for the *relationship with the rest of the city*, although both neighborhoods suffer from socio-spatial segregation, the location of Lo Campano negatively penalizes this community, though the unplanned origin of Los Mateos is punished with lower upkeep of public spaces and greater infrastructure deficit.

Finally, the *social and neighborhood networks* in rural areas are more fragile due to the fracture suffered by the expulsion and rehousing processes of their inhabitants, while the maintenance of a collective identity of Los Mateos as a self-produced space generates a relatively greater social cohesion and better organizational autonomy.

The results obtained indicate how a necropolitical process has occurred (Álvarez de Andrés, 2020; Mbembe, 2003) against the Romani communities of Lo Campano and Los Mateos, reflecting the spatialization of antigypsyism as a system of oppression (Filigrana, 2020; Jiménez & Agüero, 2020) through housing policies and the expulsion and rehousing processes (Botana Iglesias, 2022; River Ruiz, 2014; Saavedra, 2021).

Thus, the *lack of recognition or negative recognition* of the Romani in the hegemonic *discourse* has led to the exclusion of *structures of representation* through urban planning, which has authoritatively expelled them from the city through *practices* aimed at segregation and socio-economic penalization, generating a negative *redistribution*. However, resistance against this process has remained throughout history through *self-recognition* as a community and the creation of resistance *discourse* that generates *structures of representation* outside the market and the state. These structures take place through neighborhood and family

networks and are materialized in subsistence, cooperation, and mutual support *practices*, and in the very mechanisms of self-production of space.

VI. CONCLUSIONS

The realization that there has been a historical and systematic exercise of anti-Romani exclusion and segregation in urban space once again highlights the need to look further into the production of the social injustice against the Romani in Spain. The theoretical-analytical framework that has been shaped from the intersection of Fraser's three-dimensional notion of social justice (1996) and Giddens' structuration theory (1984), is presented as a valid analytical framework for the study of these processes, thereby allowing approaching a multidimensional study of the agents involved, their *discourse, practices* and *structures* and the consequences on communities.

The research results themselves point out where the path to the emancipation of these communities and the reparation of this injustice may lie. The existing mobilizations in the face of urban pressures and threats are an example of *community resistance*, defined as "a form of politically committed resilience in the face of the tensions they encounter from the existing powers" (Álvarez de Andrés et al., 2019), which is key in the claim by the communities for *recognition, representation, and redistribution* in the city and urbanism.

With a view to future lines of research, it should be remembered that "the history found in the archives is insufficient to know the memory of precarious settlements and their relationship with the territory, since this knowledge has historically been left out of the records" (Botana Iglesias, 2022, p. 40). Although this research has focused on the analysis of urban and housing planning documentation and projects, an in-depth study of the resistance that is being woven into these communities is identified as a future line of work, putting a voice to and a focus on the very people who build them.

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DAILY MOBILITY PRACTICES AND URBAN STRUCTURE IN THE PERI-URBAN ENVIRONMENT: ¹

LOMAS COLORADAS AND PORTAL DE SAN PEDRO, SAN PEDRO DE LA PAZ(CHILE)

PRÁCTICAS DE MOVILIDAD COTIDIANA Y ESTRUCTURA URBANA EN EL ENTORNO PERIURBANO:
LOMAS COLORADAS Y PORTAL DE SAN PEDRO, SAN PEDRO DE LA PAZ(CHILE)

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Se propone comprender las prácticas de movilidad cotidiana en dos áreas residenciales periurbanas contiguas, pero que presentan características distintas en cuanto a origen histórico, diseño y trazado urbano, nivel socioeconómico y acceso a transporte público. El estudio se localiza en los sectores de Lomas Coloradas y Portal de San Pedro de la comuna de San Pedro de la Paz. A partir de un análisis cuantitativo, se analizó comparativamente el nivel de integración que permite la trama urbana usando el método Space Syntax (Hillier et al., 1987) mediante el software DephtmapX, para luego identificar la cantidad de equipamientos y la densidad poblacional en base a datos disponibles del censo 2017. Por último, el desarrollo de la movilidad se estudió desde la aplicación de encuestas semiestructuradas enfocadas desde el punto de vista de la oferta. Los resultados muestran que el tipo de trama urbana y su nivel de integración local pierden incidencia en las prácticas de movilidad cotidiana cuando se trata de desplazamientos a nivel intercomunal. Así, dentro de la oferta de transporte, satisfacer únicamente la oportunidad de acceso no asegura la disminución de desigualdad urbana observada desde la movilidad cotidiana de los individuos.

Palabras clave: movilidad cotidiana, periurbanización, sintaxis espacial, urbanizaciones cerradas.

The aim of this article is to comprehend daily mobility practices in contiguous peri-urban residential areas that have different characteristics in terms of their historical origin, urban design and layout, socioeconomic level, and access to public transportation, using the areas of Lomas Coloradas and Portal de San Pedro in the commune of San Pedro de la Paz. From a quantitative analysis, the level of integration allowed by the urban fabric was analyzed comparatively using the Space Syntax method (Hillier et al., 1987) through the depthMapX software, to then identify the number of facilities and population density based on data from the 2017 census. Finally, mobility was studied by applying semi-structured surveys focused on supply. The results show that the type of urban fabric and its level of local integration lose importance in daily mobility practices when it comes to intercommunal travel. Thus, within the transport offer, just satisfying access to these areas does not ensure the reduction of the urban inequality observed in the daily mobility of people.

Keywords: daily mobility, peri-urbanization, spatial syntax, gated communities.

I. INTRODUCTION

There is consensus in the literature that the urban expansion of the contemporary city and its sprawl, are closely related to mobility systems (Galimberti, 2018; Jirón et al., 2010; Mawromatis, 2013). The creation of road infrastructures and the promotion of private vehicles, act as catalysts of urban sprawl, favoring the emergence of new urban developments outside consolidated areas. With this, they have significantly transformed the urban morphology of cities, increasing traffic problems and deepening inequalities in access to job opportunities and quality facilities and services (Tiznado-Aitken et al., 2019). This research argues the need to address the role of urban structure considering everyday mobility from its direct ties to unequal access and the forms of social exclusion in large urban areas (Jirón et al., 2010). In this aspect, the role of urban structure and public transport supply vis-a-vis mobility practices has seen less research for the peri-urban areas of medium-scale cities, specifically those with high levels of dependence on the regional capital. This article proposes addressing the case of two neighborhoods in the commune of San Pedro de la Paz as examples of accelerated urban development. Their growth has been fragmented, with a high degree of urban segregation and inequality (IDE, 2017), although with a diverse urban structure.

This research asks how the urban structure is related to daily mobility practices of peri-urban sector inhabitants with high levels of segregation and inequity. Starting from this basis, it lays down a hypothesis that the low integration of the urban fabric, with urban sprawl that has a low density and quality of public transport, are variables that intensify mobility practices and deepen existing inequalities in the peri-urban area. To investigate the characteristics of urban structure that affect mobility practices, it is proposed to comparatively analyze the daily mobility practices from the supply approach (Herce, 2009) using residents of different urban developments in the peri-urban San Pedro de la Paz, and their relationship with the levels of integration of the urban fabric (Hillier et al., 1987) and variables that shape the built environment. In this way, the implications of continuing to replicate the peripheral low-density sprawl model through gated communities are visualized. Regarding the methodology, first of all, 370 semi-structured surveys were applied to residents to understand mobility practices and the public transport supply. Secondly, to observe the urban structure and the built environment, the level of integration allowed by the urban fabric was analyzed following the Spatial Syntax

theory. The results show that, in a context of urban sprawl lacking functional and historical centralities, the structure of residential areas and dependence on motorized transportation intensify high-cost daily mobility practices and travel times. However, the type of urban fabric and its level of local integration lose their impact when it comes to intercommunal commutes. Finally, the study helps to clarify the relationship between the built environment and urban mobility, while introducing a new methodology to make the forms of urban fragmentation in a medium-scale city visible.

II. THEORETICAL FRAMEWORK

Peri-urban environment, urban fabric, and daily mobility

From the general scope, Jacobs (1961), regarding spatial configuration and urban structure, states that each crossroads represents an additional opportunity where citizens can choose between different options of urban space, concluding that one way to value the potential quality of a route as support for urban life is from the density of intersections. Similarly, Lynch (1985) addresses the ease of recognition and organization between the different parts of the urban landscape under the concept of "legibility", emphasizing that in a legible city, the routes and districts are easily identifiable and grouped into a global pattern. Hillier et al. (1993) and Penn et al. (1998) also state that the way new housing developments are embedded in the street network can affect complex social processes by affecting movement patterns in the streets. These movement patterns affect the use of land and space; therefore, they are related to the construction of community networks, the development of commercial activity, and security levels, and with this, the satisfaction of the neighborhood. In this way, the public transport network is becoming vitally important both to expand and to restrict opportunities for meeting. Thus, "the public space has the potential to rebuild what society divides" (Hillier et al., 1987). This relationship is precisely the area that has been developed by The Bartlett School of Architecture through spatial syntax, particularly through the analysis of axial maps that represent all the public spaces and streets of the city. Through modeling, the entire fabric is covered with the minimum number of straight lines, as long as possible, measuring the average number of steps it takes to move from one node of the grid to another, or from one line to another within axial maps. In this way, "global integration" is understood as the variable that measures the position of each segment

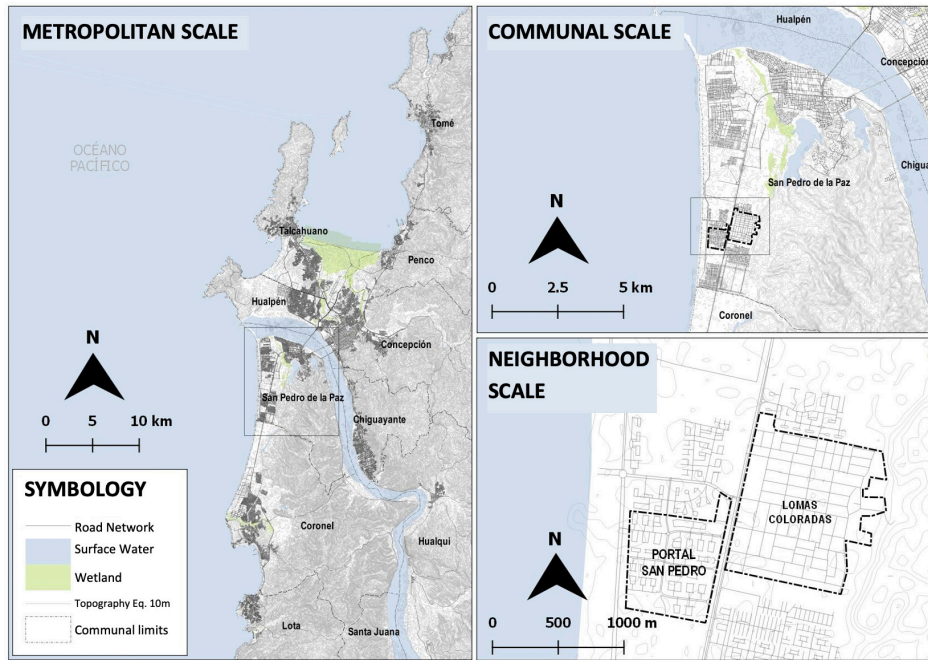


Figure 1. Localization of case studies at a metropolitan, communal, and neighborhood scale. Source: Preparation by the authors.

considering the entire system, and “local integration” as the variable that measures the position of each segment regarding its immediate surroundings (Hillier, 1996; Mora & Greene, 2008; Zumelzu et al., 2016).

In this same aspect, Marquet and Miralles (2014) propose that the observation of urban proximity phenomena, from the point of view of everyday mobility, allows analyzing not only what the city structure allows people to do, but also what they really do. From this, the concepts of “occupational mobility”, referring to trips for mandatory reasons such as studies or work, and “personal mobility”, understood as diverse activities such as shopping, leisure, and social life, are distinguished. Likewise, daily urban mobility is understood as “that social practice of daily displacement through urban time and space that allows access to activities, people, and places” (Jirón et al., 2010, p. 24). On the other hand, Herce (2009) proposes studying mobility with an alternative approach from the “supply”, understood as the key factor to increasing users from the combination between coverage, frequency, and punctuality. Similarly, Cervero (2020) proposes an “adaptive transit” model that modifies traditional transit services to respond to low-density settlement patterns. To

some extent, Cervero’s (2020) model coincides with the aspects that Herce (2009) outlines as key in the analysis of mobility, adjusting urban settlement patterns, and the designs and technologies of transport services.

In particular, from a historical perspective, in the final decades of the twentieth century, the neoliberal reforms imposed by the South American dictatorships led to the dispersion of residences and later employment, being recognized, according to Napadensky and Orellana (2019), as a phenomenon of the global transformation of metropolitan areas. This would create new centralities outside of outdated foundational centers, intensifying intra- and inter-urban relations (Napadensky & Villouta, 2019). From the metropolitan level case study, the authors understood the Metropolitan Area of Concepción (AMC, in Spanish) as an intermediate highly-complex city undergoing a metropolization process, where, the more this process progresses, the greater the concentration of specialized services in the traditional center is, thereby increasing the dependence of the peripheral communes on the urban system. On the other hand, for Castro, González, and Múnevar (2018), the peri-urban area is a discontinuous space where, intermittently, there may be

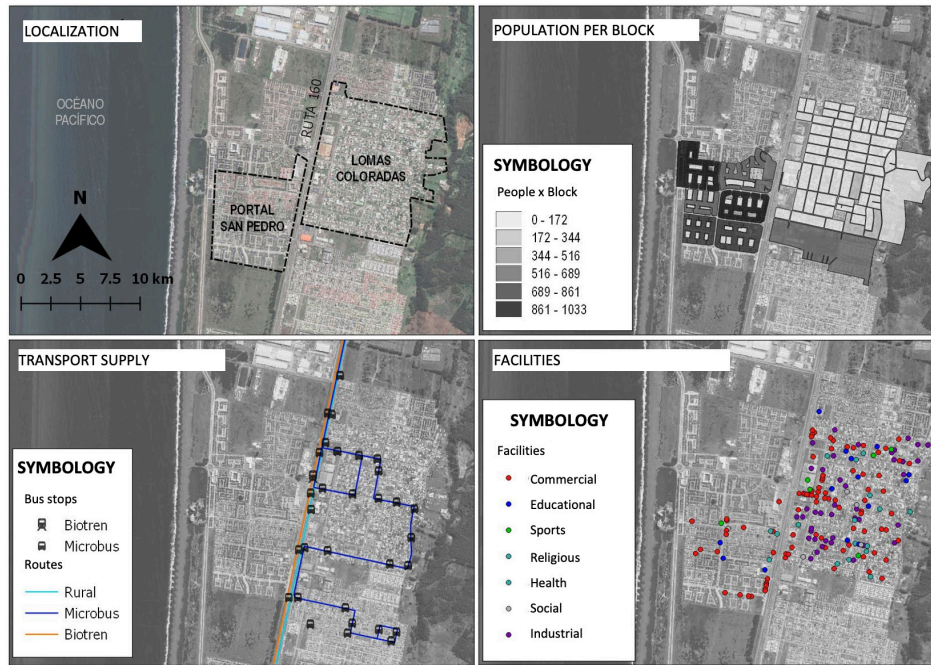


Figure 2. Built environment: density, transport, and facilities. Source: Preparation by the authors based on the 2017 Census (INE, 2018); GESITRAN cartography; SII digital cartography and field survey.

land destined for rural activity, along with a weak coverage of services and facilities.

From the local scope of the case study, the peri-urbanization process in San Pedro de la Paz mainly arose through private projects after the liberalization of the land market in Chile in 1979, which meant that land was no longer considered a scarce good. Alongside this, the approval of Decree in Law (DL) No. 3,516 of MINAGRI (1980) increased the building density on rural land⁶, reducing the minimum property subdivision from 20 hectares set by DL N° 752, of 1974, to 0.5 hectares (Jiménez et al., 2018). These measures provided the regulatory framework for the expansion of the real estate market into rural areas, mostly using the gated communities model, defined as housing complexes with controlled access and sharing common spaces⁷. In this area, Stockins (2004) describes gated communities as “urban pieces” characterized by the dissolution of the block, the turning of complexes inwards, and the use of the *cul-de-sac*. For the most part, they emerge along main roads and are characterized by the prominence that the private car acquires in them

(Galimberti, 2018), which implies a greater consumption of resources for a smaller number of inhabitants, thus promoting an unsustainable city model (Jiménez et al., 2018).

Characterization of the case studies: Lomas Coloradas and Portal de San Pedro

San Pedro de la Paz is a commune of the province of Concepción located on the coastal edge of the Bio-Bio Region (Figure 1). From the physical geography, its main units are the Pacific Ocean, the Bio-Bio River, the coastal plain, the Nahuelbuta Mountain range, Los Batros Wetland, and the Grande, Chica, and La Posada lagoons. These geographical and morphological units have been influential in the settlement, configuration, and growth processes of their urban centers (Salinas & Pérez, 2014). Thus, urban growth has developed in a fragmented way, without a spatial or functional center.

Over the past few decades, the real estate expansion process in San Pedro de la Paz has spread toward the peripheries, having as foci, route 160 along the coastal

⁶ The rural properties are understood as agricultural, livestock, or forestry properties located outside the urban limits.

⁷ The concept of “condominium” is understood generically as referring to housing complexes with controlled access that share common spaces.



Figure 3. Elevation of the built environment; Portal San Pedro (above) and Lomas Coloradas (below). Source: Preparation by the authors.

plain towards Coronel and the Andalué sector on the Nahuelbuta Mountain Range (Salinas & Pérez, 2014), where vehicle congestion has been one of the most obvious effects of urban sprawl in terms of everyday mobility. That is why, given the context of peripheral expansion and its relationship with the development of everyday mobility, it is necessary to observe the adjoining peri-urban neighborhoods of Lomas Coloradas and Portal San Pedro, which have different urban morphologies (Figure 2 and Figure 3).

Lomas Coloradas is located east of Route 160 and is a traditional neighborhood built in the 1970s after the construction of the Socoagro slaughterhouse. Its layout is orthogonal with open passageways. Self-built housing predominates, and it has a population density of 43.3 inhab/ha (INE, 2018) and diverse types of facilities covering 25% of its land.

Meanwhile, Portal San Pedro is located to the west of Route 160. The building works started in 2003, with a residential complex of gated communities arranged in a tree-like layout with detached 2-floor houses. Its population density is 110.9 inhab/ha (INE, 2018) and 9% of its land has facilities. This becomes relevant when mobility practices differ between two sectors that, despite being contiguous in the peri-urban area, are different in terms of urban morphology, densities, facilities, and the public transport supply (Figure 2 and Figure 3).

III. METHODOLOGY

This research is based on the question of how the urban structure is related to the daily mobility practices of peri-urban sector inhabitants with high levels of segregation and inequity. From this, the hypothesis is raised that, in the peri-urban setting, the structure of residential areas

is related to everyday mobility practices in terms of the integration variables of the fabric and the public transport supply, intensifying mobility practices that deepen existing inequalities.

To investigate the characteristics of the urban structure that affect mobility practices, the daily mobility practices among residents of condominiums and lots in the peri-urban area of San Pedro de la Paz and their relationship with the urban structure were analyzed comparatively. For this, a quantitative methodology with a descriptive scope was used with two levels of analysis.

At the first level, the calculation of the urban fabric's global and local integration levels was considered to study the urban structure by making a planimetric survey in AutoCAD 2015. Secondly, to process the relationship between each segment, the DepthMapX software was used (Figuerola et al., 2018). Finally, to expand upon understanding at a spatial level, this was complemented with a survey of the facilities, population, and housing density (Table 1). In the second level of analysis, the variables that Herce (2009) proposes from supply were observed to understand the mobility practices, namely: coverage, security, frequency, and punctuality, which was complemented with cartographic surveys of the transport supply. To do this, 370 origin-destination and semi-structured surveys were made to residents using a "door-to-door" system in February and March 2019, with 95% reliability and a sampling error of 5%, which were then processed with descriptive statistics of SPSS. The target population was 9,964 people and was defined according to the total inhabitants of each block in both case studies, using geo-referenced data from the 2017 Census. The following expression was used to calculate the sample (Suárez, 2004):

Sample Size = $Z^2 * (p) * (1-p) / c^2$
 where Z = Confidence level (95%); p = 0.5; c = Margin of error (0.05 = ±5)

Specific Objectives	Variables	Sources of Information	Processing
Analyzing the characteristics of the built environment and the location of urban uses that generate mobility.	Facilities Population Density	Primary: Planimetric survey Secondary: Georeferenced map of the 2017 Census	AutoCAD 2015 ArcGIS, ESRI
	Global Integration Local Integration	Primary: Spatial syntax	DepthMapX
Understanding the mobility practices in the peri-urban setting from a multiscale analysis with a supply approach.	Public transport supply Urban scale	Secondary: Integrated map - SECPLA GESITRAN Cartography	ArcGIS, ESRI
	Coverage Frequency Punctuality Security	Primary: Survey of the perception and mobility practices of a representative sample	IBM SPSS Statistics 25

Table 1. Synthesis of the methodological processes. Source: Preparation by the authors.

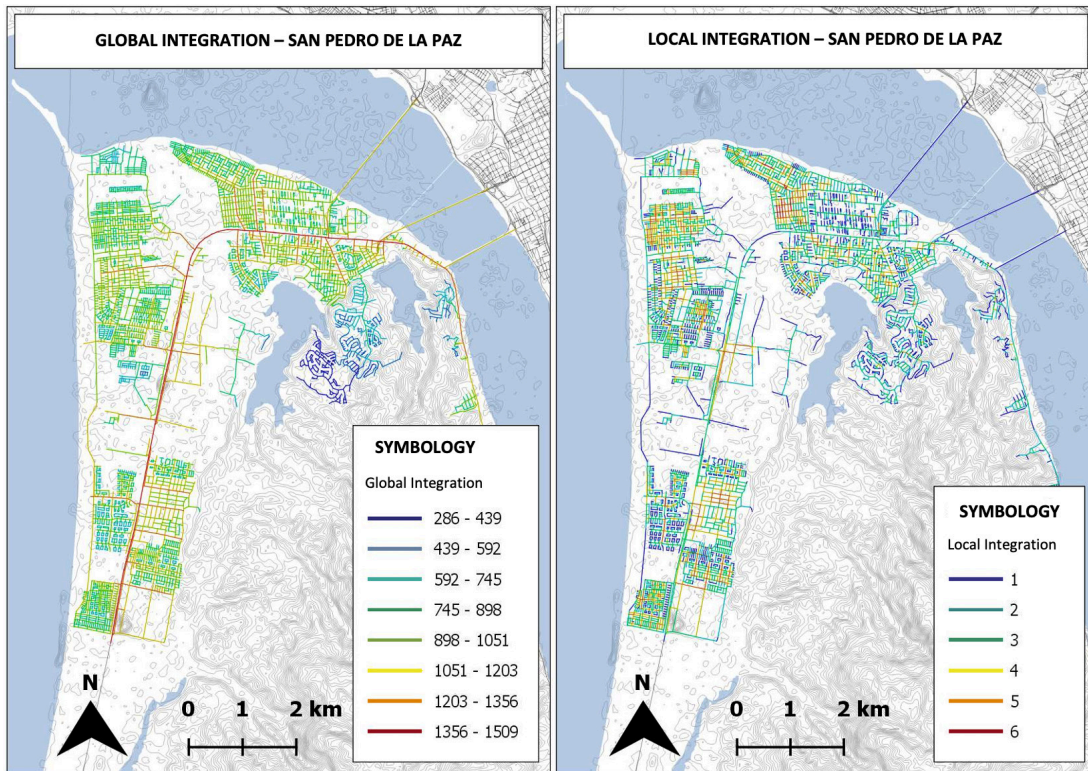


Figure 4. Global and local integration - San Pedro de la Paz. High values in red. Source: Preparation by the authors.

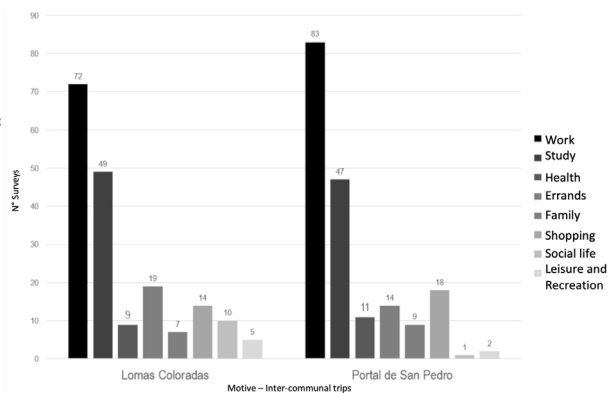
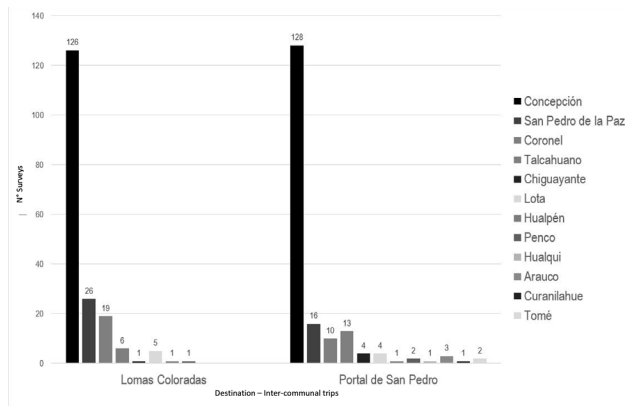


Figure 5. Commune destination on everyday trips. Source: Preparation by the authors.

Figure 6. Reason for travel for inter-communal mobility. Source: Preparation by the authors.

IV. RESULTS

Local and global integration conferred by the urban fabric in San Pedro de la Paz

The results indicate that at a communal level, the highest “global integration” values are found along Route 160, the main road that connects the interior fabrics of San Pedro de la Paz with the communes of Coronel to the south and Concepción to the north (Figure 4). Currently, the urban sprawl around Route 160 is characterized by real estate projects with low global integration, whose structure contributes to the loss of compactness and urban continuity.

In the “local integration” variable at a communal scale, the highest levels are seen in the neighborhoods of Candelaria, Michaihue, Lomas Coloradas, and part of Villa San Pedro, all consolidated residential sectors, structured based on regular orthogonal grids. While the lowest levels of local integration were recorded in the Andalué, El Venado, Portal San Pedro, San Pedro del Valle, and Huertos Familiares sectors, recent residential areas with arborescent plots, where the *cul-de-sac* predominates.

At a neighborhood level, the sectors studied have very different levels of global and local integration (Figure 4). The low levels of global integration in Portal San Pedro are explained by only having 2 roads that connect to Route 160, unlike the 6 roads that the Lomas Coloradas sector has. While the disparity in the levels of local integration arises due to the type of fabric used and the number of intersections that these allow. High values of local integration are identified in 42% of the segments

of Lomas Coloradas and 4% of Portal San Pedro, and low values of local integration in 5% of Lomas Coloradas’ segments and 45% of Portal San Pedro’s.

Intercommunal Mobility in San Pedro de la Paz

Regarding the analysis of the resident’s mobility practices, the destination commune that concentrated the most displacements was Concepción with 70%, followed by San Pedro de la Paz with 9% (Figure 5). Of these trips, it was observed that 88.7% were for work purposes (Figure 6). As for the choice of modes of transport, 34% used buses, 26% Biotren (the train), and 39%, a private car (Figure 7), meaning that 24.8% spent over \$50,000 per month on transportation (Figure 8). Considering this, the sector with the lowest overall integration into the urban fabric and the public transport network increases automotive dependence and with it, monthly expenditure for transport.

Intercommunal Mobility in Lomas Coloradas

Similar to the previous case, the communes that had the most displacements were Concepción and San Pedro de la Paz with 68% and 14% respectively (Figure 5), where work reasons accounted for 84.4% (Figure 6). Regarding the mode of transport used, the use of the bus predominates in 65% of the surveys, followed by the private car and the Biotren, with 23% and 8% respectively. The percentage of expenses over \$50,000 per month decreases to 7.6% of the sample (Figure 8). In this way, the sector with greater global integration into the urban fabric and greater public transport supply decreases vehicle dependence and, in turn, monthly spending on transport.

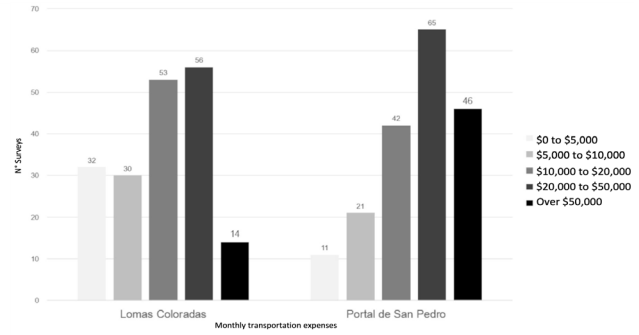
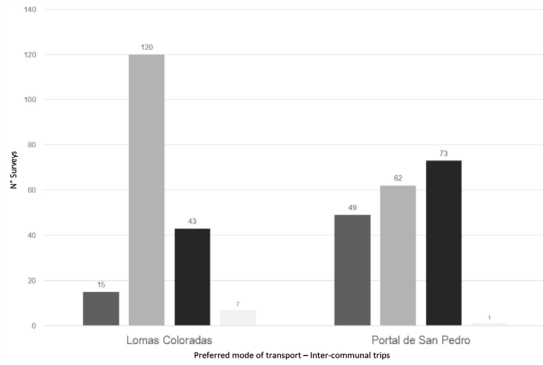


Figure 7. Preferred mode of transport on inter-communal trips. Source: Preparation by the authors.
 Figure 8. Monthly expenses for transportation. Source: Preparation by the authors.

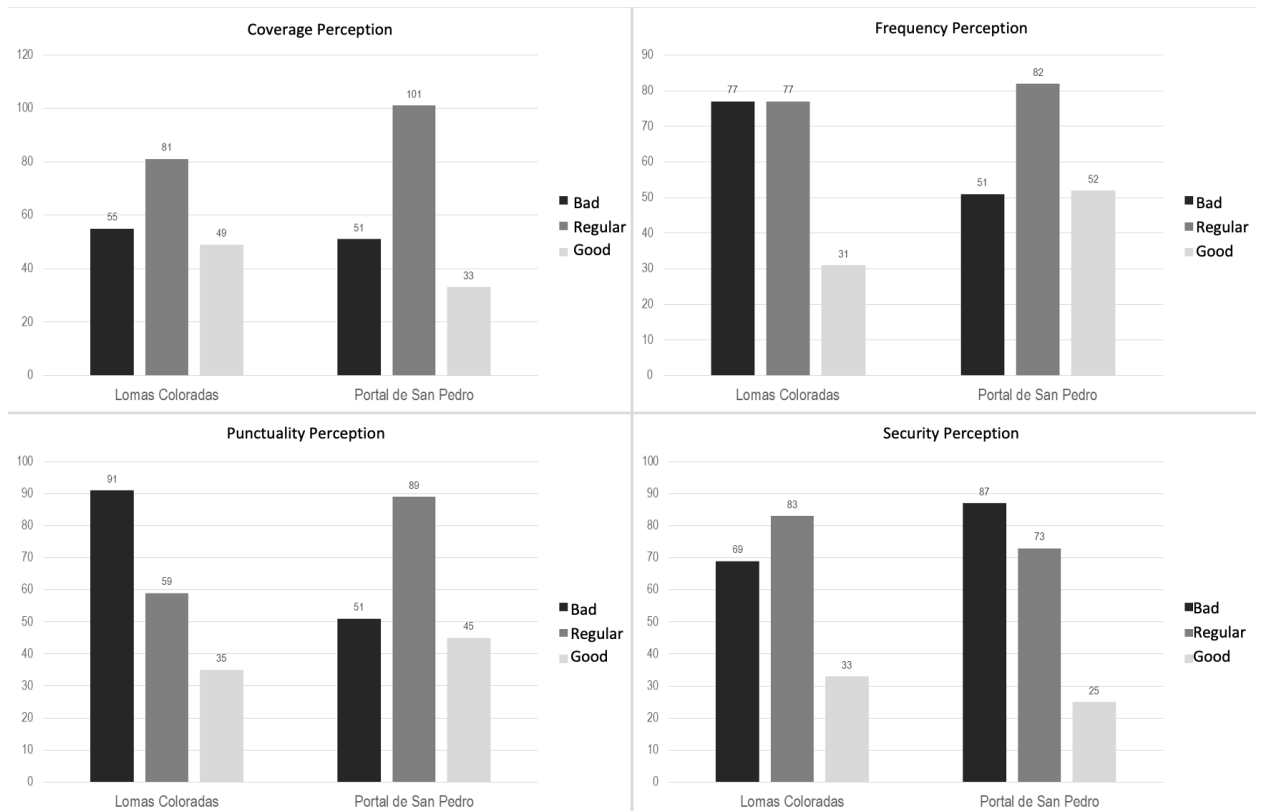


Figure 9. Public perception of the public transport offer. Source: Preparation by the authors.

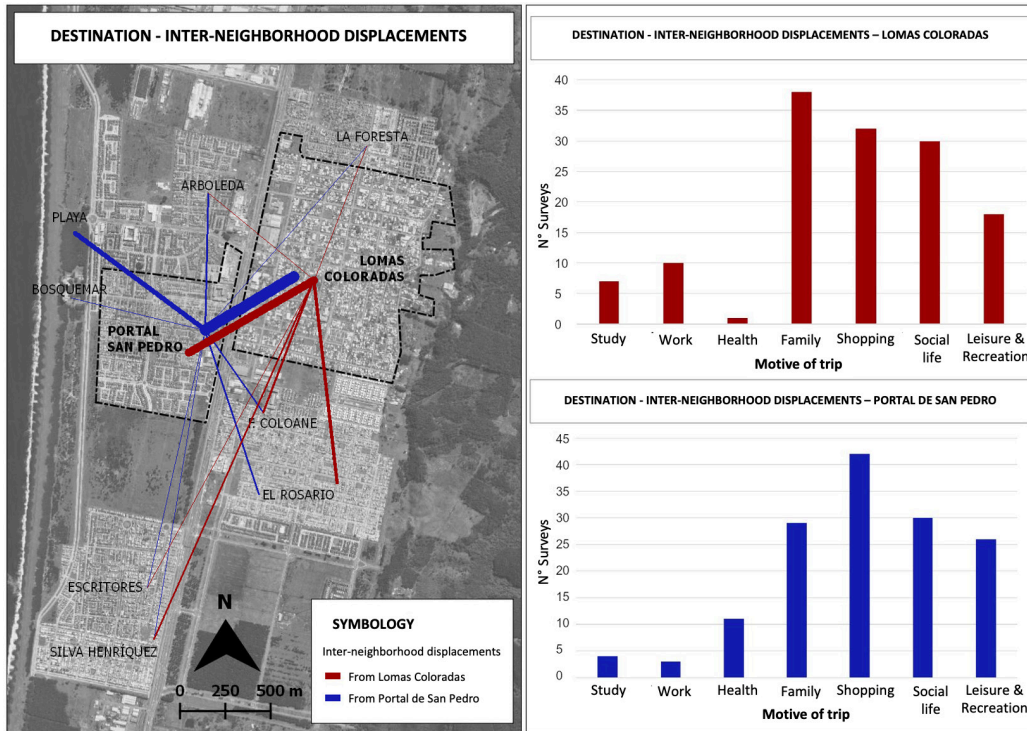


Figure 10. Inter-neighborhood displacements. Source: Preparation by the authors.

Public perception of the public transport supply

After obtaining background information on the urban fabric, location of facilities, and population density in each sector, the next step was to compare the daily mobility practices in a multiscale, communal, and inter-neighborhood way, to know from a citizen's perspective the quality of the supply in the means of transport used (Figure 9).

For the "coverage" and "frequency" variables, both sectors differ in walkable access to public transport. Even though the data indicate that for Lomas Coloradas the perception of access to public transport at walking distance is worse than Portal San Pedro (30% and 27% respectively), the frequency is better valued for the latter (28% "bad" for Portal San Pedro, 41% "bad" for Lomas Coloradas).

For "punctuality", the method used in the round trips is affected. The buses are affected by daily traffic jams, while the Biotrén runs every 15 minutes. 37% of the surveys evaluate "security" as "bad" and 45% as "regular", a figure that in Portal San Pedro increases to 47% for "bad" and 39% for "regular". Therefore, public transport in

the neighborhood with better punctuality is perceived as more unsafe, coinciding with higher expenditure on transport (24.8% over \$50,000) and the predominance of the car. And on the other hand, the sector with the best public transport coverage is perceived as safer, regardless of the punctuality variable. The latter case is the Lomas Coloradas sector which has a 65% use of the bus in the surveys for work reasons, with lower expenditure on transport.

Inter-neighborhood mobility

The reasons for inter-neighborhood travel coincide in both peri-urban sectors with different local integration, except for the "occupational" reasons of health and work. This is explained because the only healthcare facility is located in Lomas Coloradas (Figure 2) and because part of the surveyed population resided in Lomas Coloradas, but worked in Portal San Pedro. In another aspect, the results vary in terms of the displacement destination, where the sector with the lowest population density shows a greater spread outside its neighborhood of origin, hence, the higher the density, the greater the use of the immediate neighborhood is (Figure 10).

V. DISCUSSION

Mora & Greene (2008) propose that the greater the integration of the fabric, the greater the flow of movement is, where it is the structure of the space and not the land use that fosters meeting between inhabitants. In this way, the spatial configuration first probabilistically conditions and then is conditioned by the land use patterns and the distribution of activities (Mora & Greene, 2008). This is consistent with the low levels of global and local integration of new tree-type gated communities and *cul-de-sacs* identified in the Portal San Pedro sector, which promote the intensive use of cars over public transport, regardless of the punctuality variable that the Biotren system may have. In addition to this, the excessive prominence of the control, regulation, and security variables in gated communities (Svampa, 2001), as in the case of Portal San Pedro, decreases the possibility of social meetings between different social groups in the public space (Stockins, 2004). The mobility practices of residents of neighborhoods with low integration have led to a low intensity of spatial co-presence, preventing the natural materialization of encounters and interaction patterns between different social groups, which coincides with the perception of insecurity in the case of Portal San Pedro.

On the levels of local and global integration, despite achieving significantly different values in both sectors, the fabric by itself does not achieve a greater impact on the reasons for intercommunal travel. However, other aspects are affected by the context of urban sprawl and fragmentation, namely what was proposed by Mawromatis (2013), where, in a sector with less integration into the urban fabric and less access to the public transport network, vehicle dependence increases and, with it, monthly spending on transport.

"Personal" motives predominate in neighborhood-scale displacements, agreeing with Marquet & Miralles (2014) that proximity is much more related to personal activities than to occupational ones, even though both cases have different global and local integration values. However, the results vary in terms of the destination, where the less dense sector shows a greater spread of trips outside its neighborhood of origin, demonstrating that the higher the density, the greater the use of the immediate neighborhood. Faced with these cases, Marquet and Miralles (2014) argue that the increase in displacement time is offset by an increase in leisure or shopping activities in the immediate surroundings of residences.

VI. CONCLUSIONS

This research starts with the question of how the urban structure is related to the daily mobility practices of inhabitants in a peri-urban sector with high levels of segregation and

inequity. From here it is confirmed that in the analyzed peri-urban neighborhoods of San Pedro de la Paz, the spatial configuration of the environment and the structure of the residential areas intensify high-cost mobility practices, with long commute times and a preference for motorized means. The urban structure variables that intensify the mobility practices corroborated by this research are due to low global integration of the fabric, the low-density extension of the built environment, and a deficient public transport supply (unsafe and low coverage). According to Mora and Greene (2008), this implies a lower possibility of inhabitants meeting in the space with different motives and from different social groups. These variables reduce the conditions that favor the generation of commercial nuclei, foreseeing homogeneous and segregated environments. However, there are certain singularities that the proposed hypothesis specified where the low integration of the urban fabric, the low-density urban sprawl, and the low quality of the public transport supply are variables that intensify mobility practices. First, in a context of urban sprawl and fragmentation in a medium-scale city, lacking functional and historical centralities as is the case of San Pedro de la Paz, the type of layout and its level of local integration lose their impact on daily mobility practices when it comes to intercommunal displacements, due to the peri-urban location of both case studies with respect to the AMC.

Secondly, intermodal development is insufficient for the most densely populated sector, conditioning dependence on the private car over other modes of transport and, with this, increasing the saturation of the road infrastructure. In addition to this, the public transport supply and its relationship with the reason for intercommunal travel directly affects monthly transport spending, causing limitations on the opportunity to access urban activities for certain strata, and in turn, generating exclusive territories fostered by planning that increases existing inequalities.

Thirdly, the land liberalization and peri-urbanization processes, and their interrelation with the road infrastructure, where tree-growing typologies predominate at a residential level, promote an unsustainable diffuse model that demands more resources without satisfying a high density of inhabitants. This research gives rise to future studies that consider the pedestrian fabric in the integration calculation, the analysis of space visibility, and complement with disaggregated variables at the socioeconomic level of the neighborhoods. In this way, in the future the results can be implemented for the formulation of urban public policies, integrating the role of the built environment in the formation of integrated neighborhoods from a dynamic approach based on mobility.

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MIGRATION IN ANTOFAGASTA: ¹

LIVING ON A POROUS BORDER AS A STRATEGY OF RESISTANCE

46

LA MIGRACIÓN EN ANTOFAGASTA:
EL HABITAR EN FRONTERA POROSA COMO ESTRATEGIA DE RESISTENCIA

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¹ Research Project: "Geographies of access to housing for Latin American and Caribbean immigrants: Exploring new socio-spatial phenomena in northern Chilean cities" Fondecyt N°1171722 Doctoral Thesis: "An Approach to the Transformation and Construction of Spaces that Welcome Latin American Migrants in the Porous Border of the city of Antofagasta"

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Durante los últimos 20 años, el constante aumento en la llegada de migrantes latinoamericanos a Antofagasta ha implicado la ocupación del espacio marginal de la ciudad. Ante ello, observamos los espacios que mayormente ellos habitan y nos cuestionamos cómo han logrado permanecer y habitar en estos espacios marginales. La aproximación metodológica es comparativa y se estructura desde la narrativa de los propios migrantes, analizando las configuraciones urbanas y los procesos de ocupación territorial. Los principales hallazgos indican que el habitar transforma los espacios marginales en lugares migrantes ya que, por un lado, conforman fronteras entre las prácticas divergentes del Estado y del habitar migrante y, por otro lado, definen una condición de porosidad, entendida como un proceso de articulación, recuperación identitaria y demanda por el derecho de habitar la ciudad. Consecuentemente, el habitar en frontera porosa se transforma en una estrategia de resistencia.

Palabras clave: espacios marginales, lugares migrantes, frontera porosa

Over the last 20 years, the constant increase in the influx of Latin American migrants to Antofagasta has entailed occupying the marginal spaces of the city. In view of this, this article looks at the spaces that they mainly inhabit, asking how they have managed to remain and live in these marginal spaces. The methodological approach is comparative and is structured from the narrative of the migrants themselves, analyzing urban configurations and territorial occupation processes. The main findings indicate that their living transforms marginal spaces into migrant places since, on one hand, they form boundaries between the divergent practices of the State and migrant living and, on the other, they define a condition of porosity, understood as a process of articulation, identity recovery, and demand for the right to inhabit the city. Consequently, living on a porous border is transformed into a strategy of resistance.

Keywords: marginal spaces, migrant places, porous border.

I. INTRODUCTION

The growing internationalization of capital and the reorganization of production have favored an increase in the migrant population worldwide (Sassen, 2003). Given this trend, “the State as the body in charge of migration policies has been harmed by the growth of the global economic system and other transnational processes, affecting its capacity and regulatory role” (Sassen, 2003, p.37), which has caused growing stigmatization towards migrants from certain countries and unfounded fears in the resident population.

In Chile, recent migration processes have filled diverse academic and media debates. One of the key factors that has affected this has been the increase in the migrant population, as traditionally attractive centers for migrants such as the United States and Europe have begun to close their borders (Stefoni, 2005). Specifically, the number of migrants within the total resident population was 1.3% according to the 2002 Census¹, while in the 2017 Census², the migrant population increased to 4.4% (INE, 2018).

Initially, from the theoretical point of view, the study of migrations emphasized demographic analyses giving an eminently descriptive character to the phenomenon, which helped to feed a public policy from the statistical data (Stefoni & Stang, 2017). Then, over time, the narratives of the migrants themselves began to take on importance. In Chile, in particular, for about twenty years the sustained increase in scientific production regarding immigration has involved different fields of study such as feminism, racism, politics, the border, and, from urbanism, the relationship of the migrant with the city (Stefoni & Stang, 2017). In the latter context, it is possible to distinguish works that have focused, for example, on the concept of the centrality of migration, understood as the diverse relationship between the different practices and the urban space (Garcés, 2011), or the case of Peruvian migration in Chile, where space is transformed into a place of differentiation by origin, gender, or class (Stefoni, 2015). However, it seems that, from urbanism, the relationship between social practices and urban space in a capitalist context still lacks exploration, hence the importance of linking these analyses in local contexts with the migration we are witnessing (Stefoni & Stang, 2017).

Consequently, it is proposed to reflect on this disciplinary vacuum and try to answer the following research question: Why and how have migrants managed to stay and live in the marginal spaces of the city of Antofagasta? The

following hypothesis is also proposed: “Latin American migrants manage to transform the marginal spaces of the city of Antofagasta into migrant places like porous borders by managing to stay and live in them”, and the following objectives are defined: (1) to study the marginal spaces where migrants are located, and (2) to analyze the relationships that migrants are establishing with migrant places.

This research consists of seven parts. The first is this introduction. The second part proposes the theoretical framework that articulates the concepts of marginal space, migrant places, and porous borders. Then, in the third part, the case study is identified and in the fourth part, the comparative methodology between the marginal spaces that migrants inhabit is explained. The fifth part presents the main findings for each of the cases studied. Sixth, the findings obtained with the approaches and concepts addressed are discussed. Finally, in the last part the conclusions, scope of the study and future lines of research are presented.

II. THEORETICAL FRAMEWORK

Construction of the porous border

The current global migration context arises from the crisis of the Post-war Welfare State and the establishment of capitalism as a global socio-economic model (Polanyi, 2007). This system has led not only to the capitalization of labor and, as a result, migration, but also to the territorial monetization that has endangered the environment and has consolidated global and extractivist cities (Polanyi, 2007). In this regard, Harvey (2013) argues that these cities “have always sprung from the geographical and social concentration of a surplus in production” (p.21) therefore, they have generated a series of problems related to the creation of territorial fragments that are not related to each other and that accumulate both wealth and poverty, causing marginalization and segregation in the cities (Vergara-Perucich, 2018).

Back in the 80's, the geographer Wacquant (2007b) began to study this marginality, ceasing to think of it not only as a condition of poverty on the edge of the city but as a structural situation of a part of society and that implicitly carries the political sphere, which is characterized by the capitalist system and the absence of the State; economic, defined by labor informality; social, determined by economic deficiencies; and spatial, characterized by spatial concentration and territorial stigmatization (Wacquant, 2007b). However, marginality can also be considered as a

⁴ XVIII National Population Census and VIII Housing Census of 2002

⁵ XIX National Population Census and VIII Housing Census of 2017

border that divides places and contexts. Paasi (2005) indicates that borders can be considered as “divergent sets of institutional practices based on the political, cultural, economic and governmental [...] and the social and cultural practices based on social memory” (p.669). In other words, the differences and conflicts between institutionality and the community are revealed.

However, from the perspective of urbanism, it is interesting to study the spatial variable as a condition of urban marginality. Initially, space has a marked difference between the continent and the content as an abstract entity (Norberg-Schulz, 1980), but when the time variable is then incorporated, space is related to the human being. Bollnow (1969) states that “there is space only to the extent that man is a spatial being” (p.29-30). In other words, space is where man begins to inhabit and relate to his environment.

In this regard, Heidegger (1956) indicates that the concept of inhabiting gains relevance because it is how man integrates with the world. Various theorists have argued that the importance of living is related to the qualification of the space (Lefebvre, 2013; Harvey, 1998). Conceptually, this dialectic between man and space counts as a mediator to the notion of place. Augé (2000) indicates that the places are relational, have a history, and can be identified. From humanistic geography, it is observed that they have an experiential perspective (Tuan, 2001), and from architecture, they are related to the personal experiences of individuals (Zumthor, 2004). Therefore, it is possible to define “migrant place” from (a) the spatial relations which are the morphological and environmental aspects; (b) the experiential relationships concerning activities and routines; and (c) the symbolic relations concerning the representations and memories (Augé, 2000; Lefebvre, 2013; Rapoport, 1978).

A recent look invites us to think about places not only as spatial, experiential, and symbolically delimited areas but also as open and porous networks of social relations (Massey, 2001). The architects Chermayeff and Alexander (1968) go further and suggest that thinking about places from their porosities requires an effort to reposition the gaze and turn it to the socio-spatial dynamics and practices of the city. Here, architecture is confronted by its limits and is led to embrace the identity processes that are established as a way to recover the right to inhabit the city (Stavrides, 2006).

III. CASE STUDY

Antofagasta: Mining capital and port of the world

Antofagasta is a city located in the north of Chile (Figure 1), whose economy has historically been based on silver, saltpeter,

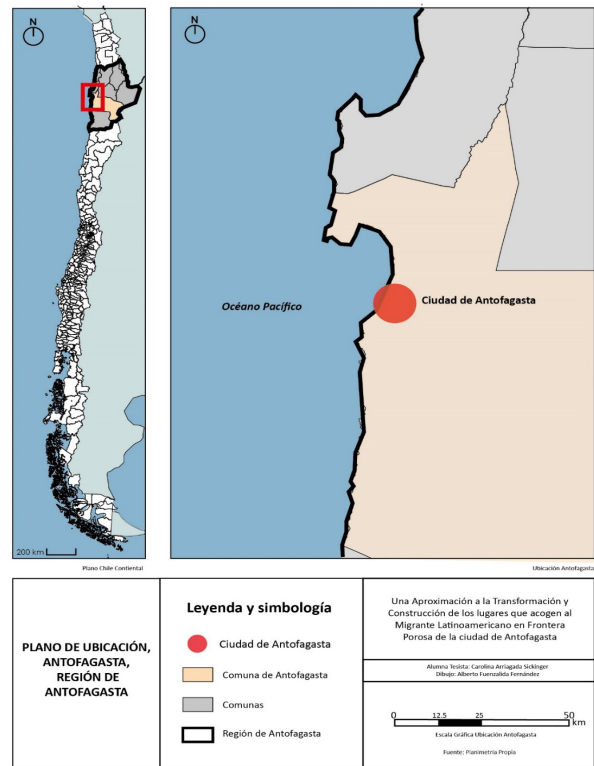


Figure 1. Location map of Antofagasta. Source: Preparation by the authors.

and copper production, which is why its growth has been developed based on an extractivist model of mineral resources (Silva & Lufin, 2013). In 2019, it contributed 28% of the world’s copper production, which has made it a key part of the country’s economic development, becoming known as the world capital of mining (Ardiles, 2013), that is, it is a global port-city in the economic world. Due to this, it is presented, on one hand, as an attractive center for migrants, but on the other, as a city detached from the national socio-environmental development that has favored the enrichment of large national and international companies and has caused the growing urban marginality found in the city (Vergara-Perucich, 2018).

IV. METHODOLOGY

The research methodology combines the hypothetical method, which proposes a question and a hypothesis derived from the theoretical framework (Hurtado, 2000), and the phenomenological method, which assumes nothing before doing the fieldwork (Husserl, 1982). This methodology

aims to approach the urban problem from the interpretation that migrants make of their reality, intertwining the theoretical discussion with the fieldwork carried out.

After identifying the marginal spaces, through the cadastral data of the 2017 Census, INE⁶, and the MINVU⁷ Camp List, where the migrants are mostly located, mapping is made using the Redatam + SP software. Then, to answer objective one, the political and spatial aspects proposed by Wacquant are analyzed. For the political field, the capitalist model and the absence of the State are analyzed, while for the spatial variable, spatial concentration and territorial stigmatization are analyzed. Specifically, five in-depth interviews conducted with key actors under the Fondecyt project are studied⁸, and ten in-depth interviews conducted with migrants under the same project are analyzed, which are random and are not representative in sample terms, and with whom a tour and participatory observation is carried out. At the same time, for territorial stigmatization, migration news is analyzed in a local newspaper during the month of September 2020.

For the second objective, which raises the analysis of the spatial, experiential, and symbolic dimensions of the identified marginal spaces, the review of five in-depth interviews conducted with key actors and ten in-depth interviews conducted with migrants under the same project is proposed. At the same time, a tour and participatory observation are carried out with the migrants themselves (Figure 2).

V. RESULTS

Urban marginality

In the city of Antofagasta, the most recurrent assertion of migration studies is confirmed, which indicates that migrants are occupying the devalued and deteriorated areas of urban space. This is how the Historical Center is identified with an average of 100 migrants per block living in a situation of subletting rooms or tenements. On the other hand, on the periphery towards the north, the Balmaceda macro-camp has the highest number of migrants, exceeding on average 300 inhabitants per block (Figure 3). These marginal spaces (hereinafter, MS) have been called, respectively: MS for Spatial Deterioration and MS for Environmental Risk, which will be displayed according to the political and spatial variables proposed by Wacquant.

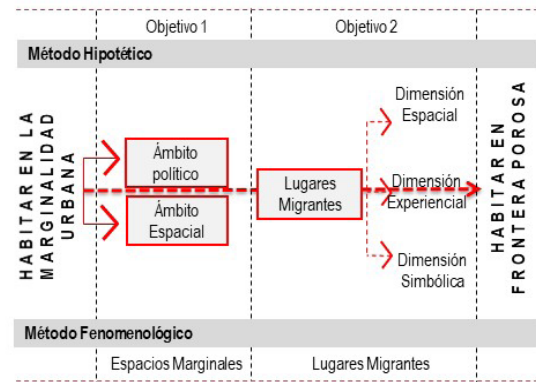


Figura 2. Methodological-conceptual structure. Source: Preparation by the authors.

Political sphere. In the marginal spaces studied, the establishment of the capitalist model has caused the monetization of urban space as an economic good. In the case of MS due to Spatial Deterioration, the low flexibility in the height of buildings has made it unattractive for investors. One of the key players indicates: "At some complex point of Antofagasta we could raise it to eight floors, not reach infinity either, but maintain eight floors continuously, now it seems that it is not business" (NS, Architect, Director Diplar, personal communication, August 17, 2018). In the case of MS due to Environmental Risk, the same interview stated that: "For the price of the land, the main goal is to raise funds through the sale or lease, not to generate investment in land." Therefore, it would seem that the State has also entered into the policy of land monetization as the sole owner of the city's foothill lands.

Likewise, the absence of the State has generated a lack of public investments, poor maintenance, and a lack of regulations in the MS due to Spatial Deterioration, which has made this sector precarious. One of the key actors says: "One doesn't take kids downtown because you see... photos of scantily clad girls and all that. So the type of trade that is being offered has become precarious, the nights here ... are very dangerous in the center of Antofagasta" (NS, Architect, Director Diplar, personal communication, August 17, 2017). There has been a similar situation in the MS due to Environmental Risk, in the same interview it is indicated that: "Today we have, as a regional government, a regional opportunity as 65% of the land in the region is fiscal, but in

⁶ National Institute of Statistics, 2018.

⁷ Ministry of Housing and Urban Planning

⁸ Fondecyt N°1171722 "Geographies of access to housing for Latin American and Caribbean immigrants: Exploring new socio-spatial phenomena in northern Chilean cities."

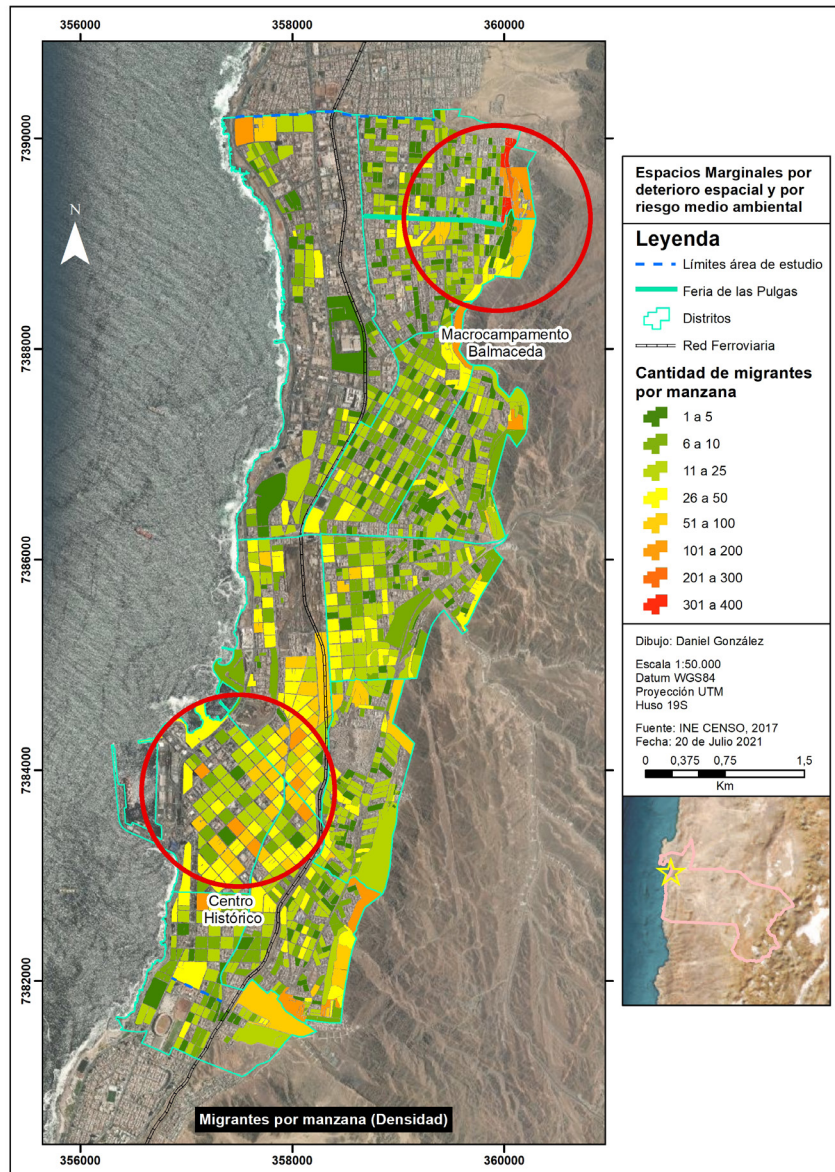


Figure 3. Marginal spaces due to spatial deterioration and environmental risk. Source: Preparation by the authors, on Census data 2017, INE, and MINVU Camp List

the end, the problem is a public management problem, there is no sales capacity". In other words, the slow management of the state has not led to a solution to the current migratory demand.

Spatial scope. The spatial variable has special importance in urbanism, where the physical characteristics of spatial concentration and territorial stigmatization are analyzed.

For spatial concentration in the MS due to Spatial Deterioration, it is important to observe how traditional commerce has moved towards the waterfront, an area that has become the city's new shopping and recreation center. In this regard, one of the key players indicates that the center of Antofagasta "has been depressed after the displacement of commercial activity to the large out-of-town parks located on the periphery of the city" (AM, Coordinator for the NGO Fractal, personal communication Antofagasta). At the same time, the affluent classes have left

No.	Title	News	Date	Nationalities Involved	Pages
1	Migratory Flows in the Country	The government has focused in recent years on the process of regulating the immigration process. A demand apparently supported by a majority.	Sept 1st	All	12
2	Organizations address the complex situation of migrants during the Pandemic	Most work in areas that have shut down, so they have no income.	Sept 4th	All	2
3	Orderly, safe, and regular migration	The regularization of the situation of migrants from their country of origin is crucial.	Sept 13th	All	12
4	Barometer reveals optimism in the future and improves migrant perception	The results of the 2020 study carried out by the IPP of the UCN and the C.E of Opinion Feedback were released yesterday through the Soy Antofagasta Portal	Sept 19th	All	2
5	Labor Tourism and Migration	It is not about opening or closing borders, but rather governance considering the quality of the basic services that we can provide	Sept 20th	All	2
6	Venezuelan Immigration	The immigration process must be regularized, much more so than in the pandemic, but without ceasing to collaborate with the tragedy that that country is experiencing.	Sept 29th	Venezuelans	12
7	138 Venezuelans have entered the El Loa Province illegally	The foreigners were brought from Iquique and Antofagasta to a socio-sanitary residence, a PCR sample is taken from them.	Sept 29th	Venezuelans	8
8	There are 39,388 foreigners in the region eligible to vote	For the next plebiscite the figure doubles the 2017 elections and 43% are Bolivians	Sept 30th	Bolivians	9

Table 1. News about migration in a local newspaper, 2020. Source: Preparation by the authors from El Mercurio of September 2020.

the sector, which has led to a gradual physical and functional deterioration of real estate assets. On the other hand, the MS due to Environmental Risk is characterized by being in a mass removal zone indicated as E10- Non-Buildable Zone of the PRC⁹ of Antofagasta-, that is, an area susceptible to falling rocks and, to a lesser extent, to landslides. One of the interviewees indicates: "This was the only land that was available, [...] we had to use creativity because it was a hill, and in the end, we used all the land and we were building little by little" (Faith, 22-year-old Bolivian woman, personal communication). At the same time, from the anthropic point of view, this marginal space is located under the easement areas of the high-voltage electric towers and the area of the city's new ring road.

For territorial stigmatization, the references to migration in a local newspaper during September 2020 are analyzed, where there were eight mentions, and where the health contingency that affected the country and the world was reflected. One mention (12.5%) referred to the city center (Av. Prat), and four (50%) to the camps located on the city's periphery of the city (Table 1). It should be noted that only one piece of news talks positively about migration. At the same time, stigmatization is also suffered by migrants in personal spaces. One of the interviewees points out: "I felt discriminated against because they said we were taking away their husbands, a lot of things. Well, actually, a lot of things" (Ma, 23-year-old Colombian woman, personal communication).

MS due to spatial deterioration	Political Sphere		Spatial Sphere	
	Capitalist System	Absence of the State	Concentration	Stigmatization
It is not profitable due to height limitations	Lack of public investment	Poor maintenance and regulation	Abandonment of traditional trade	Abandonment by well-to-do families
12.5% negative mention of migrants				
EM for Environmental Risk	Political Sphere		Spatial Sphere	
	Capitalist System	Absence of the State	Concentration	Stigmatization
It is not profitable because of the land values	Slow land tenure management by the State	Mass removal	Anthropogenic Risk	50% negative mention of migrants

Table 2. Analysis of political and spatial spheres in marginal spaces. Source: Preparation by the authors based on fieldwork and the study of interviews

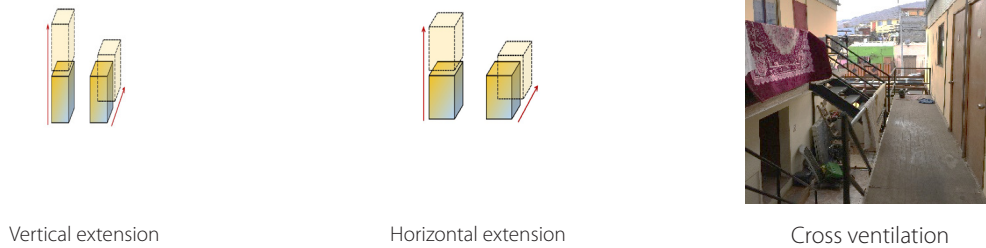


Figure 4. Spatial characteristics of the Migrant Place in marginal space due to Spatial Deterioration. Source: Preparation by the Author based on fieldwork

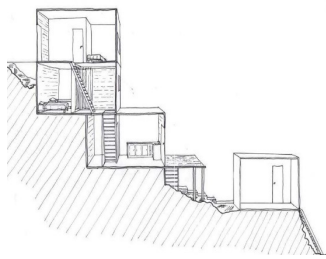
The results of the political and spatial areas are summarized in Table 2, where it is observed how the capitalist system and the absence of the State have led to a condition of marginality that is mostly stigmatized in the MS due to Environmental Risk.

Migrant places in marginal space due to spatial deterioration

From the in-depth interviews conducted and the fieldwork, it is analyzed how residence and migrant trade are intermingling in this deteriorated sector. Regarding spatial relationships, a predominance of semi-detached houses is observed, which in 100% of the analyzed cases have been extended using wood on both the first (horizontally) and second floor (vertically). One migrant says “They had the house next door and, as I would say, one attached to the other, that’s how the rooms were” (In, 52-year-old Colombian woman, personal communication).

As for the environment, strong solar radiation has forced 50% of the analyzed common spaces to have solutions that allow cross-ventilation between enclosures (Figure 4).

From the experiential relationships, 100% of the migrants interviewed say that they use the rental rooms only for overnight stays. One of the testimonies points out: “Yes, as I tell you, I just sleep there, because we left at 5 in the morning, we arrived at about eight, nine at night” (Alf, Peruvian man from Tacna, personal communication). Regarding their routines, 100% indicate that these are based on their work schedules, just resting at night. One interviewee points out: “Almost no one spent time together because they all worked and only got there to sleep, nothing more” (Alf, a Peruvian man from Tacna, personal communication). The sector has been hosting, in turn, an incipient migrant trade, which has generated a new business niche by marketing original products and making barbershops, food joints, and restaurants visible.



Slope management



Intermediate Space



Solar radiation protection

Figure 5. Spatial characteristics of the Migrant Place in the marginal space due to Environmental Risk. Source: Prepared by the author with the fieldwork and Degree Project: Antofagasta Informal: Socio-environmental study of public space in camps. Plan the Informal, Paloma Pérez, UPM.

MS due to spatial deterioration	Spatial Relations		Experiential Relationships		Symbolic Relations	
	Morphology	Environment	Activities	Routine	Representations	Memories
	100% wooden extension	50% patio	100% overnight	100% working routine	-	20% have a keepsake
EM for Environmental Risk	Spatial Relations		Experiential Relationships		Symbolic Relations	
	Morphology	Environment	Activities	Routine	Representations	Memories
	60% slope management	80% intermediate space	100% family 30% trade	100% working routine	100% Indigenous people	80% symbols and keepsakes

Table 3. Analysis of spatial, experiential, and symbolic relations of migrant places. Source: Preparation by the author based on fieldwork and the study of the interviews

One of the key actors states:

“With the arrival of migrants from other countries, the city center has revived. For the same reason, suddenly one sees streets where just about all the stores belong to migrants, right, particularly on Sucre Street and Bolivar Street” (Andrés Music, NGO Coordinator Fractal Antofagasta, personal communication, October 31st, 2017).

Finally, cultural representations are analyzed for symbolic relations. Only 20% of the interviewees indicate that they have brought some symbol or souvenir from their place of origin. One of the interviewees explains that: “¡Ah yes! The Colombian flag. We had it hanging in the room [...] I made a mandala because I really like crafts, but then I left with my partner” (An, 23-year-old Colombian woman, personal communication).

Migrant places in the marginal space due to environmental risk

It is noted how migrants begin to handle variables such as slopes and solar radiation. In the tour, it was seen how 60% of the interviewed migrants’ homes deal with the different levels of the slope, and 80% of the homes deal with solar radiation through intermediate spaces. Regarding the public space, how the slope is absorbed by stone walls, tires, or doca (sea fig) is analyzed, and the high solar radiation is controlled by Raschel mesh awnings¹⁰ (Figure 5).

Regarding experiential relationships, 100% of the migrants interviewed organize their routine around work activities, meaning the camp is unoccupied during the day. Of those interviewed, 30% have adapted spaces in their homes for a business such as barbershops, shops, and food joints. These incipient activities have meant that the camp has begun to have activity during the day.

¹⁰ Type of mesh made of high-density polyethylene

Finally, for symbolic relationships, in 80% of the homes visited it is possible to find identity aspects such as colors or signs that remind them of their origins. One of the interviewees indicates: "My brother always brings the flags, the flag of Bolivia, the flag of Santa Cruz... as the curtains are green and white" (Fe, 22-year-old Bolivian woman, personal communication). 100% of the migrants interviewed identify as indigenous, *Quechua* from Peru, Bolivia, and Ecuador, and *Aymara* from Peru and Bolivia. This has encouraged a series of festivities to generate roots as intangible heritage such as the intercultural ramadas, the Andean carnival in February, and the Celebration of the Pachamama on All Saints' Day.

The migrant place analysis variables are summarized in Table 3, which analyzes how the inhabitants establish spatial and experiential relationships with these places, but not the symbolic relationship in the MS due to spatial deterioration. Here, migrants understand that they are only *passing through* and as such do not establish symbolic relationships with the places where they live.

VI. DISCUSSION

In the marginal spaces analyzed, from a political point of view, it is reflected how, on one hand, the capitalist system has made land use profitable and, on the other, the absence of the State has caused a lack of investment, regulation, and public management leading to a systematic deterioration and abandonment of these sectors. In this regard, Wacquant (2007a) argues that the State's absence has fostered a downward spiral to such an extent that "far from increasing the possibilities of life and favoring its inhabitants' integration into national life, their stigmatization is aggravated and exclusion is confirmed" (p.259). On the other hand, the spatial variable according to Wacquant, Slater, and Pereira (2014) must be taken seriously, as it becomes a mode of struggle between the ruling and the working classes.

Therefore, when analyzing spatial concentration in the MS due to spatial deterioration, the abandonment of traditional commerce and well-to-do families is seen, while in the MS due to environmental risk, not only the risks due to mass removal and other anthropic risks are noted, but also the limited flexibility of the Antofagasta PRC to accommodate housing use. These conditions have fostered increasing stigmatization, especially in the macro-camp, where 50% of the mentions of migration were negative. In both spaces, it is observed how, despite the contextual differences, it is possible to find similarities

that make permit some generalizations about these marginal spaces. In the same vein, marginality can also be understood as a boundary condition, because it begins to act as a "marker of social identity and differentiation" (Paasi, 2005, p. 666).

On the other hand, migrant places are built from the relationships that the migrants themselves are developing. In this regard, Löw (2008) indicates that the dialectical relationship between individual and space can lead to the construction of a place, which is evidenced in the fieldwork. If Table 3 is observed regarding spatial relationships, in both cases the migrants are adapting through morphology to the city's urban environment, either by using wood, slope management, and/or the intermediate spaces. For experiential relationships, all the migrants in both cases adapt to work routines. The big difference is in the symbolic relationships in MS due to deterioration, since only 20% of migrants keep or have brought some symbol or keepsake of their places of origin. Therefore, they are not connecting with the spaces, as they know they are passing through until they can get a better income or can bring their families and move to some other camp. Developing further the idea of the relationship that migrants establish with their arrival spaces, Stavrides (2006) indicates that they are places that: "connect and establish opportunities for exchange and communication, thus eliminating the privileges of space" (p.32).

Consequently, these reflections propose a new prism of integration and analysis between migration and the spatial variables of the current city, consolidating the finding of a double condition that has been called a porous border.

Going even further in the conceptual characterization of this finding, for borders it is possible to observe how boundary-producing practices become part of a broader process that involves not only individuals but also institutions and the State. In that sense, Paasi (2005) indicates that borders can be considered as a set of divergent practices between institutionality and social individuals. On the other hand, with respect to urban porosity, Stavrides (2006) indicates that "it can provide the means to acquire an awareness of collective identity" and (p.32), therefore, respond to the demand for the right to live in the city.

Finally, following the Argentine architect Cravino (2014), the migrant inhabiting space transforms it into a place of struggle against a system that aims to configure equal, defined, and organized spaces to reproduce hegemonic logics that allow individuals to be classified and defined exhaustively in terms of their origin, race, or gender and, with this, normalize their ways of life.

VII. CONCLUSIONS

In the marginal spaces that welcome migrants in Antofagasta, new forms of spatial organization are being built that interact with those already existing in the city. Migrants appropriate the space where they arrive and transform it from spatial, experiential, and symbolic relationships, building a migrant place that allows them to inhabit, but without ceasing to coexist alongside marginality.

Consequently, the hypothesis raised is confirmed because migrants manage to live in these marginal spaces, despite being constantly expelled due to divergent State practices that propose making urban land profitable, and the migrant practices through which individuals welcome their identity diversity and demand the right to inhabit the city. This new way of remaining and living in a porous border is configured as a migratory strategy of resistance.

From a micro-political perspective, this porous border is the reflection of the consolidation of the neoliberal model that favors the few, but which is also characterized by the increase of a marginalized population, stripped of their rights to live with dignity and their legitimate aspirations for a better life.

From urbanism, this new concept of porous border aims to contribute to the little-explored relationship between migration and the city in a capitalist context, building a theoretical field that can be used in other case studies.

Finally, urban marginality shows the absence of the State in migration and urban policies, revealing the urgency of proposing other ways of planning the territory that involve the specificities of each place and also the right of social actors to be part of the construction of their destiny.

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FROM A POLITICAL TO AN IM-POLITICAL COMMUNITY: ¹

THE END OF THE COMPANY TOWN (TOCOPILLA, CHILE, 1915-1996)

58

DE COMUNIDAD POLÍTICA A COMUNIDAD IM-POLÍTICA:
EL FIN DEL COMPANY TOWN (TOCOPILLA, CHILE, 1915-1996)

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A partir de una metodología histórica y antropológica, se describe y analiza un caso de estudio urbano situado en Tocopilla (Chile), ciudad que, por efecto de la industrialización de la mina de Chuquicamata en 1915, a través de The Chile Exploration Company, atestiguó la instalación de una poderosa termoeléctrica que incluyó un *Company town*, el cual operó con las mismas normas aplicadas en el campamento de Chuquicamata. La termoeléctrica, que fue nacionalizada en 1971 y quedó bajo la gestión de CODELCO, fue privatizada en 1996. Así, la nueva empresa se desligó del rol paternalista y de control obrero y habitacional que ejercía, lo que permitió el surgimiento de un proceso que finiquitó el *Company town*. Nos interesa caracterizar el tránsito organizacional, material y semántico que se evidenció en dicho campamento desde 1996, entendido como un proceso que se desarrolló en una escena neoliberal y que hemos denominado la transición de una *comunidad política* hacia una *comunidad im-política*.

Palabras clave: *Company town*, minería, generación de eléctrica, Tocopilla, im-política.

Over the last 20 years, the constant increase in the influx of Latin American migrants to Antofagasta has entailed occupying the marginal spaces of the city. In view of this, this article looks at the spaces that they mainly inhabit, asking how they have managed to remain and live in these marginal spaces. The methodological approach is comparative and is structured from the narrative of the migrants themselves, analyzing urban configurations and territorial occupation processes. The main findings indicate that their living transforms marginal spaces into migrant places since, on one hand, they form boundaries between the divergent practices of the State and migrant living and, on the other, they define a condition of porosity, understood as a process of articulation, identity recovery, and demand for the right to inhabit the city. Consequently, living on a porous border is transformed into a strategy of resistance.

Keywords: company town, mining, electricity generation, Tocopilla, im-politics.

I. INTRODUCTION

Mining processes in the Atacama Desert under the hegemony of the technical systems inaugurated since 1915 by the Guggenheim family and its two major companies, The Chile Exploration Company (copper) and the Anglo-Chilean Consolidated Nitrate Corporation (saltpeter), brought as a substantive byproduct a new way of inhabiting through the Company town. These new ways of living were seen in Chuquicamata (copper mine), Tocopilla (thermoelectric plant for the mine), and in the saltpeter offices of the Guggenheim system³, such as María Elena (since 1926) and Pedro de Valdivia (since 1931).

Those Company towns were the expression of an innovation in paternal and capitalist management that included, in addition to the urban and materiality, a political and biological imprint as a way of controlling life in an intimate or non-work territory (Sierra, 1990). Thus, American mining capitalism was building a city, landscape, and new sociability in the desert, based on functional materiality and the new parameters of social relationship, which became a kind of small country within another (Gutiérrez & Figueroa, 1920; Pérez & Viches, 2014; Weinberg, 2021; Olivares et al, 2022; Galaz-Mandakovic, 2020a; Galaz-Mandakovic & Tapia, 2022; Tapia & Castro, 2022).

This article looks to characterize a case study located in the city of Tocopilla, a town which, due to the industrialization of the Chuquicamata mine in 1915 through The Chile Exploration Company, witnessed the installation of a powerful thermoelectric plant to power the distant mine 140 kilometers away (Galaz-Mandakovic, 2017). The installation of that power plant included the implementation of a Company town, which operated with the same rules applied in the Chuquicamata camp.

The Tocopilla thermoelectric plant, nationalized in 1971 during the government of Salvador Allende, came under the management of CODELCO and, 25 years later, in 1996, was finally privatized. Thus, the new company that took over the energization detached itself from the paternalistic role initially applied in the Company town. The idea here is to characterize the constitution and the organizational, material, and semantic path that was seen in that camp, a process that brought the end of the Company town's political project.

The hypothesis presented is that the Company town was an ideological project derived from large-scale copper mining

that sought to set up a disciplined and functional community, but within the alteration framework of management regimes and that of an anthropological aporia, the housing and neighborhood political project dissipated and it was materiality that archived and witnessed a social intervention and agency. Thus, it is considered that, since 1996, the Company town transited from a political community to an im-political community, the latter expressed in the opening and tearing down of identity limits and systems (Espósito, 2006).

In this article, samples of a transition that arose with the privatization of the company will be given, seeing how that process generated the emergence of a reality that became incomprehensible, unrepresentable, and undisciplined to the control of its original limits.

II. THEORETICAL FRAMEWORK

The Company town as a political project

The political community is understood here as the business project of a closed, absolute, and controlled identity that seeks unity of neighborhood meaning (Gravano, 2009). Without these structures, mining projects would be interfered with or impaired in their productivity. It is considered that politics are an attempt at domestication, of production of an ontological unity of meaning, but that always coincide with "its fracture", with its own limit: "Living together should not be interpreted as the production of community life, based on the existence of common principles that identify and determine a proximity of fusion between individuals" (Gudiño, 2011, p.34).

The construction of capitalist landscapes and, above all, the need to produce and maintain collective goods, requires the establishment of some system of government, preferably formalized to constitute a territorial management system: "If a state did not previously exist, capital will have to create something similar to facilitate and manage its own collective conditions of production and consumption" (Harvey, 2015, p.152). Thus, the so-called *Company town* acted as an urban project that had a sociological institution as its ideological horizon through a community program that facilitated the processes of labor fulfillment and productive optimization (Harvey, 2015; Le Gouill, 2018). With this objective "they are reflected urbanistically as a social manufacture oriented to a single productive activity, which generated a social group limited to any other urban diversification" (Olivares et al., 2022).

³ The Shanks system was a saltpeter production method, characterized by leaching caliche at high temperatures and was the system that determined an entire saltpeter industry from the Tarapacá to the Taltal areas, involving the establishment of large processing plants with a respective workers' camp. In 1926, the Guggenheim system emerged in the Department of Tocopilla, thanks to a mining family that revolutionized the industry through the mechanization and electrification of all extraction processes, leaching at a lower temperature, better crystallization, and the transfer and mechanical shipment of nitrates (Galaz-Mandakovic, 2020 b).

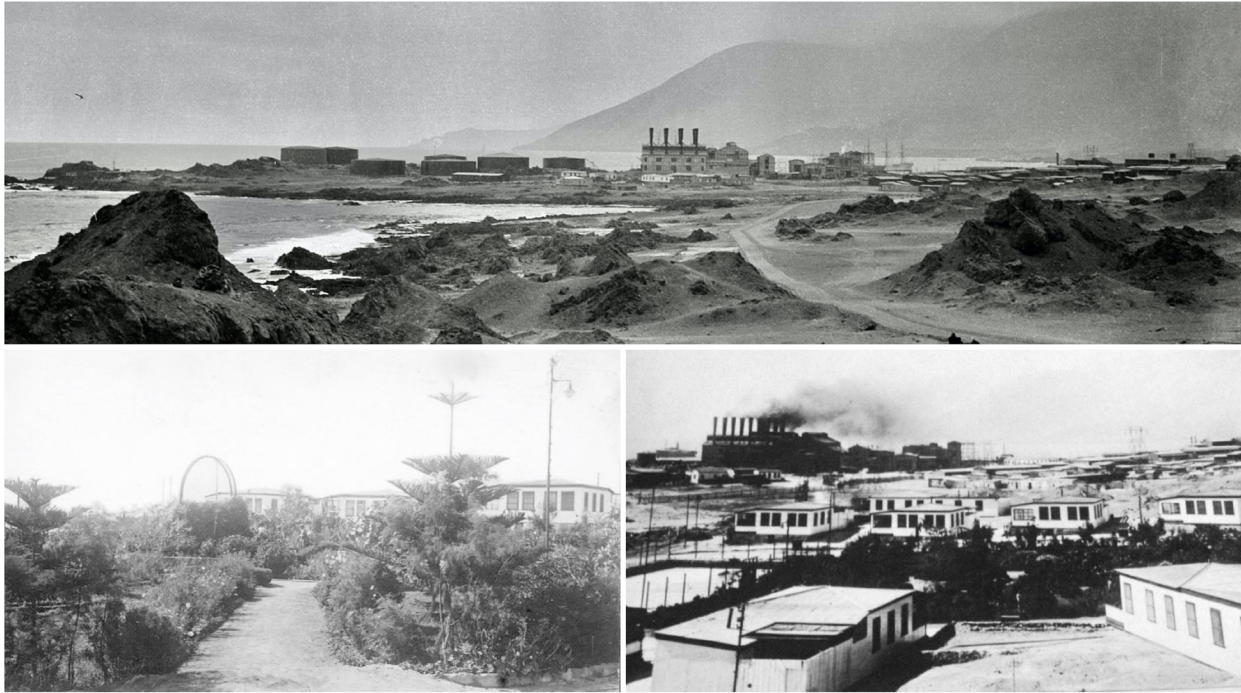


Figure 1. Above: The electric power plant of the Chuquicamata mine, located in the Algodonales Bay of Tocopilla (1923). Left: The thermoelectric plant and the mine were avant-gardes in terms of their production scale. Right: A section of the Company town, named Villa Americana (1928) along with its groves and the everyday life of pollution from the combustion of crude oil. Source: ACECCh, Preparation by the author.

It was then that historically consolidated cities were constituted as material, functional, and semiotic otherness, including the production “of a set of condensed and shared values” (Gravano, 2009, p.42). In that production, the camps for workers and employees in the Atacama Desert were the improved version of the French *Cité ouvrière*, the Spanish Industrial Colony, the industrial towns implemented in England, the *Burg* Company town in Bayreuth, Lowell, in Massachusetts, or the *Arbeiten Siedlungen* in Germany. The new mining populations established innovation for the saltpeter camps of the *Shanks* cycle (El Toco Canton) because they inaugurated new more profound elements of neighborhood life management, adding a specific urban design as a device and new materiality that, in this case, expressed an early rationalism (Vilches, 2018).

III CASE STUDY

The material constitution of the Company town in Tocopilla

The implementation of the Company town was a process of urban expansion, with a materiality and semantics of innovation. The newspaper La Prensa de Tocopilla

commented in 1928: “Simultaneously, with the development of industrial plants, the very beautiful working-class neighborhood of Villa Covadonga (...) equipped with gyms, sports fields, boxing ring, etc. has been built in the port *by Chile Exploration*” (La Prensa de Tocopilla, December 13th, 1928). The newspaper portrayed the camp located two kilometers south of Tocopilla as an organic territorial project that truly became a new city due to its extension, appearance, and organization. Its streets were spacious, on flat and homogeneous grounds. It had several public facilities. (Figure 1). The built surface area in the Company town of Tocopilla, completed on June 20th, 1925, was 11,500 m². In total, the camp had 190 buildings intended for residences (AGT, Official Letter No. 285, to the Governor, November 12th, 1927).

As in Chuquicamata, the new coastal city had a block layout based on a labor hierarchy. In this case, it had: 2 Type C blocks for lower-level bosses; 22 (6 houses each) Type D blocks for workers; 1 block (staff) for single workers; Manager’s house and administration buildings (Welfare Department) (Table 1). In addition, it had a Cooling House - known as a Grocery Store-, plus a hospital, a school, private beaches, a recreation house for the workers of



Figure 2. The initial Company town of Tocopilla, completed in June 1925. The housing blocks for the workers and their families are seen. Source: ACECCh, Preparation by the author.

Chuquicamata, sports and social clubs, football and baseball pitches, a golf course, tennis courts, a stadium, a ballroom, and an extensive and well-distributed electrification system. For their part, the Americans enjoyed exclusive use of a swimming pool located in the highest sector of the neighborhood. The Guggenheim Brothers, who were Jewish, installed a Catholic church for their workers and also a Crypt where residents visited the image of the Virgin of Lourdes (Figure 2).

The newspaper La Prensa de Tocopilla commented that the camp was located:

On an open field, between parched mountains and the black crags of the coast. The Americans have built a camp with the little houses of the company's bosses and a hotel hung from the crags, like bird

Units	Divisions and users
12 houses	4 rooms each for employees
142 houses	3 rooms for married workers
2 houses	31 rooms for single workers
1 house	Resident Engineer
1 house	Assistant Resident Engineer
4 houses	First class type A
12 houses	Second class type B
4 houses	Third class type C
12 houses	For single employees with 15 rooms each

Table 1. Specifications of the Tocopilla Company town in 1927. Source: AGT. Official Letter No. 285, to the Governor, Tocopilla, November 12th, 1927, prepared by the author.

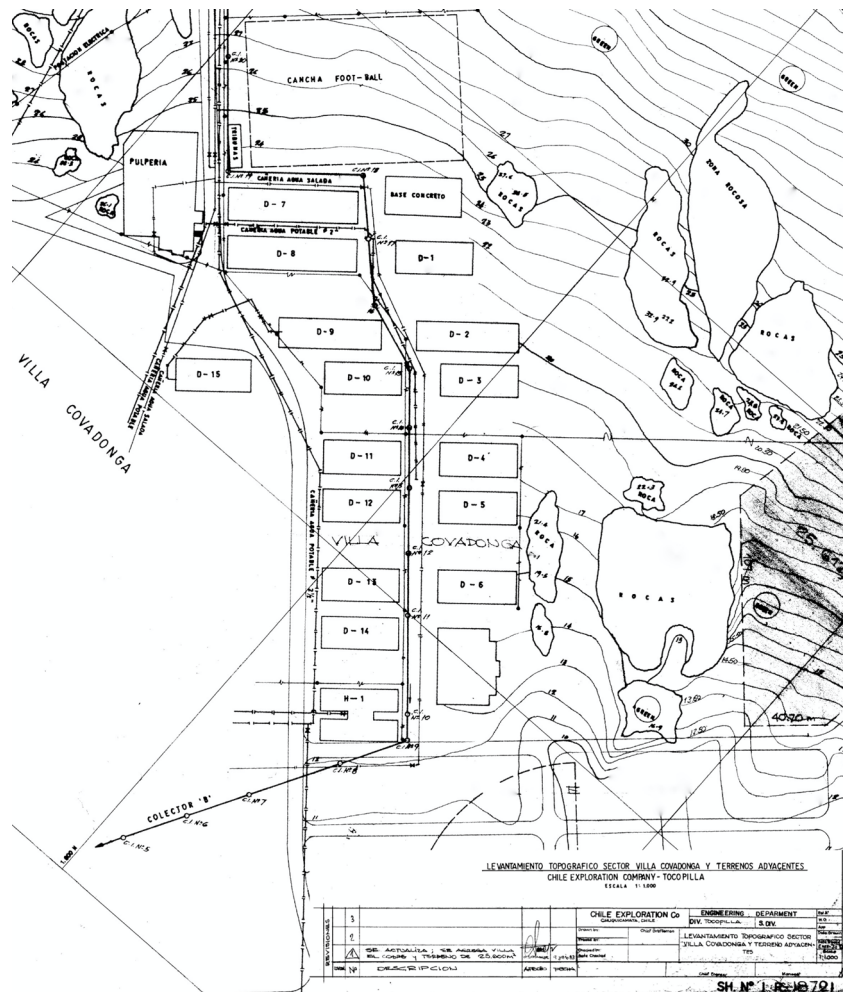


Figure 3. Fragment of an update of a topographic survey of the Villa Covadonga camp and adjacent lands. Source: ACECCh.

cages. The little houses of the workers with a one-meter front yard on which vines climb and at whose feet geraniums grow have given this horrid landscape a lovely note (La Prensa de Tocopilla, May 26, 1928).

The Tocopillano camp had a police and private security system led by watchmen. In the sector known as Villa Americana, a square was installed that stood out for its dense grove and exotic decoration for the desert coast.

In a mail sent to the governor, Tocopilla's Mayor in 1927 indicated that the worker neighborhoods that The Chile Exploration Company had built had the services provided for in Art. 46, "to which the circular of the Ministry of the Interior refers, namely drinking water, electric lighting, and hygienic drains" (sic) (AGT, Official Letter No. 285, to the

Governor, November 12, 1927). This information was relevant in comparison with Tocopilla, where drinking water was scarce, and with very low pressure, where drains did not exist in the 1920s, with cesspools being the most commonly used devices (Figure 3 and Figure 4).

This new neighborhood, thanks to its sanitary and lighting technologies, was also an otherness concerning its materiality because many of these houses were made from reinforced concrete with half-timbered wood, signifying a break with the memory of Tocopillana architecture. The rooms of the houses were boarded with an insulation system against heat and cold, with large fenced patios. It must be pointed out that in most of the houses, mainly those of the workers, although there was a sewer connected to the sea, the bathrooms were communal.

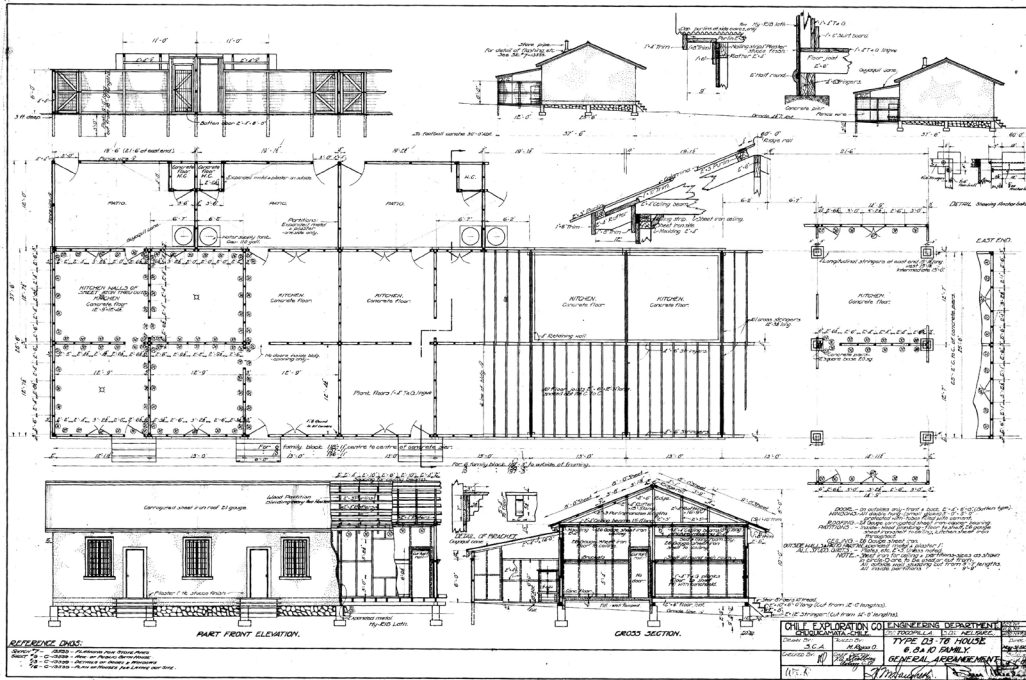


Figure 4. Constructive details of the Company town's houses. Source: ACECCh, May 31, 1924.

The organizational and semiotic constitution of the Company town

The setup of the Company town was the promotion of a certain biopolitization of the territory in terms of ordering the bodies, the control of circulation, available in the camp, its discipline, pedestrian movement times, hygienic rules, prohibition of dipsomaniacs, spaces for food, recreation, separation by marital status, by segment and labor hierarchy, also by nationality.

If the categories of Augé (2005) are considered, this would be an anthropological place in the differentiation with "space", because it was a concrete and symbolic construction that could not by itself account for the vicissitudes and contradictions of social life (Augé, 2005). In the words of Gravano (2009), there is a scene efficiency in place, namely a neighborhood that brings together "a problem" in its setting (Gravano, 2009, p.59). That is, the architecture and its neighborhoods were semiotically densified. The planning of the territory correlated with the physical space, such a situation would allow an understanding of the correlation between the location in the territory and the rank⁴. As Bourdieu

would say, the social space is built in such a way that the agents or groups are distributed in it "according to their position in the statistical distributions according to the two principles of differences: economic capital and cultural capital" (Bourdieu, 2003, p. 30).

In this territory's management, an otherness (Gravano, 2009) was formed, namely: the undisciplined, the delinquent, the insane, the unhygienic, the drunk, prostitutes, etc. All these were constituted as synonymous categories, being considered as opposed and harmful to the company's project if they enter the company town. For this reason, they were categorizations of people and attitudes that became incompatible with the community due to their supposed power of danger and indiscipline that, in the end, would mean a stumbling block for the capitalist process, assuming them, then, as vectors of risk for the society that The Chile Exploration Company projected, as a potential for degeneration and infection.

Coercion was prevalent in this group of people, for that reason control and examination were applied to the actions of daily life

⁴ For example, in the Chuquicamata camp, living at a higher geographical altitude was indicated by the job rank. Therefore, the houses located near the so-called Casa 2000, The General Manager's House, were occupied by important people in the company. The ones that were located geographically lower, near the entrance to the camp, were those destined for the lower hierarchies within the labor divisions in the mining company. In the Tocopillano case, the manager (Resident Engineer) lived on the highest part of a rocky hill.

to monitor and correct, which allowed developing multiple and conflicting alliances, for example, between mayors, governors, judges, doctors, the police, military, and inspectors. Those agents imagined the workers as eccentric subjects who dealt with a minimal gradation between normality and abnormality, between lack of control and the power of diseconomy. Therefore, it was necessary to guide them towards the new semantic center that represented being a worker and inhabitant of a territory designed from outside national borders. It added an adjectival stamp of Indians and communists to the conflictive workers (Galaz-Mandakovic & Rivera, 2021). In this context, the company became a political police (Agamben, 2003). The role of the company's Welfare Department can be understood as moral police and that for outside the Company town, it fed the respective fears of being an uncontrolled or supposedly uncontrolled territory. The socio-economic and labor disjunction arose where the Company town was the territory of closure, segregation, and the respective morality according to American parameters. These neighborhoods were a machine of discipline at labor, recreational, educational, health, and moral levels. A device that made the rules explicit was the Regulations for the Workers' Room, a statute that circulated both in Chuquicamata and Tocopilla and that was jealously guarded and cited when facing any breach (AGT, Regulations for the Workers' Room, The Chile Exploration Company, January 28, 1925).

As commented by Gutiérrez and Figueroa (1920), racism was a structuring axis:

Harry Guggenheim considers (...) that the Chilean worker was a ragged vagabond, who could not be trusted because of his mental and physical degradation, who lived in slums (...) he expresses that now they are encouraged to bathe and wash, and to keep their clothes free of parasites. He recognizes the innate intelligence of the Chilean workers whom he calls natives by the derogatory epithet (Gutiérrez & Figueroa, 1920, p.7).

When analyzing this process of neighborhood innovation, the inclusion of the company's paternal exercise is evidenced, based substantially on a set of operations for the reproduction and control of life, which was manifested through the coverage of community demands in health, housing, roads, education, sports promotion, social welfare and the promotion of healthy neighborhood life. This whole process had no other purpose than to mold a good citizen; a citizen who would always be good when he was a good worker, namely: punctual, clean, orderly, calm, with family, submissive, docile, and disciplined. These methods targeted a new ethnicity: the worker and the employee who gave his job to the Americans became a recipient of the project for the new ethnic model of the disciplined citizen. Thus, in Nancy's (2000) words, the political was the community space, the place of a specific and common coexistence, where exclusion and closure from outside dangers

arose (Nancy, 2000).

Likewise, metaphors of social ties emerged that overlaid hypothetical realities, for example, the notion that the power plant and mine workers were the regional upper class, what Eric Hobsbawm (1987) called the constitution of a labor aristocracy. This, in relation to otherness, was an obvious form of governmentality because the workers themselves reproduced the discursivity and imaginaries produced by the company, promoting the emergence of a destructuring of traditional ways of life.

On an internal plane, to paraphrase Nancy (2000), this type of community "strives to confer a dubious intersubjective nature, which would be endowed with the virtue of linking (...) one with the other" (Nancy, 2000, p. 40). It evidenced the emergence of a theory as to which community would be the opposite of one's own, and that is explained by the obligation or duty to others (Espósito, 2003), where the community itself is the vacuum due to the effect of limits, "the public thing is inseparable from nothing" (Espósito, 2003, p. 33). Thus, as in Chuquicamata, the existence of this camp "generated a great sense of belonging" (Weinberg, 2021, p.205).

According to Scranton (1984), the idea of worker infantilization is revealed in these business considerations: in fact, they were built as people who require a certain polishing and guidance. Sierra (1990) mentions that these processes targeted the project of the dreamed worker, as a project of industrial paternalism, where the worker must project himself to the places of non-work, that is, to the spaces of socialization and family reproduction. Namely, an invention of a model worker, as a regenerationist employers' program of a new man full of social and work virtues.

The success of the process, therefore, would consist in the reproduction of each norm outside of work, outside of industry, it is there, then, that the far-reaching program manifests itself. Everything would begin in the company, there, in the production space of the worker's habitus through continuous disciplines, that is, a domiciled and locatable, law-abiding worker, with a family role and without vices (Sierra, 1990).

IV. METHODOLOGY

The historical processes that relate the evolution of architecture, urbanism, and the management of massiveness linked to copper mining in the Atacama Desert during the twentieth century, do not exclude adding an interdisciplinary analysis from political anthropology and the social history of extractivism itself.

Regarding this, the work here consists of a case study located in the city of Tocopilla (Antofagasta Region), a city where a thermoelectric plant was implemented to power the Chuquicamata mine. For this reason, it included the construction

of a Company town. This paper looks at analyzing the finalization of that urban project.

The time range considered runs from 1915, when the mining project was established, to 1996, the period that saw the end of the Company town in question.

The approach in this study has a historiographic methodology, for this reason, it resorts to data collection through the examination of unpublished primary sources (review of documentary archives, press archives, historical plans, and photographic archives), which are analyzed from a diachronic perspective. In terms of hermeneutics, theoretical frameworks typical of political anthropology are used, in particular, the considerations of im-politics (Agamben, 2003; Espósito, 2006; Gudiño, 2011).

This includes the visual record of the studied area through fieldwork carried out in the former Company town.

V. RESULTS

End of the Company town: new consortium and new territorial organization

Once copper was nationalized in Chile in 1971, CODELCO took over the mine and the thermoelectric plant with the respective Company towns of Chuquicamata and Tocopilla, maintaining the tradition of internal hierarchization and the diverse semantics and semiotics typical of the American era. The Tocopillano camp was expanding, with the emergence of Villa El Cobre and Villa Carlos Condell in the throes of the 1970s (Galaz-Mandakovic, 2017). However, in 1996 the Tocopillana thermoelectric plant was privatized and saw the impairment of the socio-economic benefits that workers received, but also the end to the preponderance of the company over the Company town. In this way, the company Electroandina⁵ detached itself from the disciplinary, welfare, and life management character of the workers that was established in the camp with the North American company which had been maintained by CODELCO.

In everyday events, privatization meant the end of the grocery store, which became a supermarket with access for all kinds of public. Workers and their families had to buy with cash, no longer with cards, or vouchers, and no discounts from the pay slips. In addition, the neighborhood surveillance system disappeared, ending controls and administration over neighborhood behaviors.

At the same time, many of the camp's houses were transferred to workers, and the residence of neighbors not connected

with the thermoelectric plant was allowed with the sale of some properties and the appearance of rental properties.

Social agency and the new materialities

An important fact is that the houses could be intervened and extended to develop a self-construction process of rooms and residential spaces. This situation had been prohibited by the American company, as well as by CODELCO. In this sense, the functional architecture (sheds with half-timbered wood, partitions, rectangular trusses, and gabled roofs) moved towards a DIY architecture, with an indeterminate language, towards the loss of the neighborhood's homogenization. The neighborhood began to show new colors, new shapes, extensions, and significant deformation of the original neighborhood, strongly impacting the visual. It was a uniform deconstruction. The resistance to similarity was manifested by the effect of an agency of the resident subjects. The foundation of front yards, garages, fences, new windows, new paint, extensions in height, etc., was the manifestation of this material and architectural postmodernity and the demonstration of multiple stylistic singularities.

At the same time, in the crucial year, 1996, a neighborhood adjacent to the Company town called Padre Alberto Hurtado, which was built by SERVIU, was inaugurated by the same promoter of the thermoelectric plant's privatization, President Eduardo Frei Ruiz-Tagle, meaning another deconstruction process by the arrival of hundreds of families from the lowest socioeconomic strata that surrounded the old thermoelectric camp (Galaz-Mandakovic, 2013).

This process of concluding the Company town was immersed in the domestic economy's neoliberal process, which had an impact on a new form of local capitalist relationship, resulting in new internal fragmentation in the thermoelectric industry expressed in staff reductions, several internal reconversions, and also marked by a profound flexibilization of work regimes and the introduction of contractors and subcontracted workers who received lower wages, many of them workers from central and southern Chile.

The workers who managed to get around the privatization process were able to continue living in the old Company town, but little by little the status projected by the Americans and maintained by CODELCO was being dismantled. The notion of an upper class little by little was breaking down when, in 1996, families had to start paying with their own resources for electricity, telephone, and water, to pay for their children's university studies, to shop at the supermarket without greater privileges, etc. Then, their economic reality was made precarious by the new privatization process. (Figure 5 and Figure 6).

⁵ The property was acquired by Tractebel (Belgium), Iberdrola (Spain), and Enagás (Chile). In 2000, the firm Iberdrola and ENAGAS sold their entire stake to Tractebel.

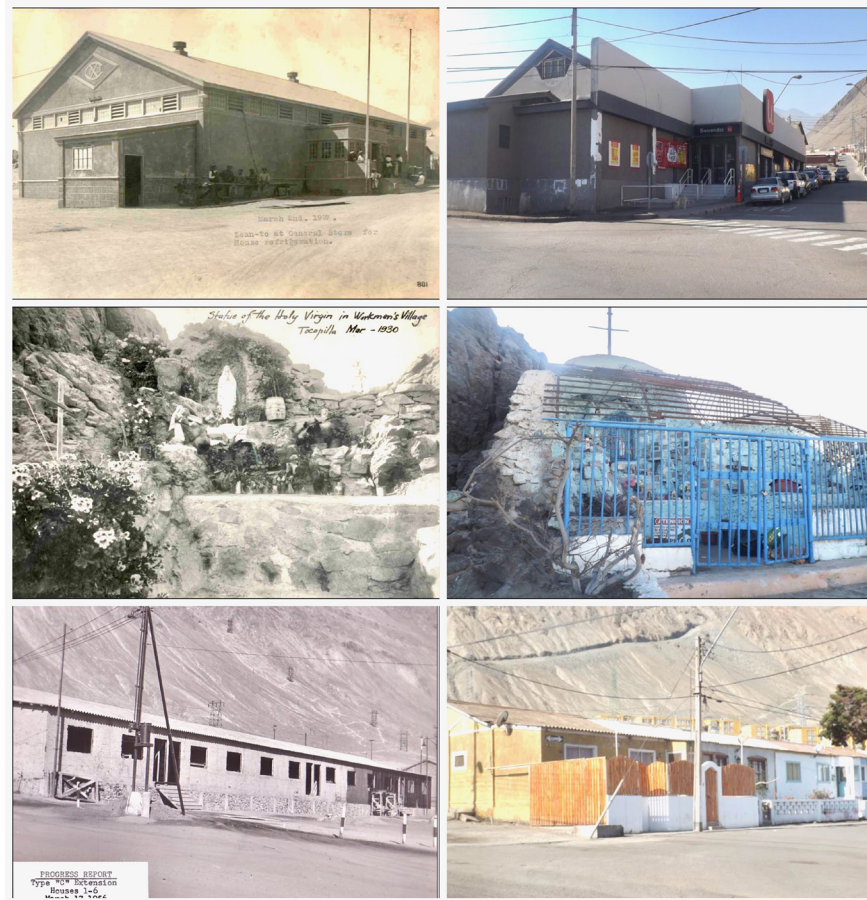


Figure 5. Original facilities of the Company town compared to the current situation. It shows the grocery store, the crypt, and houses of the Type C block and the respective self-construction interventions once the business control over the camp had dissipated. Source: Author's files, preparation by the author.



Figure 6. Comparative panoramas between the buildings and original neighborhoods of The Chile Exploration's Company town and the contemporary scene that expresses the urban expansion of Tocopilla, a consequence of the dissipation of the thermoelectric company's territorial control. Source: Author's files, preparation by the author.

VI. DISCUSSION

A new semantic: from political community to im-political community

As has already been explained, the workers' camp was the constitution of a political community, that constituted an identity closure, signifying the confrontation and expression of the difference with the historical city. In that sense, when the disciplinary and community control of the company was diluted, the path of a political community to an im-political community arose (Espósito, 2006). This is because, with the emergence of the breakdown and the passage to a certain fusion and emergence of the heterogeneity of the company neighborhood, arose an exposure to the different, emergence of singular and diverse existences, an ineradicable process that meant the opening to otherness, to an innovation in community coexistence. This process can also be understood as the irruption of fragments of Tocopilla towards a sector where there was no labor diversity, towards a sector that was closed for many years by the management of a company that projected homosociability with a strong semantic load.

In that scenario, the company aimed at living together under the same controls, namely that living together is the opposite because it is not the production of a political and identity closure of the community on itself, "but the possibility of exposing ourselves and living together in non-identification, in otherness, and in constant openness to the other" (Gudiño, 2011, p.35). In this context, it is confirmed that the "real" coexistence began when otherness broke into the old camp and the essentialist limit of what it meant for the rest of the different population was broken down. In this framework, "the im-political rests on the institutive liminality that crosses the interaction between these two dimensions" (Espósito, 2006, p.14).

Thus, the political project coincides with the order of its fracture, understanding that the general idea of politics and also of culturalists and essentialists is to see the difference, deriving in discourses of identity defense to construct unitary orders (Agamben, 2003, p.43). According to Espósito (2006), the community inhibits the subject and a de-democratization emerges since it hinders the formation of a full identity.

Once the rules of the Company town dissipated, identities of living emerged through the material agency in the dwellings. With these transformations, the idea of a city becomes tangible, its public and private spaces "do not remain static or immutable (...) they take on new meanings attributed by their inhabitants" (Fuentes & Cerda, 2022, p.4), as has happened in multiple contexts. Finally, "the im-political has a particularly emancipatory nature" (Lucero, 2022, p.71), that is, the effective community is constituted in the heterocline, with a polysemic dimension emerging.

VII. CONCLUSIONS

It can be said that the development of mining capitalism in the north of Chile was not only an economic, technological, and extractive imprint but also had a strong substrate of ideology and political subjectivity when designing new sociological and urban horizons.

Thus, as has been pointed out, the Company town of Tocopilla originally became a way of living that helped the intensity of difference, with images held by the actors (Gravano, 2009, p.266), of status, of classism; that is, an ideologized expression of the company's policy in its desire for discipline and biopolitical management of the territory, called political community, which established a persistent struggle against the possibilities of the project breaking down, stemming from abhorrence to the others from a specific architecture. From the Company town, it was sought to inhibit the emergence of deviations or dystopias detrimental to productive development.

This process of discipline began to collapse in 1996 with its privatization from CODELCO, as a result of the neoliberal policies of the Concertación governments. It was then that, faced with this privatization, a process of dislocation and paradigmatic rupture arose, making the static dimensions that were intended to structure the unity of meaning in the neighborhood impossible. In other words, new materiality emerged, a heterogeneous intervention that broke from the originality of the neighborhood, germinating a plural form of coexistence with an inscription of the multiple.

The end of the Company town's management offered a dynamic impossible to be confined and irreconcilable with the institutional discursive order of the original business policy, with a way of coexistence with an absence of identity emerging, not intervening in dispersion or the multiple. This is where the im-political community is identified. According to Agamben (2003), an im-political community is never defined because everything is to come, that is why it is infinite and dynamic and it resists being identified, avoiding every instance of representation. It is there that architecture began to archive the transformation agencies in the hands of the subjects who modified the materiality or incorporated others. That same character or condition of unrepresentability constitutes it as the reverse, as the antithesis of the overwhelming processes of identity and the regimes of truth that represented the original project of Company towns in the Atacama Desert.

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CHARACTERIZATION OF TYPOLOGIES OF REPRESENTATION THROUGH VIRTUAL ETHNOGRAPHY¹

THE PURÉPECHA ROADS IN THE PATZCUARO LAKE REGION AS A HERITAGE CORRIDOR.

CARACTERIZACIÓN DE LAS TIPOLOGÍAS DE REPRESENTACIÓN
A TRAVÉS DE LA ETNOGRAFÍA VIRTUAL. LOS CAMINOS PURÉPECHA EN LA REGIÓN
LACUSTRE DE PÁTZCUARO COMO CORREDOR PATRIMONIAL.

70

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Los caminos han comenzado en época reciente a valorarse como un recurso patrimonial que trascienden más allá de considerarse una infraestructura vinculada a la antropización del territorio. Actualmente, son escasas las propuestas metodológicas para su caracterización patrimonial. Por ello, este artículo muestra el diseño y aplicación de una metodología interdisciplinar apoyada en la Etnografía Virtual y basada en un análisis histórico-cartográfico que permite registrar y categorizar tipologías de representación asociadas a la evolución de los caminos. Se toma como caso de estudio la región lacustre de Pátzcuaro, en México. El análisis histórico-cartográfico a través de la etnografía virtual permite identificar tipologías de representación asociadas no solo a la evolución histórica de los caminos, sino que también de su vínculo con la antropización del entorno lacustre. Al llegar al periodo contemporáneo, la cartografía muestra los caminos como una mera infraestructura y visibiliza a los pueblos lacustres como piezas separadas en torno al turismo cultural. Con la aplicación de esta metodología, se confirma que la cartografía es una herramienta estratégica y que su evolución ha permitido establecer que, históricamente, los caminos han sido un eje vertebrador en la ordenación y el desarrollo del este territorio en distintos procesos históricos. Su vigencia es reflejo de que esta región se mantenga vigente, dada su actual transferencia al turismo cultural. Es importante visibilizar que son todas estas poblaciones en su conjunto las que le confieren una identidad cultural a la región lacustre y que los caminos son el medio que ha permitido que este territorio evolucione históricamente de acuerdo con la necesidad de sus poblaciones, situación que justifica su consideración como corredor patrimonial.

Palabras clave: cartografía histórica, etnografía virtual, infraestructura vial, corredor patrimonial, cultura Purépecha, pueblos mágicos

Roads have recently begun to be valued as a heritage resource that transcends being considered solely as an infrastructure linked to the anthropization of the territory. Currently, there are few methodological proposals for their heritage characterization. Therefore, this article shows the design and application of an interdisciplinary methodology supported by Virtual Ethnography and based on a historical-cartographic analysis that allows recording and categorizing representation typologies associated with the evolution of roads. The lake region of Patzcuaro, Mexico, is taken as a case study. Its historical-cartographic analysis through virtual ethnography allows identifying typologies of representation associated not only with the historical evolution of roads but also with their ties to the anthropization of the lake setting. The cartography, in the contemporary period, shows roads as a mere infrastructure and makes the lake villages visible as separate pieces for cultural tourism. With the application of this methodology, it is confirmed that cartography is a strategic tool and that its evolution has made it possible to establish that, historically, roads have been a backbone in the management and development of this territory in different historical processes. Its validity is a reflection of the fact that this region is still valid, given its current transfer to cultural tourism. It is important to make visible that it is these populations as a whole that confer a cultural identity to the lake region and that the roads are the means that have allowed this territory to evolve historically considering the needs of its population, a situation that justifies its consideration as a heritage corridor.

Keywords: historical cartography, virtual ethnography, road infrastructure, heritage corridor, Purepecha culture, magic towns.

I. INTRODUCTION

Making roads visible as a historical and heritage resource and not merely as an infrastructure linked to territorial transformation and planning, became clear in the 1980s thanks to the research of John Brinckerhoff Jackson. From urban and landscape planning, he set precedents from a contemporary perspective on the importance of making the native landscape visible (Brinckerhoff Jackson, 2010) and, at the same time, to characterize how contemporary landscapes have been laid out by their roads (Brinckerhoff Jackson, 2011). However, few interdisciplinary studies identify road heritage and the value of this infrastructure as a cultural corridor (Loren-Méndez et al., 2016).

The culture associated with the past is an exogenous factor for the socio-economic development that has been generated around these infrastructures. Historically, roads have been associated with transportation and socio-cultural activities, often resulting in the construction of symbolic images associated with popular culture and the consolidation of social imaginaries (Payne & Hurt, 2015; Tubadji & Nijkamp, 2018).

In the case of Mexico, the lake region of Patzcuaro has positioned itself in the last two decades as a place of tourist interest, both nationally and internationally. The Federal Government, through the Secretariat of Tourism (SECTUR, in Spanish), has implemented tourism and heritage protection strategies. The trend of cultural tourism leads to recognizing the resources that are located in the Historical Centers as important, a situation that makes invisible resources that, due to their scale or location, are outside the urban core.

This study focuses on the lake district of Lake Patzcuaro, located in the heart of the State of Michoacán, Mexico (Figure 1), a place where the Purépecha culture was established and later where, in the Colonial period, the first capital of the Province of Michoacán was constituted. Currently, the resources linked to the historical, cultural, and natural identity of this region have been valued by diverse government entities, to promote cultural tourism in the region (Núñez-Camarena & Ettinger-Mc Enulty, 2020).

The historical importance of the Purépecha region is reflected in codices such as the *Relationship of ceremonies, rites, population, and governance of the Yndios of the Province of Michoacan (1540)* by Friar Jerónimo de Alcalá, or the canvas of Jucutacato, which were made between the 16th and 18th centuries, as well as in cartography where the reorganization of the territory is shown. With the perfecting of cartographic techniques, this is joined by travel stories which, for the most part, are exogenous views that characterized the uniqueness of the region. Examples of this are the works by Alfred Conkling, James Steele (1884), Thomas Janvier (1886), Marie Robinson Wright (1897), Wallace Gillpatrick (1911), and Reau Campbell and Hopkinson Smith (1914) (García Sánchez, 2015).

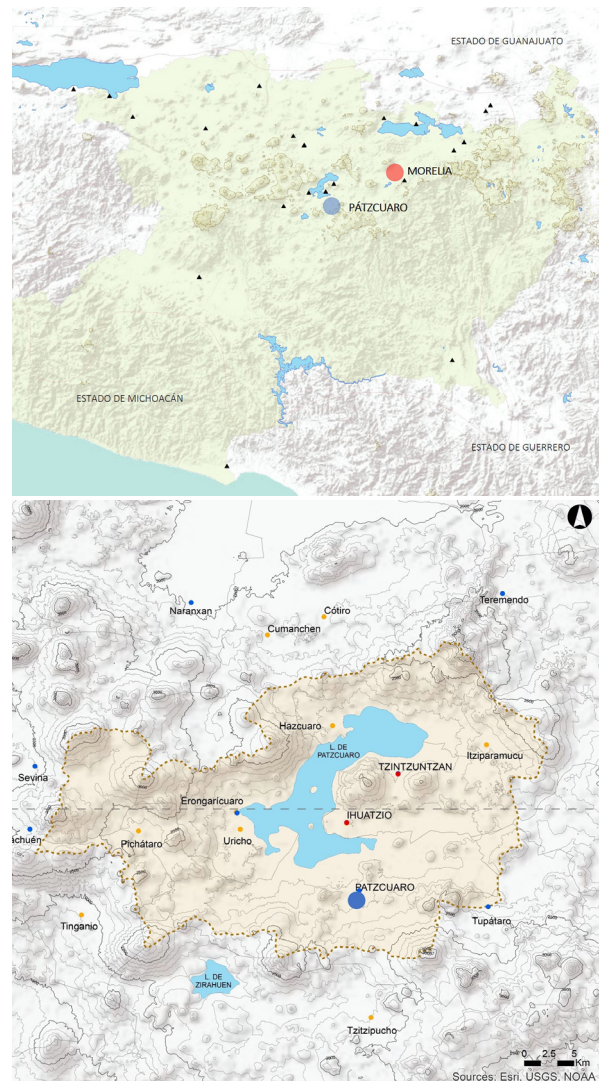


Figure 1. Location of the Patzcuaro basin. Source: Prepared by the author, GMNC, 2022.

The first quarter of the 20th century, during the time of Cardinism (1934-1940), saw the greatest-ever road development in Mexico, boosting the automobile industry and road tourism alongside the United States. The travel guides, road maps, and photographs issued at the time, recommended visiting the region of Patzcuaro to enjoy the freedom of traveling by car in picturesque Mexico (Martínez-Aguilar & Ettinger-McEnulty, 2021).

In 2001, the SECTUR launched the *Magic Towns* project at the national level, a cultural tourism strategy, with Patzcuaro being the first municipality in Michoacán awarded this label in 2002. In 2011, the Michoacán SECTUR launched the *Don Vasco Route*,

which includes the lake district, establishing a historical narrative where the roads allowed evangelizing the territory (Hiriart Pardo, 2018).

Through tourist cartography and the official discourse, visiting Pátzcuaro and Tzintzuntzan as *Magical Towns* was promoted, while the surrounding villages appear as mere location references. The *Magical Towns*, such as the *Don Vasco Route*, are limited by tourism, making visible buildings that are located on the perimeter of the historical centers, but unconsciously denying the existence and potential of resources, that due to their scale in the territory, are located outside the urban perimeter (Núñez-Camarena & Loren-Méndez, 2020).

This research intends to be a contribution where the historical-cartographic analysis, supported by virtual ethnography, allows constructing a qualitative methodology, where its results can be analyzed quantitatively. The analysis allows not only identifying the typologies of representation associated with the evolution of the roads but also recognizes the cohesive role that they have had around the identity of the lake populations, as they have historically evolved along the roads. From a contemporary perspective, the Purépecha roads as a result of historical anthropization, can be seen as a heritage corridor.

II. THEORETICAL FRAMEWORK

To define the typologies of representation, contemporary research is taken as a reference where the road is characterized not as a mere infrastructure, but as a backbone of history and culture. *The N-340 road corridor as the historical axis of the Andalusian coastline: characterization methodologies and strategies for its patrimonialization and sustainable regeneration* (Loren-Méndez et al., 2016), collects how, through sustainable regeneration strategies, it is possible to recognize historical, cultural, and social elements in the territory, documenting the heritage associated with the development of historical corridors (Loren-Méndez et al., 2016).

The historical roads can be made visible as heritage corridors since their evolution is the result of the anthropization of the territory, where social migrations adapt and transform it to cover their basic needs (Byrne, 2016). Currently, roads are vulnerable resources and their transformations are the result of processes related to land use change. Without control, these dynamics bring with them the loss of intangible values of the populations that inhabit the territory (Hoppert et al., 2018; Nogué et al., 2013).

Theoretical approaches agree on the importance of applying interdisciplinary methodologies in the characterization, analysis, and identification of the historical, cultural, and natural permanences of a territory (Alba Dorado, 2019; Fernández Cacho et al., 2021). Virtual ethnography, in this sense, becomes a

powerful tool, allowing the reformulation of the space under which the research is carried out (Suárez-Vergne, 2020). This allows expanding upon, consolidating, and enriching the construction of a more solid database, understanding that the culture and the studied community are not direct products of a physical place or a single historical perception, since this evolves and is perfected over time (Hine, 2004; Suárez-Vergne, 2020).

The consultation of historical and bibliographic archives, which due to their longevity and physical location are in different geographical points, constitutes an excellent opportunity to expand the field of interaction between scientific production and cultural understanding (Hine, 2004; Mosquera, 2008). In addition, it allows contextualizing how, throughout history, culture is produced and reproduced in the media through social perception (Durán Salado & Fernández Cacho, 2020).

Therefore, social perception as an instrument of analysis indirectly drives an active action by the researcher (Bernard & Gravlee, 2014; Caliandro, 2018), discerning from the analyzed materials the phenomena that are sought to be studied, abstracting the typologies of representation reflected in historical resources such as cartography, since they are a reflection of the collective identity of a region (Noguera, 1995; Pellicer et al., 2013).

Background of the region

Due to the historical, cultural, and natural importance of Pátzcuaro and its surroundings, its characterization has been approached scientifically in interdisciplinary fields. For just over a decade, after the consolidation of cultural tourism, research has been made that addresses the evolution of this territory and its passing to tourism. The image of the lake district as idyllic for rest has been cemented throughout history by the exogenous gaze visible in cartographies, narratives, travel journals, and tourist guides (García Sánchez, 2015). However, it is during the first decades of the 20th century, thanks to road development and the arrival of the automobile, that this region is touristically positioned (Martínez-Aguilar & Ettinger-McEnulty, 2021). The perception that the visitor had of the lake district was conditioned by the imaginaries that the government promoted from tourism, making the identity elements of the Purépecha culture their own, since the regionalist aesthetics framed the postcard of the picturesque, adding to it the road as a symbol of modernity (Ettinger-McEnulty, 2018; Jolly, 2018).

Contextualizing the scientific production around the Pátzcuaro region, the contribution of this article deals with recognizing the historical permanences associated with the evolution of the roads and whose reflection reveals their possible recognition as a heritage corridor.

ARCHIVES CONSULTED TO BUILD THE CARTOGRAPHIC SAMPLE

N°.	File Name	Country	N°.	File Name	Country
1	Ibero-Amerikanisches Institut	Germany	28	Digital Community, Massachusetts Collection	USA
2	Archive of the Royal Library of the Monastery of San Lorenzo del Escorial	Spain	29	David Rumsey Historical Map Collection	USA
3	General Archive of the Indies. PARS State Archives	Spain	30	JCB Archive of Early American Images	USA
4	General Archive of the Indies. Repository in Seville, Spain	Spain	31	John Carter Brown Library at Brown University	USA
5	Digital Library of the Bibliographic Heritage	Spain	32	Library of Congress, USA	USA
6	Hispanic Digital Library. National Library of Spain	Spain	33	TuckDB Postcards: database of antique postcards	USA
7	Royal Academy of History Digital Library	Spain	34	National Library of France	France
8	National Library of Spain	Spain	35	Gallica: Collections of the National Library of France	France
9	Collective Catalog of the Library Network of the State Archives	Spain	36	Alidrisi Cartography	Mexico
10	CERES: Digital network of Museum collections in Spain	Spain	37	General Archive of the Nation	Mexico
11	Institute of Cultural Heritage of Spain	Spain	38	Historical Archive of the City Council of Pátzcuaro	Mexico
12	PARES: Spanish Archives Portal	Spain	39	Historical Archives of Chihuahua	Mexico
13	Barrón Maps	USA	40	Digital Library of the Autonomous University of Nuevo León	Mexico
14	Barry Lawrence Ruderman. Antique Maps Inc.	USA	41	Mexican Digital Library	Mexico
15	Beinecke Digital Collections, Yale University	USA	42	Foundation for the Advancement of Mesoamerican Studies	Mexico
16	Beinecke Library of Rare Books and Manuscripts, Yale University	USA	43	Latin American Institute of Educational Communication	Mexico
17	Stanford University Library	USA	44	Mapoteca Manuel Orozco y Berra	Mexico
18	Yale University Library	USA	45	INAH Media Library	Mexico
19	United States Library of Congress	USA	46	Pátzcuaro postcard	Mexico
20	University of Berkeley Digital Library	USA	47	Indigenous Peoples of Mexico	Mexico
21	World Digital Library. Library of Congress of the USA	USA	48	Royal Academy of History	Mexico
22	Boston Public Library. Norman B. Leventhal Map	USA	49	Michoacan Nicolás León Regional Museum	Mexico
23	Umedia Library: University of Minnesota	USA	50	Cartography of the Netherlands	The Netherlands
24	Boston Rare Maps, antique maps	USA	51	Europeana Collection	The Netherlands
25	Barnebys auction house. Private collections.	USA	52	National Digital Library of Portugal	Portugal
26	BidSquare auction house. Private collections.	USA	53	akpool UK auction house Private collections	United Kingdom
27	Morton auction house. Private collections.	USA			

Table 1. Archives consulted. Source: Prepared by the author, GMNC, 2022.

METHODOLOGICAL CONSTRUCTION OF THE CARTOGRAPHIC SAMPLE CLASSIFICATION SYSTEM

CARTOGRAPHIC RESOURCES				HISTORICAL PROCESSES					THEMATIC BLOCKS																	
Particular data				Typology					Scale					1° 2° 3° 4° 5°					Category		Subcategory					
N.º	Authorship	Year	Title	anamus (Petroglyphs)	Codex	Cartography	Lithography	Photography	Global	Continental	National	State	Regional	Municipal	Appropriations in Western Mexico (1800 AD.C. - 1200 AD.)	Expansion and consolidation of the Tarascan State (1200 - 1521)	Integration and reorganization of the colonial territory (1521 - 1810)	Definition of the independent territory (1810 - 1930)	From industrialization to digital expansion (1930-2020)	Typology of representation	Typology of representation	Typology of representation	Typology of representation	Typology of representation	Typology of representation	
1	Chichimeca Culture	900	Janamus	x										x											x	
2	Purépecha Culture	1200	Janamus	x												x										x
3	Henricus Martellus G.	1490	Map of the known world			x			x		x		x													x
6	Friar Jerónimo de Alcalá	1540	Codex. Relationship of Michoacán		x												x								x	x
7	Jerónimo Girava	1556	World Map			x			x		x		x					x								x
11	Jacobo Gastaldi	1562	World Map			x			x		x							x								x
122	Pascual Ortiz Rubio	1900	State Charter			x						x														x
123	Secretary of Development	1900	State Charter			x							x													x
212	INEGI	2016	Cadastral Letter			x						x														x
213	INEGI	2019	Cadastral Letter			x						x														x

Table 2. Classification system of cartographic sources. Source: Prepared by the author, GMNC, 2022.

III. METHODOLOGY

Phase 1. Construction of the cartographic base and definition of the typologies of representation

To build the cartographic base, virtual ethnography has made it possible to consult 53 archives in person and digitally, since these are physically located in seven different countries (Table 1). Expanding the field of research through the virtual field allows access to cartographic resources that, due to their physical condition, can no longer be consulted. A sample of 432 sources was obtained, and 213 where the Pátzcuaro lake district is represented, were analyzed.

To thematically define the order and hierarchy of the typologies of representation, the internal structure of the Thesaurus of the Andalusian Institute of Historical Heritage (hereinafter, IAPH, for its Spanish acronym) was consulted (IAPH, 2019). Its use is justified given that Mexico does not include a thesaurus that incorporates concepts of national heritage. Depending on how the typologies of representation are perceived, the explanatory power of perception will be defined when identifying, hierarchizing, and analyzing the permanences that continue to be in force in the territory (Fernández Cacho et al., 2015).

Phase 2. Development of the methodology of historical cartographic analysis

Three large blocks are established from which the mapping is

TYPOLOGIES OF REPRESENTATION		
Activities	1881	35%
Structures	1124	21%
Real Estate	1094	20%
Associated aspects	1087	20%
Purépecha Culture	83	2%
Mexican Culture	79	2%
Events	11	0%
	5359	100%
A. Typologies of representation associated with each thematic block		

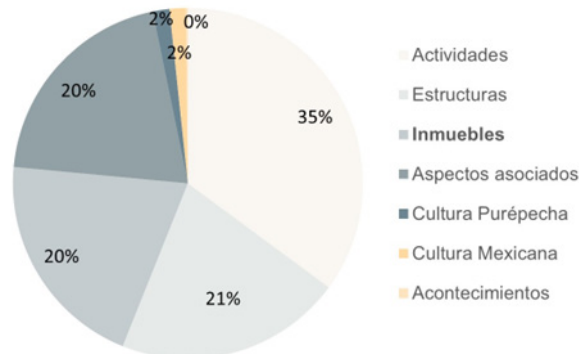


Table 3. Hierarchy of the thematic blocks by their typologies of representation. Source: Prepared by the author, GMNC, 2022.

organized: 1. Sources consulted, 2. Historical processes, and 3. Thematic blocks (Table 2).

1. Sources consulted. 213 cartographic sources are arranged chronologically, indicating the year of production, the title of the work, and the name of the author or entity responsible for its production. The goal is to record and thematically classify the typologies of representation, to establish the extent to which the roads have evolved.
2. Historical processes. In a second block, five historical processes are established: Appropriations in western Mexico (1800 AD - 1200 AD); Expansion and consolidation of the Tarascan State (1200 - 1521); Integration and reorganization of the colonial territory (1521 - 1810); Definition of the independent territory (1810-1930); and From industrialization to digital expansion (1930-2020). The objective is to chronologically relate the cartography and the evolution of the typologies of representation.
3. Thematic blocks. This is the core part of the methodology. Here, each one of the typologies of representation that are reflected in cartography is defined, classified, and categorized thematically. Following the thematic structure of the IAPH Thesaurus, seven main thematic blocks are established: 1. Events; 2. Activities; 3. Associated aspects; 4. Structures; 5. Real estate; 6. Mexican culture, and 7. Purépecha culture. The last two blocks condense typologies typical of Mexico.

The methodology allows processing the results obtained from the historical-cartographic analysis and understanding how each thematic block evolves in cartography. The results are understood through two readings:

1. The weight of each thematic block is hierarchized according to the total number of cartographic sources that have been associated with it or, on the contrary,

2. The information is hierarchized according to the total number of typologies of representation grouped in each thematic block.

Both criteria are valid for this research. However, to characterize the image projected by the typologies of representation associated with the roads, the second criterion is chosen. This is based on the hypothesis that cartography shows elements that are recognized today as permanences in the territory and, in some cases, reflects resources where only the cartographic record remains.

IV. RESULTS

To analyze the data obtained, the criterion of hierarchizing the thematic blocks using the total number of typologies of representation grouped in each thematic block is chosen. Of the 213 cartographic sources, 5,359 typologies of representation were obtained. According to what can be seen in Figure 2, the order is as follows: 1,881 correspond to activities; 1,121 to structures; 1,094 to buildings; 1,087 to associated aspects; 83 to the Purépecha culture; 79 to the Mexican culture, and lastly, the events reflect 11 typologies (Table 3).

According to the objective of this article, the category of real estate is analyzed since, in their internal structure, roads are part of the road networks. In cartography, this infrastructure has territorial importance, since its continuity and evolution show an anthropized territory and with it, the existence of historical resources associated with its permanence. (Loren-Méndez et al., 2016; Rosell et al., 2020).

The historical evolution of road networks is shown in Table 4, with railroads being the typology that is most represented in

THEMATIC STRUCTURE FOR THE ANALYSIS OF THE IMAGE PROJECTED BY THE CARTOGRAPHY. Real Estate				Cartographic sample	Representations on the territory	
				2013	5359	100%
				Cartographic resources	Representations by thematic block	
5	Real Estate			149	1094	20%
5,1	Building area				278	
5.2.4	Territorial infrastructures			91	466	
5.2.4.1	Transport infrastructure					
5.2.4.1.1	Road networks			91	466	
	5.2.4.1.1.1	Dirt roads			8	
	5.2.4.1.1.2	Roads			152	
	5.2.4.1.1.3	Highway			67	
	5.2.4.1.1.4	Dirt tracks			4	
	5.2.4.1.1.5	Sidewalk			6	
	5.2.4.1.1.6	Vehicles			3	
	5.2.4.1.1.7	Infrastructures			11	
	5.2.4.1.1.8	Railroads			201	
	5.2.4.1.1.9	Itineraries			14	

Table 4. Types of representation: real estate. Source: Prepared by the author, GMNC, 2022.

cartography (201 representations). However, for our analysis, this resource is not a faithful reflection of the evolution of the roads, since its presence corresponds to the cartography developed at the end of the 19th century, which would make the evolution of the roads before the railways, invisible. The dirt roads and sidewalks are part of the evolutionary process of the roads until the arrival of the highway to the Pátzcuaro lake district.

The uniqueness of cartography in the historical characterization of the Purépecha heritage corridor

As part of the territorial infrastructures, roads have had a direct impact on the transformation and planning of the territory. The results presented allow reflecting on the importance of their evolution in the Pátzcuaro lake district, from the period when the Purépecha culture was established to its contemporary transfer to cultural tourism.

Cartographic evolution reflects not only a better knowledge of the territory by the agents, since they are the ones who show how territorial properties were consolidated around the roads, in this case, religious sites, as well as population settlements. Going down the scale of analysis, religious, residential and non-residential buildings were built around the settlements, as well as service buildings. Socially, the roads have influenced

the development of socio-economic, festive-ceremonial, and magical-religious activities.

During the historical process of *Integration and reorganization of the colonial territory* (1521 - 1810) codices and cartographies were elaborated to record the uniqueness of the new territories and how they were ordered according to the new political-territorial structure. In 1540, Friar Jerónimo de Alcalá made the codex *Relationship of the ceremonies and rituals and population and governance of the Yndios of the province of Michoacán*, in which the layout of the roads and the aesthetics of the lake dwellings are shown. Currently, this typology of housing (the *Troje*) is being recovered, because with contemporary materials the use of this vernacular architecture was left aside (Figure 2).

Friar Francisco Ajofrín (1959) in *View of Pátzcuaro from the Calvary Church*, characterizes the natural environment of the basin, highlighting the topography of the territory. The roads, in particular those that give access to the city, have a hierarchical role. In Figure 3, buildings such as the Royal Customs house, the school of San Ignacio, and the Augustinian Convent are identified, whose buildings confirm the territorial hierarchy of Pátzcuaro compared to the other towns in the region (Figure 3).



Figure 2. Historical cartography, 16th century. Source: *Relationship of the ceremonies and rites, population and governance of the Yndios of the Province of Michoacán* (1540); INAH media library (2021).



Figure 3. Historical cartography, 18th century. Source: *View of Pátzcuaro from the Calvary Church*, Friar Francisco Ajofrín (1764).



In the first stage of evangelization, chapels and churches were built in the main population centers of the Tarascan State. In 1932, Pedro Beaumont, in *Chronicles of Michoacán*, indicated that the roads of the lake district were the guiding axis of religious discourse because, through their continuity, the orders were established first in Tzintzuntzan, and later in Pátzcuaro. This cultural miscegenation brought with it new uses and customs, which were reflected in magical-religious activities, such as the devotional practices shown in Figure 4.

In the historical *definition of the independent territory (1810-1930)* process, José Guadalupe Romero elaborates in 1865, the *Geographical map of the Department of Michoacán*. In it, the region that communicates the lake district of Pátzcuaro with the capital of Morelia is observed, showing the arrangement of the road networks, which evidences the hierarchy between dirt roads, sidewalks, and roads. The population settlements located around the connecting roads of the Pátzcuaro region differed from the rural-urban ones, as did the existence of ranches and *haciendas*. Of these last two typologies of representation, in some cases, only their cartographic record remains (Figure 5). because time has destroyed them.

The cartographic analysis itself supports the hypothesis that, according to the time when each cartographic resource is



Figure 4. Historical cartography, 18th century. Source: *Chronicles of Michoacán*, Pedro Beaumont (1772).

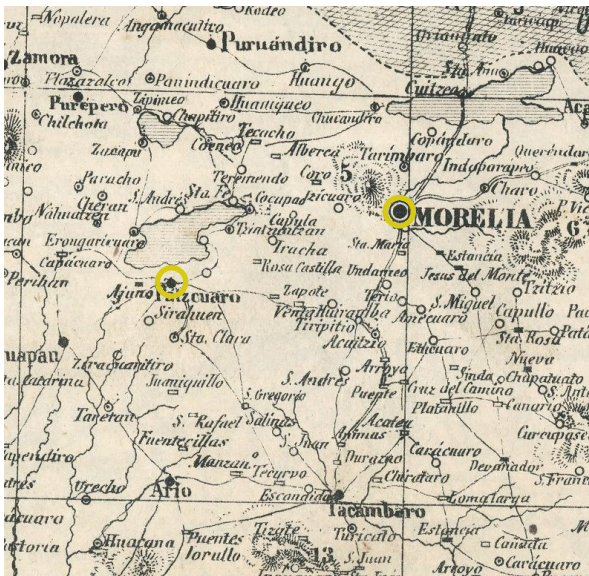


Figure 5. Historical cartography, 19th century. Source: Geographical map of the Department of Michoacán, José Guadalupe Romero (1865).

issued, the scale and resources that characterize the territory are prioritized. At the end of the 19th century and throughout the 20th century, the urban scale had a greater presence compared to the regional or state scale. The roads disappear visually and indications appear in the direction of the different off-roads that the population centers had. The urban scale favored the representation of the equipment and buildings that the main urban and rural centers had.

During the historical process *From industrialization to digital expansion (1930-2020)*, the Government of the State of Michoacán is the main agent in the cartographic elaboration of Pátzcuaro and its surroundings. In 1895, it produced the *Map of the city of Pátzcuaro* (Figure 6). The urban layout defined since its refounding is subdivided (at that historical moment) into sectors and inside each sector, there are squares, fountains, and temples. The hotels and inns were necessary for those who spent the night in western Mexico. These were located on the side of the main road entering Pátzcuaro, as well as in the surroundings of the public squares. Currently, most of these hotels continue to provide their service, while the roads as a service infrastructure become a highway. This process began during the first decades of the 20th century.

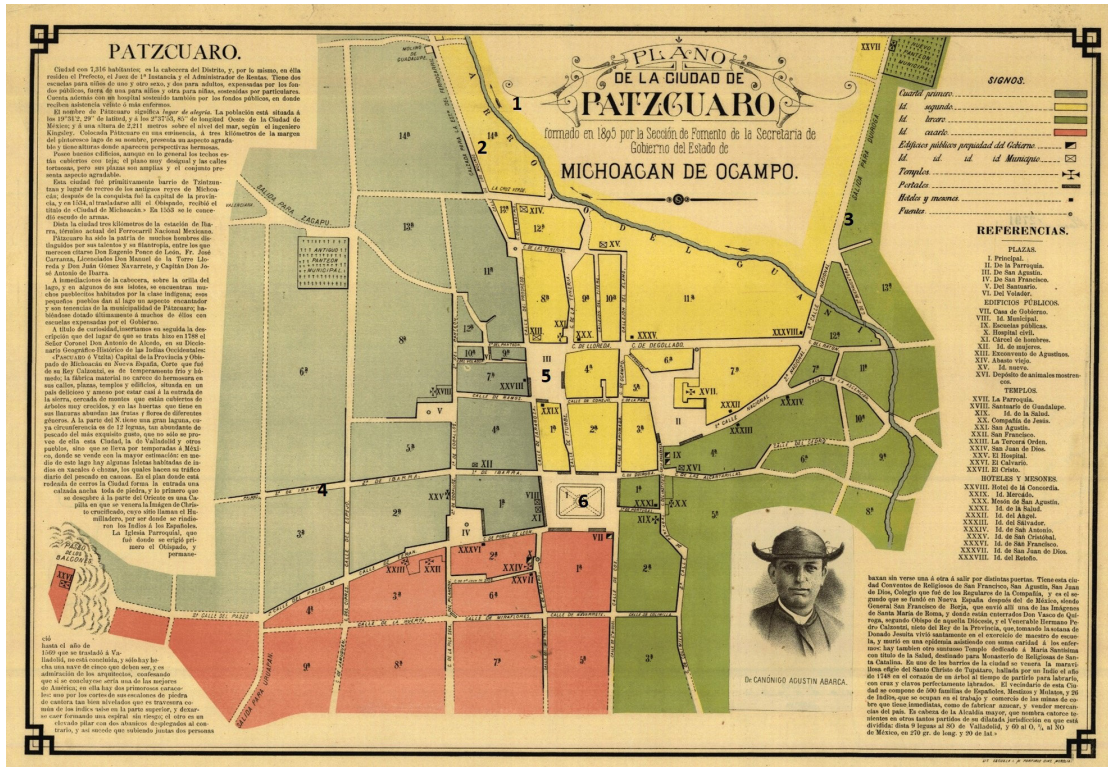


Figure 6. Urban layout of the city of Pátzcuaro. Source: Development Section of the Government Secretariat of Michoacán (1895), *City map of Pátzcuaro*.

In 1970, the *Map of the city of Pátzcuaro*, which differs little from that of 1875, was prepared. Its change is a result of urban development in the north of the city. Between 1930 and 1940 the road that would be the new entrance to Pátzcuaro was built, which allowed the arrival of vehicles, mainly tourists and foreigners. This road came from Ibarra station and the old road to the station was left for the tram (Figure 7).

Officially this territory begins its transfer to tourism in the 1930s. In 2002, with the incorporation of Pátzcuaro into the *Magical Towns* program, the strategy restructures the way to make the territory and its heritage visible, separating the lake district into individual pieces and valuing the historical centers of the towns with that denomination.

In 2012, the Michoacán Ministry of Tourism issued maps and tourist brochures to promote the *Magical Towns* of the State (Figure 8). In the case of Pátzcuaro, the tourist is invited to get to know the colonial heritage there is in the Historical Monuments Area (historic center). Existing resources outside the perimeter remain outside the official discourse. Churches are visible, as well as the cultural equipment built in religious spaces that were no longer dedicated to worship in the 1930s. The urban landscape



Figure 7. Urban improvements: improvement in the northern access of the city. Source: Government of the State of Michoacán de Ocampo (1970), *Pátzcuaro city map*.



Figure 8. Tourist cartography of Pátzcuaro. Source: Maps and tourist brochures, SECTUR Michoacán (2012).

is one of the resources promoted as part of the imaginary of the typical and picturesque town, adding to this the image of the contemporary Purépecha woman.

V. CONCLUSIONS

This work contributes to demonstrating the necessary construction of interdisciplinary methodologies that allow characterizing the historical anthropization of roads and their possible recognition as a heritage corridor. In the case of the Pátzcuaro lake district, the historical-cartographic analysis identified 1,094 typologies of representation associated with road networks. Hence, it is stated that natural, built, and social permanences represented in the cartography are a reflection of the anthropization of this territory, leaving records of the time when the Purépecha culture was established and the Tarascan State was consolidated, until reaching the contemporary period where the transfer of this territory to cultural tourism begins.

It has been decisive to identify how, from the original cartography, the roads were represented, being the visual axis from which the image was constructed that showed the uniqueness of the lake district and how its environment was transformed. Tourist strategies such as the *Magical Towns* bring with them a reduction in the scale on which the tourist is shown the territory, making historical resources invisible that, due to their dimension, are located outside the urban environment. This happens with the roads.

The populations around Lake Pátzcuaro are as a whole those that, due to their culture, identity, and idiosyncrasies, have conferred a historical value to the territory and not only the

populations that have tourist recognition. Finally, in the case of the Pátzcuaro lake district, the roads are a faithful testimony of the anthropization processes that took place in this territory. The evolution of the typologies of representation is an example that the trinomial of roads, territory, and local population should be considered in its historical evolution, to generate the opportunity for the Purépecha roads to be recognized as a heritage corridor.

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REHABILITATING A MASS HOUSING NEIGHBORHOOD IN BARCELONA, A SUCCESSFUL TRANSFORMATION?¹

REHABILITANDO UN BARRIO DE VIVIENDA MASIVA EN BARCELONA,
¿UNA TRANSFORMACIÓN EXITOSA?

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Los barrios de vivienda masiva desarrollados en la segunda mitad del siglo XX constituyen una parte importante del parque de viviendas sociales y asequibles del sur de Europa, pero sufren problemas sociales y degradación física. Centrado en un estudio de caso de transformación arquetípica de una urbanización en Barcelona (Canyelles), este artículo pretende identificar las condiciones necesarias para reducir las desigualdades sociales en este tipo de barrios, además de la implementación de programas de rehabilitación urbana. La metodología mixta aplicada consistió en una combinación de entrevistas semiestructuradas con los principales actores involucrados, un grupo focal con la junta de vecinos y un análisis estadístico multivariante de indicadores sociales a escala fina intraurbana. A partir de estos métodos, analizamos los proyectos de transformación urbana, así como sus consecuencias sociales, que se pueden observar en la evolución de la composición social del barrio. Por lo tanto, observamos una mejora significativa en la calidad de vida de los vecinos como resultado de programas, tanto de rehabilitación de viviendas como de renovación de espacios públicos. Finalmente, estos cambios están contribuyendo a aumentar la integración social, así como también a iniciar un proceso de gentrificación.

Palabras clave: vivienda masiva, rehabilitación, espacios públicos, integración social, gentrificación.

Mass housing neighborhoods emerged in the second half of the twentieth century as an important part of the affordable social housing stock in Southern Europe, but now these are suffering from social problems and physical degradation. This article, which focuses on a case study of an archetypical transformation of a housing estate in Barcelona (Canyelles), aims at identifying the conditions needed to reduce social inequalities in this type of neighborhood and implement urban rehabilitation programs. The mixed methodology applied consisted of a combination of semi-structured interviews with the main actors involved, a focus group with the neighborhood council, and a multivariate statistical analysis of intra-urban fine-scale social indicators. Based on these methods, the urban transformation projects and their social consequences, which can be observed in the evolution of the social composition of the neighborhood, are analyzed. A significant improvement in the quality of life of the neighbors is seen as a result of the housing rehabilitation and renovation of public spaces programs. Ultimately, these changes are contributing to increasing social integration, as well as initiating a gentrification process.

Keywords: mass housing, rehabilitation, public spaces, social integration, gentrification.

I. INTRODUCTION

The shortage of social housing in southern Europe has meant that the regeneration of mass housing neighborhoods of the late Francoism (1960s-70s) has become especially relevant in housing policies on representing an important part of the housing stock available today (Arbaci, 2019; Pareja-Eastaway & Sánchez-Martínez, 2017). Part of the research on this issue focuses on the importance of strategies that combine urban renewal projects and social intervention programs to solve inequality and social exclusion problems in these neighborhoods (Hall et al., 2005; Hess et al., 2018; Rowlands et al., 2009). However, it is also possible to identify specific cases where effective transformations can be achieved by using physical interventions to achieve the sought-after social goals (Belmessous et al., 2005). The underlying issue is the need to identify whether effective social and urban changes are now possible thanks to physical interventions, whether the initial social conditions allow these interventions to be effective, and/or whether there is a social dynamic independent of the rehabilitation or renovation projects carried out.

This article seeks to point out some lessons about the relationship between a rehabilitation process in a physically degraded neighborhood and the long-term social dynamics. In this way, the main objective is to identify the conditions of a mass housing neighborhood needed so that physical rehabilitation strategies can contribute to a transformation of its social composition and in this way, solve the associated inequality problems. One way to reduce inequality could be the result of generalized upward social mobility (Arbaci, 2019) by improving living conditions and education. Another possible way would be displacing and replacing social exclusion families with others that have greater economic and cultural capital (Fernández Arrigoitia, 2018).

In this sense, this article is part of studies on the processes of physical transformation of mass housing neighborhoods and their possible social consequences in the context of southern European cities. Specifically, a case study is made in Barcelona, in the Canyelles neighborhood, whose choice is because it is a project that is considered successful *a priori* from the perspective of physical intervention, thanks to the combination of the comprehensive rehabilitation and reorganization of public spaces. In addition, this transformation seems to be accompanied by an improvement in its overall perception by its residents and the rest of the citizenry. Within the working-class district of Nou Barris, the possible recent increased

attractiveness of this mass housing neighborhood is also part of the significant improvement of its accessibility to other parts of the city. Given the initial nature of a peripheral enclave that is slightly above the city center and weakly connected to it, two major metropolitan transformations are combined to change the latter. On one hand, connectivity with the rest of the city is improved with the design of the Ronda de Dalt ring road, built as part of the 1992 Olympic Games infrastructure program. On the other, the Canyelles metro station which opened in 2003, allows direct communication with the urban center of Barcelona.

This article is structured as follows: after this introduction, a theoretical section looks at intervention policies in degraded mass housing neighborhoods. Then, the mixed methods used in the research are presented, before presenting the case study. The results are organized into two main sections. First of all, the rehabilitation projects in the Canyelles neighborhood are explained. Secondly, the social changes in the studied neighborhood are presented regarding the metropolitan dynamics observed in recent decades. The article ends with a discussion section and conclusions on the relationship between social transformations and urban rehabilitation.

II. THEORETICAL FRAMEWORK

The crisis of affordable and/or social housing has become a key issue in government strategies on different scales that aspire to approach the goal of ensuring the right to the city and adequate housing for all citizens (Lefebvre, 1972; Rolnik, 2019; Wetzstein, 2017). The physical decline and social problems of mass housing neighborhoods in the second half of the 20th century justify the need for different wide-reaching restructuring or regeneration strategies (Rowlands et al., 2009; Van Kempen et al., 2005; Watt & Smets, 2017). However, there is no single recipe to overcome the formal and social problems observed in this type of housing complex. In addition, the structural differences in terms of home ownership typical of the territorial contexts influence the type of strategies followed. In general, two main types of approaches can be distinguished when implementing these policies depending on whether social programs are included. On one hand, a "classic" vision, based on physical intervention either in the absence of public intervention or based on an intervention piloted by the State. This type of approach ranges from rehabilitation projects of certain houses to physical renovation projects of mass housing neighborhoods that include the total or partial destruction of buildings where there is extreme physical or social degradation (Hess et al., 2018).

On the other hand, the regeneration or comprehensive urban rehabilitation approaches, depending on the degree of physical intervention in the neighborhoods in question, are characterized by a combination of a program of social inclusion measures and the promotion of economic activities. This group is part of the social mix strategy, which specifically seeks to attract new middle and upper-class residents to these working-class neighborhoods and their marginalization and social exclusion issues, usually involving relocations (Lelévrier, 2013). In the Spanish context, the comprehensive rehabilitation programs carried out in this type of neighborhood are also part of this second approach (Hernández Aja et al., 2015). In this sense, the Integrated Rehabilitation Areas (ARI, in Spanish) and especially the URBAN programs, since the 2000s, are initiatives that use building rehabilitation and public space redevelopment, along with a program of socio-economic revitalization actions (Hernández Aja & García Madruga, 2014; De Gregorio Hurtado, 2017). This approach to the transformation of degraded neighborhoods, which includes aspects related to urban form and social programs, is directly linked to integrated urban regeneration. This trend contributes to changing previous transformation strategies for these mass housing neighborhoods, focused on the formal intervention in the built space and reduced to highly spatially localized actions or accessibility strategies. Despite this, even some of the paradigmatic cases of integrated approaches, such as the one in the Barrio de la Mina (Barcelona Metropolitan area), show that there are few items budgeted for social inclusion programs (Jornet et al., 2009).

Regeneration or comprehensive rehabilitation strategies, and in particular those that seek social mixing, can generate an undesirable effect such as the displacement of long-term residents with the arrival of new middle- and upper-class inhabitants, typical of gentrification processes (Fernández Arrigoitia, 2018). This type of social change in these neighborhoods is being promoted by housing financialization (Aalbers, 2019; García-Lamarca, 2020; Rolnik, 2019), as well as the marketization and privatization of the social housing stock (Bernt et al., 2017; Gurran & Bramley, 2017; Lelévrier, 2021). At the same time, some research has focused on the impact and evaluation of regeneration strategies on the dynamics of segregation and social exclusion in these large housing complexes in different territorial contexts (Arbaci, 2019).

In Europe, there is a growing ethnic and social segregation, especially in social housing neighborhoods (Tammaru et al., 2016). In any case, the macro-regional and state differences in Europe are essential to understand the differences in social trends observed with regeneration processes (Hess et al., 2018). Arbaci indicates how the housing stock structure, dominated to a large extent by

resident owners, as well as the residential distribution between native and foreign groups, are essential factors that explain *low levels of ethnic spatial concentration vis à vis high levels of social marginalization* observed in southern European cities in recent decades (Arbaci, 2019, p. 303). Focusing on the context of Spanish metropolises, increasing segregation, social vulnerability, and ethnic diversity in mass housing neighborhoods are explained, as the result of former residents being replaced with the arrival of foreign migrants (Sorando et al., 2021; Uceda et al., 2018).

III. CASE STUDY

A mass housing neighborhood in Barcelona: Canyelles

The shortage of social housing in southern European countries such as Italy, Portugal, or Spain, compared to other Western countries, is explained by the weakness of their welfare state in the 20th century and their approaches to housing policies (Arbaci, 2019; Lanero, 2020). The social housing policy in late-Franco Spain sought to eradicate slums and was characterized by a strategy promoting deferred access to property. For this reason, the social mass housing neighborhoods financed by the state, through organizations such as the National Housing Institute (INV, in Spanish), looked to change the initial public ownership of homes to the private ownership of their residents after two decades (Lanero, 2020; Scanlon et al., 2014). Thus, today, these homes are considered mass housing neighborhoods, not social housing, because their ownership structure is mostly private.

In the case of Barcelona, the Barcelona Municipal Housing Board (PMVM, in Spanish), the House Building Union (OSH, in Spain), and the INV promoted building large housing complexes on the periphery of the consolidated urban space, mainly in the 1960s and 1970s (Ferrer i Aixalà, 1996; Tatjer & Larrea, 2010). Many of the mass housing neighborhoods built have been the subject to public-led regeneration programs, especially regional and local ones, among which the Catalan government's neighborhood program stands out (Generalitat de Catalunya, 2006a), and its continuation in the city of Barcelona with the so-called *Pla de Barris* (Ajuntament de Barcelona, n.d.). Among the mass housing neighborhoods built towards the end of the Franco dictatorship, Canyelles was one of those that managed to implement several physical transformation projects within these programs.

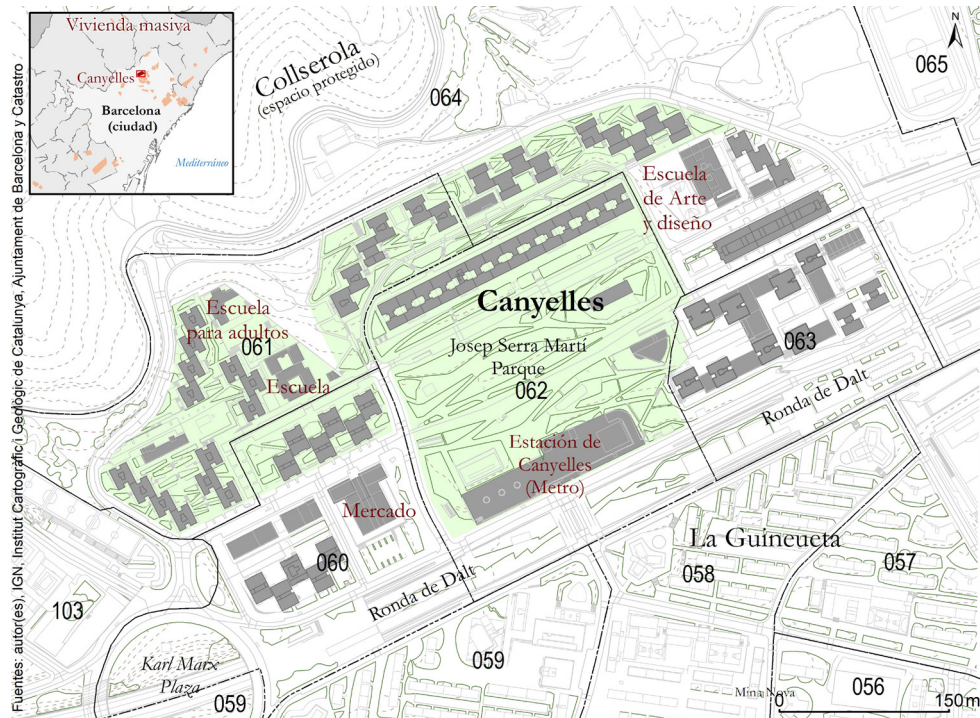


Figure 1. Map of Canyelles in the city of Barcelona. Source: Preparation by the author.

Canyelles is a mass housing neighborhood of just under 3,000 homes and 7,000 residents, located in northeastern Barcelona, next to one of the entrances to the Sierra de Collserola park, in a working-class district with a high concentration of housing estates (Nou Barris) (Figure 1). It is one of the last neighborhoods promoted by the PMVB in the Franco period in this city (built between 1974 and 1978) and one of the first built using industrialized construction techniques (Ferrer i Aixalà, 1996). This neighborhood (like many others of that type), from its inauguration and throughout the 1980s, was characterized by a lack of basic equipment and infrastructure and by suffering serious social marginalization issues. Although, its long tradition of neighborhood associations contributed to obtaining improvements in the neighborhood's living conditions.

IV. METHODOLOGY

This article applies a mixed method that combines quantitative and qualitative techniques, which allows, on one hand, identifying the main characteristics of rehabilitation and redevelopment projects and, on the other, contrasting the social dynamics seen from the

perspective of residents and the main urban agents involved. In this sense, three types of materials were used for this research: i) statistical; ii) documentary; and iii) fieldwork. The latter includes anthropological observations from different visits made in March 2019, on the progress of the latest rehabilitation phases with the accompaniment of some of the urban agents involved and the residents' spatial practices. As for the former, this uses the population and housing statistical data produced by the official statistical agencies at a local, regional, and state level. This addresses the resident population by education level, professional activity, income, and housing according to the tenure system, focusing on the latest available official databases. With these data, a multiscale statistical analysis was made (from the census for the center of the metropolitan area) which combines several social indicators (Table 1). Synthetic indices such as the segregation index (SI) were used to measure and compare the evolution of metropolitan residential segregation processes (Musterd et al., 2017). In this case, these variables were used to explain the situation of the current spatial pattern and the recent evolution of social inequality in this neighborhood of Barcelona compared to the central part of the metropolitan area. The period between 2001 and 2021 was used as a timeframe for the diachronic

Variable	Finest scale available	Period or date	Source
Resident population (total)	Census sections	2001-present	INE (Census and Electoral Register)
Population by nationality (Spanish and foreign)	Census sections	2001, 2011, 2021	INE (Census and Electoral Register)
Population by age group	Census sections	2001(*), 2011, 2015-2017, 2021	INE (Census and Electoral Register), Idescat, and Statistics of Barcelona
Level of studies (4 levels)	Census or neighborhood sections	2001(*), 2011, 2013-2020, 2021(*)	INE (Census and Electoral Register)
Unemployment rate	Census or neighborhood sections	2001, 2011, 2015-2020	INE (Census and Electoral Register)
Income after tax (by type of tax)	Census or neighborhood sections	2015-2018	INE, Idescat, and Barcelona Statistics

Table 1. Main socioeconomic variables used in multiscale statistical analysis. Source: Prepared by the author based on data from the official statistical institutes. (*) Incomplete data series at a detailed scale.

analysis, and the latest data available for the analysis of the current profile. As a reference to the social situation of the neighborhood's first few decades, the indications in the project documentation and the discourse of the residents were considered.

With regard to the qualitative methods, on one hand, the legislative documents on housing and documentation of the rehabilitation programs and projects built in Canyelles were accessed. Then, an analysis of the discourse of the different agents involved was prepared based on a series of eleven semi-structured interviews with architects, urban designers, and urban planners related to building rehabilitation and the reorganization of public spaces in Barcelona's housing estates (6) and specifically of Canyelles (5). On the other hand, a focus group was organized with different long-term residents who are actively involved in the neighborhood association. An open transcription and coding were made from the recordings, to make a qualitative analysis of the discourse (Dittmer, 2010). The interviews and the focus group followed a common question guideline that allowed comparing information on the perception and the discursive position of the different participants (Longhurst, 2010).

V. RESULTS

Projects for the rehabilitation of housing blocks and redevelopment of public spaces

The physical interventions that stand out within the neighborhood involve the public space and the housing

blocks. On one hand, within the framework of the regional plan to transform this type of mass housing neighborhood (Generalitat de Catalunya, 2006b), a block rehabilitation project has been implemented since 2015 (budget of 40.2 million euros) led by the Catalonia Housing Agency, which establishes co-financing between the municipality Housing Consortium (25%), the Generalitat de Catalunya (60%), and the communities of owners of each housing block (15%). This project, in an advanced state of execution, has allowed consolidating parts of the residential blocks and towers that had carbonation and detachment risks, waterproofing their roofs, coating facades to solve insulation issues, and repainting them following a global chromatic plan (Figure 2). The different agents and residents agree when expressing their satisfaction with the quality-of-life improvements obtained, emphasizing the issue of thermal insulation and the finishings of the buildings. The urban agents point out that this latest transformation of the neighborhood is based on infrastructures that increased the neighborhood's connectivity with the rest of the city. This aspect has been included thanks to the partial resurfacing of the Ronda de Dalt ring road in the 2000s, improving local transversal connectivity with neighboring areas and the creation of new public spaces, as indicated by one of the main urban planners:

Connecting the neighborhood's essential interests to incorporate them into these [the ring roads], which are a mixture of infrastructure and public space. That's where the coverage came from, [...] the transversal connectivity of these spaces, but with the condition that [the ring roads]



Figure 2. Rehabilitation of a housing block and elevator as an example of improving accessibility. Source: Preparation by the author (2019/01/12)
Figure 3. Ramps, gardens, and furniture of the first public space transformation phases in the first decades of the 21st century. Source: Preparation by the author (2018/11/01)

would never be covered when there are ramps. (Architect 1, personal communication, 2019/03/18).

On the other hand, the district of Nou Barris, since 2007, has commissioned the development of several transformation phases and redevelopment projects of Canyelles' public space that have consisted, initially, of reorganizing the landscape of spaces and secondary roads in the western half of Canyelles. The ramps with opaque side walls were replaced by open and non-slip ones, and stairs with stainless steel railings and elevators were installed to cross the larger slopes (Figure 2 and Figure 3).

In 2021, the last phase of the public space redevelopment project of the eastern half of the neighborhood began, led by the municipal company BIMSA (Barcelona Municipal Infrastructure). This included creating fully accessible routes between the lower part around the ring road, and the higher part in contact with the mountain range, and also reduced the number of parking spaces and cars circulating. Lighting was increased, and high walls and vegetation were avoided, reducing low visibility areas under what would be called *urbanism* with a *gender* and inclusive perspective (Architect 7, personal communication, 2019/03/13).

The long-term residents of Canyelles consider this series of transformations momentous in improving the neighborhood's image, which had been in place especially since the second half of the nineties: "At first, no one wanted to live [here] or they wanted to leave, now everyone is in love with their neighborhood." In this sense, the central

park of Canyelles is "*a lung (...) and a meeting point*" (Focus Group, personal communication, 2020/12/15), used as an example of a public space success story experienced daily by the inhabitants of the neighborhood and nearby urban sectors. Regarding the housing rehabilitation projects and the reorganization of public spaces, the residents interviewed indicate that many families who gained access to a property in this neighborhood continue to live in it and that there are no forced changes of residence for economic reasons. In addition, they indicate that, for a few years, homes have been created in the old commercial basements of certain blocks, to be sold or rented:

Most of these [commercial] premises are being transformed into housing, into lofts [...] What used to be small businesses, have made a 25-40m² loft [...] They get a return that they didn't get before. Some companies are buying the basements to do this. (Focus Group, personal communication, 2020/12/15).

Recent socio-economic and residential segregation trends of the neighborhood in the metropolitan context

Social dynamics and residential segregation. Canyelles, from the social point of view, started with a composition marked by the predominance of the working class and the existence of social exclusion and conflict issues comparable to other neighborhoods of the same origin. According to the residents interviewed, there was a reduction in marginality in the mid-nineties with

	Median income per individual (euros per year, 2017)	Median household income (euros per year, 2017)	Evolution of median income by individual 2015-2017 (%)	Evolution of the median household income 2015-2017 (%)	Gini Income Index (2017)	Ratio of Decile 8 / Decile 2 for incomes (2017)	Percentage share of wages in income (2017)	Percentage of pension participation in income (2017)	Percentage share of other social assistance in income (2017)
Metropolitan area	18750	51514.6	6.4	5.9	30.4	2.6	-	-	-
Barcelonés (center of the metropolitan region)	15470	40766	4.8	6.1	32.5	2.8	62.5	21.4	4.2
Barcelona (municipality)	19250	44433	3.8	2.5	36.4	3.1	59.0	19.2	2.8
Nou Barris District (Barcelona)	15050	36287	4.9	4.0	32.9	2.9	60.0	23.8	3.2
Canyelles - section 60	18550	44388	3.9	8.5	30.4	2.6	51.5	31.1	5.7
Canyelles - section 61	16450	34650	4.4	-14.9	29.0	2.3	69.0	14.7	2.3
Canyelles - section 62	18550	48115	12.8	5.3	26.5	2.3	67.1	17.2	4.4
Canyelles - section 63	22050	54530	3.3	4.9	28.1	2.6	50.6	35.1	4.4
Canyelles - section 64	15750	39629	4.7	8.9	29.4	2.5	53.0	33.0	5.0

Table 2. Income indicators at different scales for the census sections of Canyelles and the center of the Barcelona metropolitan area. Source: Prepared by the author based on the data of the Spanish National Institute of Statistics (INE).

the residential change of several problematic families. Currently, Canyelles has a recent demographic stagnation, with a strong aging (29.7% of people over 65), and a density of inhabitants per hectare of 627, lower than that of the district as a whole (748 inhabitants/ha). This indicator, together with the formal layout of the buildings (Figure 1), provides a first observation of a neighborhood that has a high rate of free space despite being located in a central municipality of Barcelona.

On the other hand, the education levels and unemployment rates show a fundamental social change

that has taken place in this type of neighborhood, which initially comprised working social classes with little education. When considering people without basic studies, in Canyelles quite high values were seen in 2001, of 18.6%, which decrease to 3.9% in 2020, although still higher than the relative value of the municipality of Barcelona (2%). At the other end of the study level spectrum, if data for people with university education is considered there has been a significant increase in the same period, reaching over 13% in 2020. Even so, this is slightly lower than the city of Barcelona (15.5%). As for unemployment, Canyelles continues to have slightly higher percentages

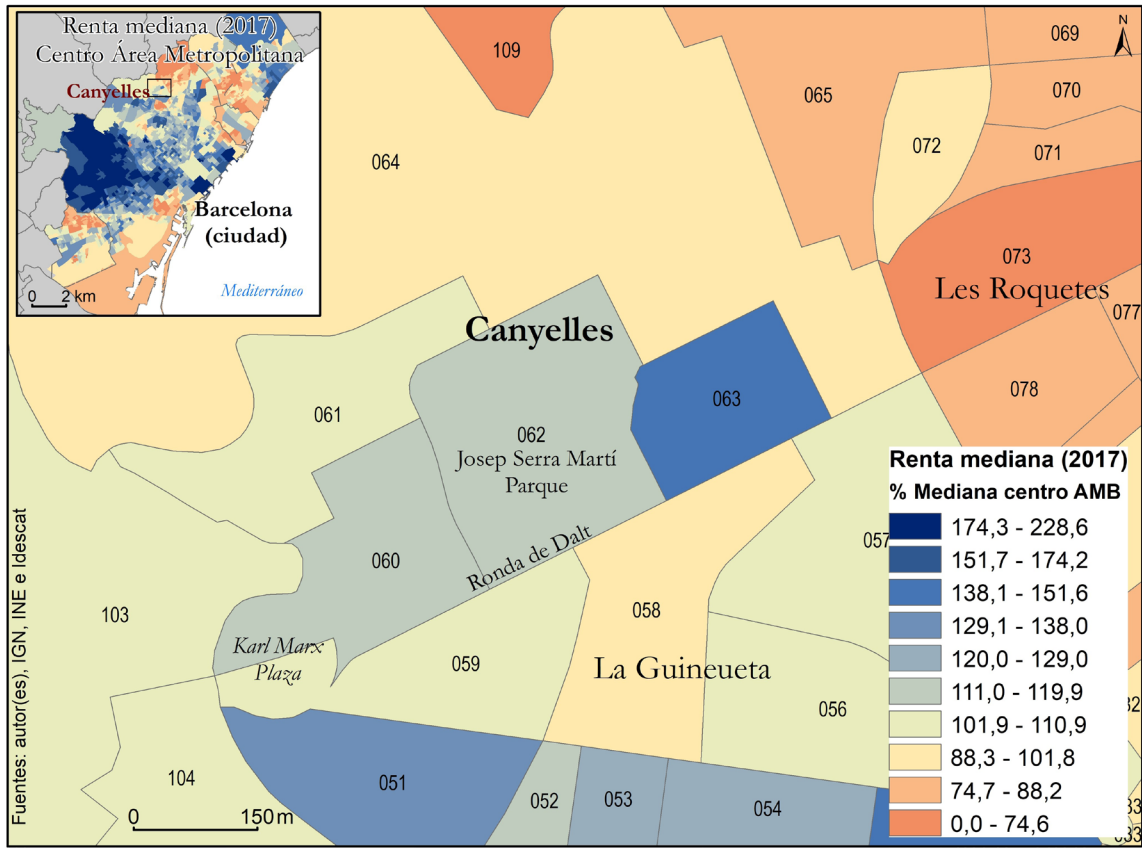


Figure 4. Median income for individuals in 2017 using the census scale of Canyelles compared to the values for the central part of the Barcelona metropolitan area. Source: Preparation by the author.

than those registered in the district (but lower than other neighborhoods of this type, such as Trinitat Nova) and higher than those of the city, falling from 18.9% in 2001 to 13.5% unemployment in 2020 (in Nou Barris and the municipality of Barcelona, the figures were 11.2% and 8.5%, respectively).

But what stands out in Canyelles' social composition is its especially low level of foreigners, 6.7% in 2020, while in the district as a whole, the percentage is 20.3%. This implies a differentiated social dynamic compared to the rest of the district's old mass housing neighborhoods. The foreign population segregation index, on the census scale in Canyelles, shows an especially low value of segregation in 2021 (9.1) decreasing with respect to 2011 (26.8). These figures are much lower than those obtained on the same scale in the district of Nou Barris (21.8 in 2011 and 36.8 in 2011) and the city of Barcelona (24.2 in 2021 and 34.8 in 2011).

Recent socio-spatial profile. To characterize the

neighborhood's current situation, the analysis of the indicators related to the available rental properties (Table 2 and Figure 4, respectively), indicates values that are globally higher than those of the district average, and are similar to or slightly higher than the median of the center of the metropolitan area (Barcelona). Individual income inequality levels are lower than those observed in the other territorial scales, with a Gini index of less than 30 and a ratio between deciles 8 and 2 of around 2.5 in the census sections of Canyelles. Considering this indicator, the income levels of residents are more equitable than in the district, the city, and the center of the metropolitan region.

Canyelles differs from other traditional working-class neighborhoods at the heart of the Barcelona metropolitan region by having a much lower percentage of young residents, people without studies or illiterate, as well as unemployment rates that are comparable or moderately higher than those of the city as a whole. Thus, the Canyelles census sections are linked to two intermediate

classes or profiles that are characterized by a high level of equity considering median available individual incomes and a markedly aging population. A second class of census sections is related to a high proportion of residents with university studies, median incomes equivalent to those in the center of the metropolitan region, and the presence of residents with a profile of potential gentrifiers.

Through the confirmation of the socio-spatial patterns observed, the long-term residents interviewed indicate a recent trend of a certain substitution of these by their descendants or new tenants, in addition to pointing to a higher rental price than similar housing in other mass housing neighborhoods of the district. *"most of us are owners here (...) when a person dies, usually, the heirs either come to live or rent. [Foreign] immigration, there's practically none (...); "(...) it is rare that rents fall below 800 euros [40% more than in neighboring areas]"* (Focus Group, personal communication, 2020/12/15).

VI. DISCUSSION AND CONCLUSIONS

This article addresses the transformations of a large mass housing neighborhood with physical degradation problems in a southern European metropolis. All the series of physical interventions in the urban fabric, accompanied by the improvement of internal mobility, safety, and accessibility of the neighborhood, have served to achieve an attractive lifestyle for residents and reduce structural deficiencies. On one hand, public spaces saw improvements in their quality and adaptation to the different groups of citizens. This confirms the idea of García et al. (2020) that the amplitude and formal arrangement of free spaces for public use is an essential factor for the habitability of this type of large mass housing neighborhood. On the other hand, comprehensive rehabilitation projects of residential buildings solve the serious problems of landslide risks and isolation. These changes and their metropolitan centrality, thanks to an increase in accessibility, reinforce its good image and tendency towards a high degree of social inclusion and social equity. This makes Canyelles a strongly attractive neighborhood, although residential offer is scarce. The transformation of commercial basements into new homes for rent (or sale) is an indication of its growing residential attractiveness and, more generally, of the incipient use of emerging opportunities to capture potential rental differentials in housing, through the platform economy (Wachsmuth & Weisler, 2018).

A process of relative upward social mobility has been seen considering a working-class social composition

comparable to that of other mass housing neighborhoods. However, it differs from the dynamics observed in other neighborhoods of the same Nou Barris district, which comprise mainly working class, with social unemployment problems, a high percentage of low-qualified residents, and a high proportion of young people and foreign nationals with social inclusion difficulties (Blanco & León, 2017). In Canyelles, a reduced supply of available housing and the revaluation of the residential stock explains why foreign migrants with low educational and income levels have not settled. In addition, it has been shown that there are no observable segregation processes of foreign residents in the Canyelles neighborhood, which is another indication of social cohesion. These divergences compared to other mass housing neighborhoods in Barcelona confirm the trend explained by Arbaci (2019), regarding the reduction of the ethnic segregation level in central neighborhoods of the metropolises of southern Europe, where there is a "displacement" of this type of segregation towards more peripheral neighborhoods of the metropolitan ring.

The formal transformation takes place in a neighborhood that had overcome its social marginality issues, so urban rehabilitation is successful because of its ability to improve their living environment. At the same time, favoring light dynamics improves social indicators compared to other similar neighborhoods. The two fundamental social changes identified are, first of all, the relative upward social mobility of long-term residents and their descendants, which can be explained by analyzing the increase in median incomes in the census, and the discourse of the residents. This type of mutation in Canyelles consists of intergenerational social mobility, as explained by different authors in the metropolis of southern Europe since the 1990s (Arbaci, 2019, Leal, 2004). Secondly, there is the arrival of new residents from a higher social class, which is directly related to the revaluation of housing due to the rehabilitation projects. The existence of an incipient form of gentrification in large mass housing neighborhoods can be considered without a drastic change in the property structure. Gentrification of these former urban housing sectors, such as Canyelles, is of a slightly different type to that indicated by Fernández Arrigoitia (2018) since it takes place in a real estate setting currently controlled by small resident owners. However, this also constitutes a risk of displacement and loss of community identity.

In conclusion, future research could focus on the specific analysis of the recent social substitution of the first generations of residents from this type of mass housing neighborhood. This will allow identifying changes in housing ownership to characterize the trajectory of the ongoing gentrification process and the assessment of the social impact of rehabilitation projects.

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SOCIAL AND SPATIAL PATTERNS: ¹

A COMPARATIVE STUDY BETWEEN TWO PUBLIC SPACES IN THE CITY OF QUITO.

PATRONES SOCIALES Y ESPACIALES: A COMPARATIVE STUDY BETWEEN TWO PUBLIC SPACES IN THE CITY OF QUITO.

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El espacio público es el escenario idóneo para analizar y evaluar la correlación existente entre el comportamiento y las condicionantes morfológicas en la estructura urbana. Esta relación entre el comportamiento de habitantes y la configuración espacial se experimenta como un resultante social. Desde esta perspectiva, se percibe el éxito del diseño urbano desde la capacidad que tiene de conciliar las condiciones espaciales con las alternativas que permite a las relaciones colectivas, desde una relación estrecha y bidireccional. De acuerdo con los estudios urbanos sobre aproximaciones morfológicas, a partir de la segunda mitad del siglo XX se reconocen dos configuraciones formales: primero, la que se identifica como esquema de ciudad tradicional, en tanto entender las ciudades como estructuras interconectadas de edificaciones, por lo que los vacíos que quedan entre ellas son los que configuran las manzanas; segundo, la denominada funcionalista, cuya configuración de edificaciones comprende una disposición libre y aislada en el espacio, generando esquemas indefinidos (Carmona, 2010, p. 77). Esta investigación presenta un estudio comparativo de análisis para los espacios públicos, el cual conjuga estudios relacionados con tipo-morfología de la ciudad y tratados cruciales sobre el comportamiento en los espacios públicos. Se evalúan los patrones espaciales y de comportamiento en dos áreas en la ciudad de Quito, Ecuador: por un lado, una plaza en el Centro Histórico con un esquema tradicional: Plaza “La Merced”; y por otro, un espacio urbano con un esquema funcionalista: Plaza “La República”. El estudio se enfoca en la generación de información diagnóstica que proviene directamente de la observación sobre el comportamiento social y el análisis de los elementos morfológicos del espacio estudiado. Finalmente, este estudio contrasta la revisión de condiciones espaciales específicas de un lugar con las dinámicas de comportamiento de sus habitantes.

Palabras clave: diseño urbano, comportamiento urbano, morfología, Quito, espacio público

The public space is the ideal scenario to analyze and evaluate the correlation between behavior and morphological conditioning factors in the urban structure. This relationship between the behavior of inhabitants and the spatial configuration is experienced as a social result. From this perspective, the success of urban design is perceived from the capacity it has to reconcile spatial conditions with the alternatives it allows for collective relations, from a close and bidirectional relationship.

According to urban studies on morphological approaches, from the second half of the twentieth century two formal configurations are recognized: first, one identified as the traditional city layout, understanding cities as interconnected structures of buildings, with the gaps between them forming the blocks; second, the so-called functionalist, whose configuration of buildings includes a free and isolated arrangement in space, generating undefined layouts (Carmona, 2010, p. 77).

This research presents a comparative analysis study for public spaces, which combines studies related to the city's type-morphology and crucial treatises on behavior in public spaces. Spatial and behavioral patterns are evaluated in two areas in the city of Quito, Ecuador: on one hand, a square in the Historic Center with a traditional layout: Plaza “La Merced”; and on the other, an urban space with a functionalist layout: Plaza “La República”. The study focuses on the generation of diagnostic information that comes directly from the observation of social behavior and the analysis of the morphological elements of the studied space. Finally, this study contrasts the review of specific spatial conditions of a place with the behavioral dynamics of its inhabitants.

Keywords: urban design, urban behavior, morphology, Quito, public space.

I. INTRODUCTION

Cities host forms of collective life that would not be possible without their particular spatiality, manifesting the connection between the materiality of space and the unpredictable flow of human interaction. The city shapes the codes of coexistence in the private sphere and, simultaneously, is influenced by the usual practices in the public sphere; thus, connecting acts of the past, present, and future (Netto, 2017). The private sphere is considered conservative in the face of the reproduction of cultural patterns, while the public space generates them (Hillier & Netto, 2002). The objective of this article is to evaluate the correlation there is between human behavior and the morphological conditioning factors of urban structures.

This research, carried out in Quito, presents a comparative study of public spaces, where typo-morphology and behavioral variables are combined. The areas analyzed are the result of different urban structures. As an initial hypothesis, the typo-morphology and formal variants at a pedestrian scale enable or restrict behavior patterns regardless of the functional variables of the place (land use and zoning).

This work initially lays down a theoretical framework that presents public spaces as ideal places to assess built structures, in contrast to the way people behave. The ideas of 1) the inhabitant, 2) the model, and 3) the language, are worked upon as the necessary constructs for a comprehensive understanding of the complex reality of the city. Then, two urban city squares of Quito are presented, as case studies for spatial evaluation, following the typo-morphological perspectives established by Carmona (2010), namely, a traditional perspective opposed to a functionalist one. After this, the methodological proposal of the theoretical correlation between spatial and social elements is presented, as such this organized information structure constitutes the essential contribution of the study. The results section presents and summarizes the research findings, while in the discussion, recommendations are established in terms of alternatives called urban scenarios. Finally, the conclusions encapsulate the findings considering the original quandary. The study of the morphological elements of urban space, as well as information on the behavior of people in the public sphere is a broad although incipient concept in Latin America, and has been viewed in greater depth from different academic positions over time, mainly in an Anglo-Saxon context.

Plaza La Merced (La Merced Square), located in the Historic Center, with traditional morphological patterns, is compared with Plaza La República (La República Square), with a functionalist urban perspective associated with

the Modern Movement. Both spaces are a canvas for recognizing social patterns, which, following Forty's theoretical line, are independent of the concept of use, function, and aesthetic categories in both urban and architectural terms (Forty, 2000; Netto, 2017).

II. THEORETICAL FRAMEWORK

Squares are one of the most relevant elements of urban form, both because of their intrinsic representativeness fostered by their topological and spatial form, and because of their links with relevant buildings (Norberg Schulz, 1980). These elements have identity conditions that transcend their morphological principles, manifesting the characteristic features of a society at a given time and space (Norberg Schulz, 1995). Thus, a certain spatial model reacts differently at different times. A space can be read in a denotative and connotative way, with the morphological and spatial definition being as important as the communicative and symbolic value. These readings are neither static nor hierarchical, moreover, their interpretation varies over time (Eco, 1971). These semiotic reconfigurations in Quito can be analyzed from three approaches: 1) inhabitant, 2) model, and 3) language. The choice of these approaches considers the typo-morphological conditions related to the idea of spatial patterns (represented in the model), integrating the inhabitant as an agent that interferes with social patterns. In addition, it incorporates a semiotic reading (an intangible), considering all of them as elements that affect the performance of the urban space.

Inhabitant. The inhabitant of a square acts in a temporal frame, which allows occupying the space in lapses of time and diverse ways. This temporality is not only related to everyday performance but is also linked to the meaning of the inhabitant's collective imaginary, in the sense that, while in Renaissance layouts work is done under the principle of building an ideal city, where the square acquires great representativeness, in modernity, we break with the historical city and work with approaches based on functionalism and spatial division. As a result of these transformations, the mode of appropriation of public space by the inhabitant is also modified (Ayala-García, 2021). This recognition of the user as an inhabitant is achieved by affinity, both by the activity and the spatial conditions or by the significance of the place at a cultural level, allowing a collective vision of connection. The production of public space should be understood as an open process of a dynamic and flexible condition, which meets the relational demands of the inhabitant and not the other way around (Silva-Roquefort & Muñoz, 2019).

Model. Talking about a model for squares has a distinctive feature since these are configured regarding a topological character, with greater flexibility to the place, which operates in a vacuum (Lynch, 1998). In Quito, except for some squares, the result of the colonial checkerboard, there are no rigorously reproduced morphological “types”, but spaces that adapt to the topography or heterogeneous situations, causing a catalog of dissimilar results.

Language. The semiotic structure based on the denotative and connotative values is built on the characterization of activities, the appropriation, and the way of “using” was is public in Quito. It is pertinent to distinguish between spatial concreteness and the use made of it. These connotative values unite the spatial component with the event that happens in said space (Augé, 2000).

The typo-morphological configuration of the squares will be a fundamental component in the freedom relative to the activity or vocation of said spaces. Likewise, a more ductile configuration will allow greater ease of adaptation to social demands. Regarding the meaning and symbolism, one of the characteristic factors of the public space is to be a unifying symbol of a certain social ensemble (Augé, 2000), considering not only the isolated public space but its surroundings, which recurrently house buildings linked to nuclei of power, public representativeness, and monumental in nature. These characteristics in the public space demonstrate the characteristic traits of a given society that are evident when they transcend the purely functional study. This is why the study considers: 1) spatial patterns, and 2) social patterns.

Spatial Patterns

This research studies the formal structure of the city considering four aspects of public space design: urban form in terms of typo-morphology, confinement and positive space, the symbolic and utilitarian elements (true city), and the definition of urban interfaces.

Carmona (2010, p. 77) defines the formal structure of cities as the set of physical elements resulting from a process of growth over time. The configuration of urban space is determined through the classification of buildings and open areas in cities (Moudon, 1994, p. 289).

The concept of spatial confinement is presented as the geometric and proportional relationship between the width and height of voids and buildings; that is, the spatial relationship between the built and the open spaces (Carmona, 2010, p.183). Booth (1983) analyzes the parameters of spatial containment of elements in the landscape, establishing a structure of several configuration possibilities called positive space from the geometric relationship between the empty

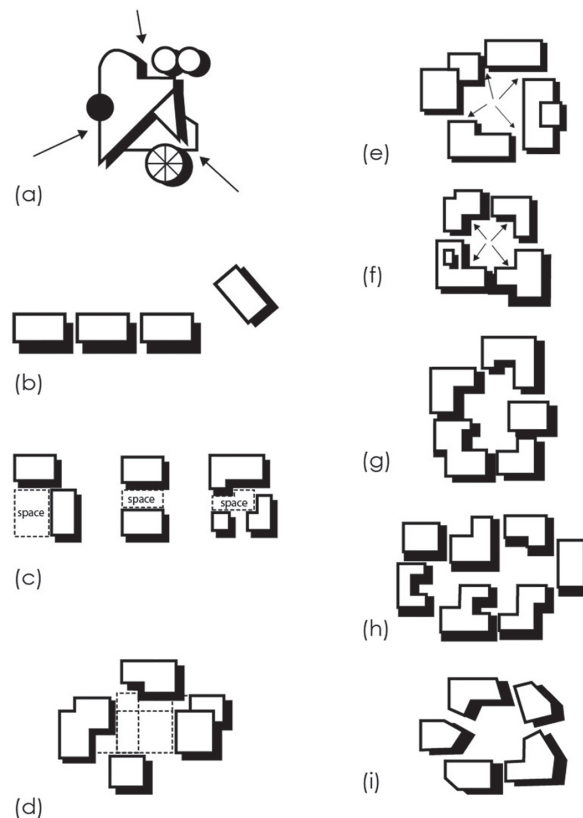


Figure 1. Spatial confinement. Source: Norman Booth, 1983.

space (the square) and the elements that contain it (the surrounding buildings) (Figure 1). Booth shows that the results, in terms of urban form, have a direct influence on the experience and use of space. Contemporary authors agree that the controlled and proportionate condition of confinement is a necessary feature for the design of urban spaces that are appropriately adapted to social dynamics (Carmona, 2010; Dovey, 2016; Gehl, 2011).

The study of architectural typologies as determinants of city configuration is key to investigating urban typo-morphology. The implication and direct connection of these elements are evidenced in the studies carried out by Rob Krier (1990), who presents a formal classification of spaces based on three basic forms where different modulation and modification factors are applied. The square and the street are defined as the two fundamental elements to study urban space, establishing a correlation between architectural typologies

and urban structures. In turn, León Krier (1990) defines the city as a structure of buildings in a so-called *true city* organization, comprising elements in two layers: a *public network* of buildings with symbolic and civic value; and a *private network* of buildings with utilitarian value.

This research also uses the concept of urban interfaces to evaluate the spatial characteristics of boundaries between public and private spaces. Dovey (2016) defines four characteristics that determine the possible relationship between these boundaries: permeability, transparency qualities, the setback of the building in terms of location, and the use vocation of the place. Analyzing the conditions of the space with the interface criteria emphasizes the importance of correlating the architectural scale and its implication in the use of urban spaces (López & Vaca, 2018).

Social Patterns

Behavior in spaces has universal patterns that typically happen in the subconscious following social constructs (Lang, 1987, p. 145). The information on dynamics is usually not considered a determining component for urban design (López & Vaca, 2018). Behavior has been studied extensively in branches of social sciences. Although this research focuses on issues related to territoriality, spatialization, and activities in the public sphere, the evaluation of these spaces also considers the relationship with action patterns. It is possible to establish that spatial characteristics favor certain behaviors and social dynamics do not have a deterministic character (Psarra, 2009, p. 3).

Edward T. Hall (1966) determined different types of interactions related to the distance they maintain, considering cultural differences and the different ways of using public spaces. According to his research, Hall coined the term *proxemic* to define the perspective determined by the distance that human beings maintain from each other when an activity or interaction occurs (Hall, 1963, p. 103). Hall establishes four possible distances in terms of proxemic: intimate, personal, social, and public (Altman & Wohlwill, 1977, p.184; Dovey, 2016, p.40). The specific values for each proxemic distance have a variation (closeness or amplitude) considering the specific cultural constructs.

A study based on the research of Habermas (1989) determines that there are three types of behaviors in the public space: the public of the public sphere, the public of the private sphere, and the private of the private sphere (Liao, et al., 2012, p.6). Collective identity is shown in public behavior in the public sphere; namely, actions in the space in political terms and of cultural exchange. As for public behavior in the private sphere, this is dedicated to the dissemination of ideas of private interest in collective places. Finally, private behavior patterns in the private sphere are the most frequent in urban spaces,

and according to Gehl, they are the basis of collective citizen exchange (Gehl, 2011, p.11).

An essential concept to evaluate behavior in public spaces is privacy because the perception of space quality depends on the user's ability to obtain different levels of intimacy in their relationship with others (Lang, 1987, p. 156). Davis and Palladino (1997) define privacy perceptions as the ability of each person to regulate boundaries of interaction with others. Privacy levels are presented as options for interacting or not with others (Rapoport, 1977, p. 261). Proximity dynamics are flexible perceptions that regulate interactions with varying degrees of control from isolation to agglomeration.

The urban form and its direct relationship with human behavior have been widely studied in recent decades. However, the approaches vary depending on the nature of the research. The relationship of urban form with well-being has been studied in research such as that of Mouratidis (2018), which looks deeper into the influence of urban morphology on social life. The relationship of morphology with public health and physical activity has also been investigated (Fathi et al., 2020; Ariza-Villaverde et al., 2014), also considering comfort and appropriate temperatures to enjoy the public sphere, as in the studies of Zhang et al. (2022). Some approaches process spatial, temporal, and usage data to establish patterns of psychological changes in people living in urban environments (Ojha et al., 2019). Recent studies analyze the influence of built environments and human behavior with artificial agents and data management (Ciardo et al., 2022).

On the other hand, some studies of morphological structures have also focused on the intensity of activities in the city. Works such as those of Kurniasanti et al. (2018) and Kang et al. (2012) look into movement patterns and preferences within the urban environment and others analyze the intensity of formal and informal activities in the built environment. Similar studies present the specific relationship between morphology, lifestyle, and life decisions of people, and the decision process in terms of local and global mobility (Adolphson et al., 2022). Finally, the theoretical and methodological branch of space syntax has contributed through research on morphological characteristics and social activity, mainly focused on movement flows and visibility between users (Gümüş & Yılmaz, 2022; Can & Heath, 2016; Rashid, 2019). It should be mentioned that the literature in English is extensive, but studies in Latin America are scarce, and particularly in Ecuador this topic has not been addressed in academic studies.

III. CASE STUDY

This work presents a study of two public spaces in the city of Quito, Ecuador: a square in the Historical Center with a traditional perspective: Plaza "La Merced"; and a second

SPATIAL PATTERNS		SOCIAL PATTERNS	
Urban Form	Street patterns	* Social patterns are not recognizable on this scale of study	
	Blocks		
	Lots		
	Buildings		
Spatial Confinement + Positive Space	Confinement	Privacy	Types of behavior in public spaces
	Positive Space	Proxemic	Interpersonal distances. Distance relationship for use of public space
		Types of activities	Public sphere
			Private sphere
Scope of the public authority			
Interfaces	Interfaces Study of the physical boundaries between public and private spaces.	Privacy	Types of behavior in public spaces
		Proxemic	Interpersonal distances. Distance relationship for use of public space
		Types of activities	Public sphere
			Private sphere
Scope of the public authority			
Elements of the real city	Symbolic elements	Privacy	Types of behavior in public spaces
	Utilitarian elements	Proxemic	Interpersonal distances. Distance relationship for use of public space
		Types of activities	Public sphere
			Private sphere
Scope of the public authority			
URBAN DESIGN RESULTS			
Related morphological element		Types of activities in the public space	
Urban Form + Confinement + Geometry + Interfaces		Proxemic + Flows + Activities + Types of Activities	

Table 1. Outline of a methodological proposal to evaluate public spaces. Source: López & Vaca, 2021. Preparation by the authors.

public space with a functionalist perspective: Plaza de “La República”. The choice is based on the definition of urban spaces in terms of typo morphology, namely a *traditional* space and another *functionalist* one (Carmona, 2010, p.77).

A review was made using field information and on-site mapping, where the temporality of the places is recorded 24 times in 2018 and 2019, on two days (weekend and during the week), and three times during the day (morning, mid-afternoon, and evening). The data recording period is one hour, therefore, the resulting maps are a static record of the life of that particular square during a specific period. The relevance of the case study choice is based on a comparison of equivalent urban elements in scalar terms, but with clearly differentiated vocations and urban design guidelines. Plaza La República is one of the few

examples of a functionalist square in the city of Quito, while Plaza La Merced is one of the few urban traditional structure perspectives that has not undergone major changes in the 20th century.

IV. METHODOLOGY

The spatial response of urban design should be understood as the result of the contrasted study that considers the morphological perspectives of cities and the behavioral dynamics of their inhabitants. This study of the evaluation of public spaces through a spatial analysis uses a series of theoretical parameters of morphological values, as well as social patterns and dynamics (López & Vaca, 2018).

Plaza La Merced



Centro Histórico de Quito.
Esc. 1 : 2500



Figura - Fondo. Centro Histórico de Quito.
Esc. 1 : 2500

Plaza de la República



Ciudadela Larrea - Quito.
Esc. 1 : 2500



Figura - Fondo. Ciudadela Larrea.
Esc. 1 : 2500

Figure 2. Spatial patterns. Urban fabric analysis. Source: López & Vaca, 2021.

For spatial patterns, the morphology, geometry spatial values, and element size are studied. In addition, the geometric relationships of proportion are analyzed to establish confinement and positive space, studying the city's interfaces, and its symbolic and utilitarian elements. As social patterns, the conditions of privacy, proxemic, and types of activities in terms of social spheres are analyzed (Table 1).

The identification of social patterns was done using a process based on observation and registration for a subsequent study of the flows, activities, proxemic distances, and the scope (public or private) of the registered activities. This process was carried out over periods of one hour at different times and days of the week to analyze the different behaviors depending on temporality.

V. RESULTS

The study of the urban structure and the comparison reveals obvious differences in the basic morphological configuration.

The studied squares were chosen because they are opposites in their original morphology: Plaza La Merced is the result of a reticular geometry, while Plaza La República is the result of the arrangement of an architectural object. The former has a structure typical of walkable and compact cities, while the latter evidences a configuration where roads take on greater importance than the public space (Figure 2)

The results obtained regarding the analysis parameters are shown below:

Urban form

The contrasting configurations (traditional and functionalist) do not reflect representative contrasts in the sizes and geometry of their lots and blocks. The biggest disparity in this scale is the predominant lot occupancy and architectural typology: the buildings in the Historic Center maintain the central courtyard typology, while around Plaza La República they are varied and respond to architecture from the proposals of modernity.

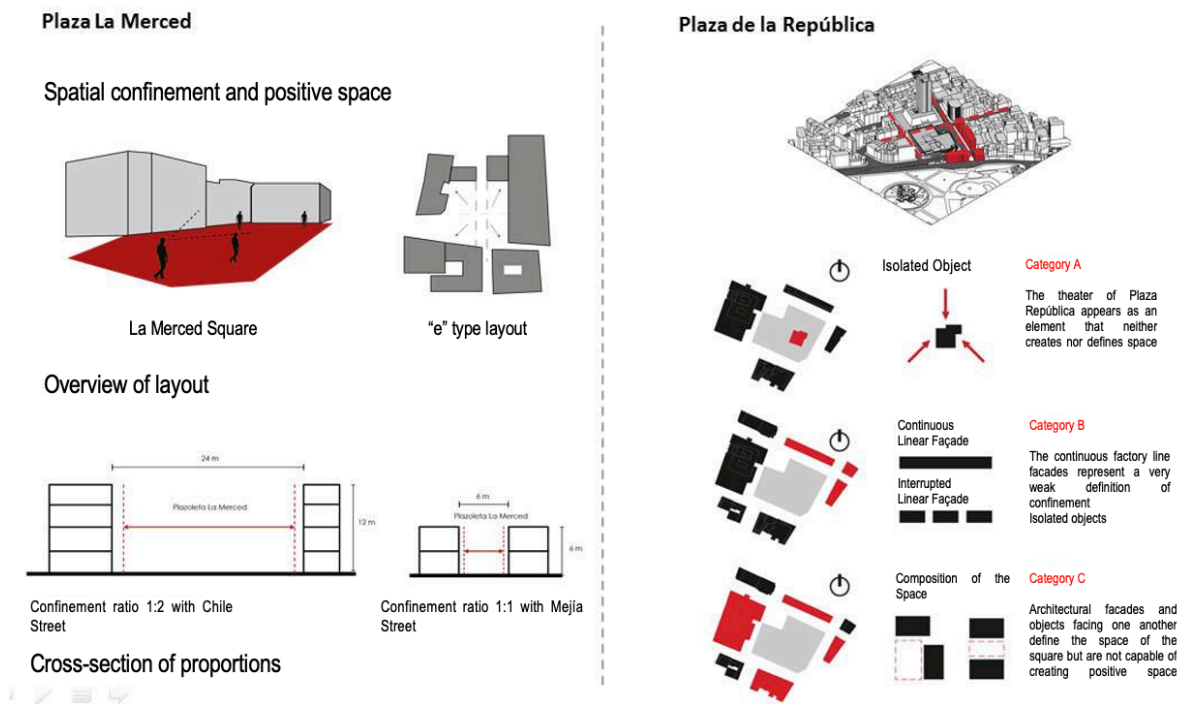


Figure 3. Spatial patterns. Comparative study of confinement. Source: López & Vaca, 2021.

Spatial confinement and positive space

The crucial contrast between the squares originates in the geometric configuration of the empty space and its surroundings. The geometric analysis of confinement reveals that in Plaza de La Merced, the buildings are grouped around a central space and the void (the square) is the center of the geometric composition. The facades overlap and leave gaps at the intersection of the streets, generating a high level of confinement. Therefore, it can be said that there is *positive space*.

On the contrary, Plaza La República is the entrance to the building that houses the Government of the Province of Pichincha. The 21-story building, built in 1980, marked a milestone in the city's architecture, especially its size, with a trapezoidal entrance volume that opens to the center of the square. These characteristics contrast an isolated reading of the building with its surroundings. Although the linear configuration of the adjacent facades defines a central space, this geometry does not create positive space. Plaza la República is a subordinate space to the building, which is not comfortable for extended stays. (Figure 3).

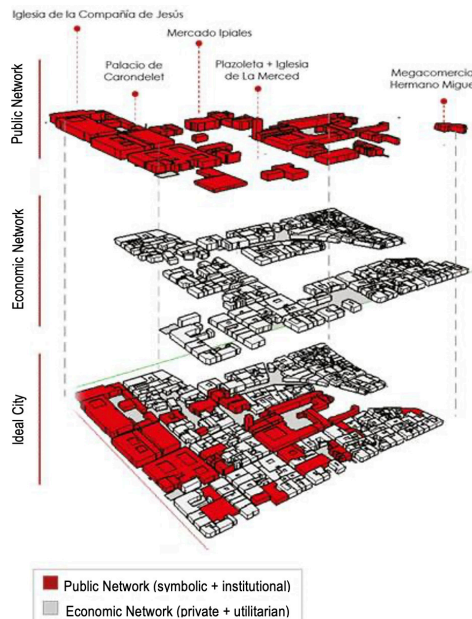


Figure 4. Spatial patterns. City components study - Plaza La Merced. Source: López & Vaca, 2021.

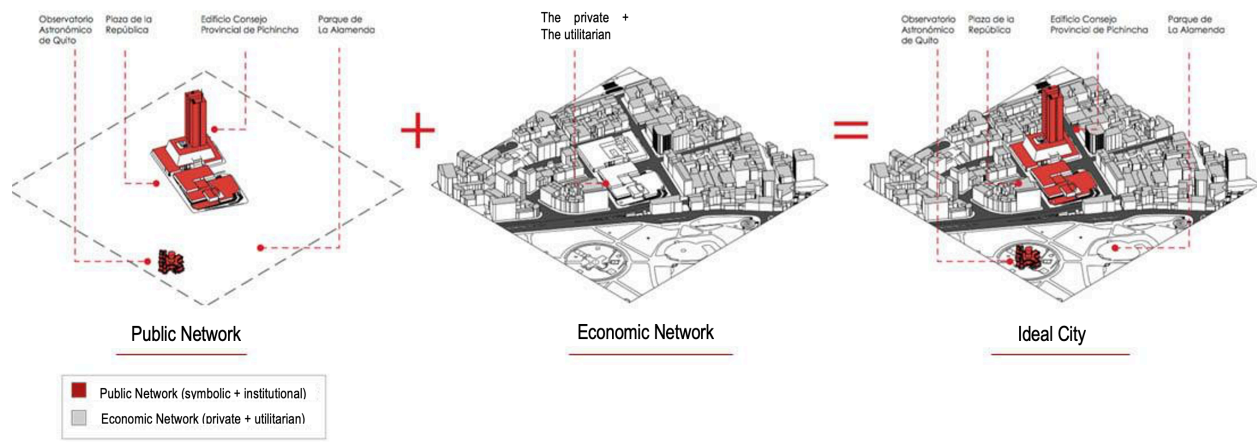


Figure 5. Spatial patterns. City components study - Plaza La República. Source: López & Vaca, 2021.

The contrast between the two squares is accentuated by making a geometric analysis with the sections of the surrounding streets, evidencing the proportion between the road and the square. In La Merced, it is related to pedestrian roads with a ratio close to 1:1, while in La República the ratio is obviously higher.

Elements of the real city

The Historical Center of the city, which houses Plaza de La Merced, has a greater number of architectural objects with a symbolic character than the Ciudadela Larrea, where the utilitarian network predominates. (Figure 4 and Figure 5).

Interfaces

The comparison does not show significant differences. Both squares are surrounded by transparent-accessible elements. A notable feature is the facade of the Church, which, although it is opaque along most of the part adjoining the square, is key for the configuration of the *positive space*.

Influence of morphological structure on social patterns

The data recording periods take place at 24 different times. The information is prioritized for four elements: flows, activities, proxemic distances, and types of behavior. Recognizing the temporality and ductility of public space

also shows that places react to the practices of different actors and, therefore, to various forms of appropriation of the place. The multiple temporalities reveal differences in frequency, duration, and interactions associated with spatial conditions. Momentary encounters, considered crucial for the city's vitality, are only possible because of the morphological organization that enables the convergence of actors immersed in diverse rhythms and activities.

The morphological configuration that allows the existence of the positive space makes the difference in the rhythm of flows and activities. The records in Plaza La Merced show that pedestrian flows are constant. The square and Chile Street merge into a place that operates both as a place of passage and stay, the busiest area being the southern section, where pedestrian flows are concentrated on the street. The northern section is a transition zone, that is not visited much due to the opaque and inaccessible facade of the Church. In contrast, the south side of the square is more active during the day, allowing diverse commercial and short-stay activities ranging from the private of the private interest to the public of the private interest. These activities are related to everyday actions and linked to individual interests. The presence of symbolic elements of the real city and the geometric proportion of confinement configures the square as a positive space, being accompanied by heterogeneous social patterns with varied proxemic distances, which evidence a good performance of the public space.

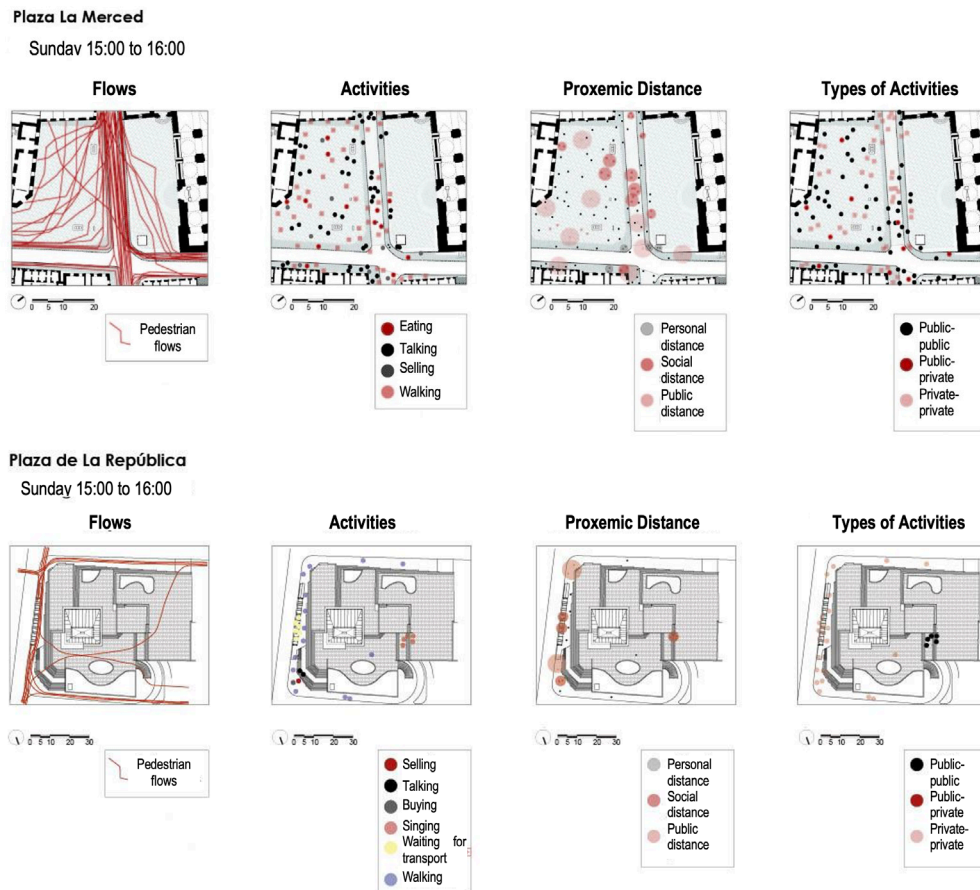


Figure 6. Social patterns. Record of Sunday from 15:00 to 16:00 - Plaza de la Merced and Plaza de la República. Source: López & Vaca, 2021.

These records show contrasting data in Plaza La República, which, despite being a busy site, evidences a perimeter use that is not accompanied by the flows of the sector where it is located. The initial design of the square generates an important unevenness compared to its surrounding streets being an entrance for the predominant architectural object and the plaza's road layout. These characteristics make the plaza a transitional space between 10 de Agosto Avenue and the Provincial Government building of Pichincha. The limited activity in the center of the square contrasts with the intense use of the surrounding sidewalks that host a variety of private and public activities of private interest.

The evaluation of the proxemic distances in Plaza La República shows that there are activities that allow intimate distance. However, most take place on the edges with personal and social

distances. The nighttime records show an inactive place, with little flow and informal activities. In contrast, La Merced Square has activities at personal, social, and public distances in the central part, evidencing that the square is where people stay. (Figure 6 and Figure 7).

VI. DISCUSSION

The comparative analysis between the squares reveals that their main difference is determined by the morphological structure, namely, by the physical configuration of the public space and the buildings that surround it. According to the initial studies of Booth (1983), the morphological pattern that marks the contrast is the presence of positive space and, therefore, the high sense

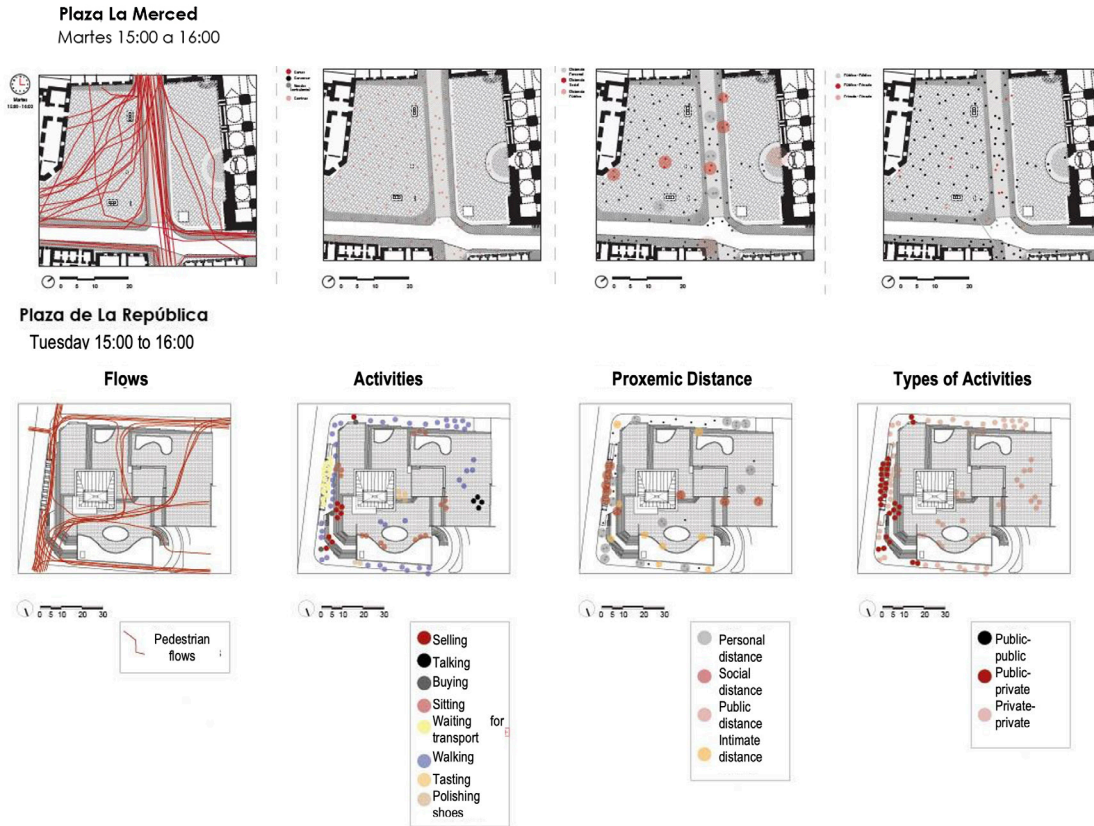


Figure 7. Social patterns. Record of Tuesday from 15:00 to 16:00 - Plaza de la Merced and Plaza de la República. Source: López & Vaca, 2021.

of spatial confinement, which is characteristic of long stays. In Plaza La Merced, behavior patterns associated with the private, introverted, and independent are promoted, as well as social patterns of a community and public nature. La Merced has morphological patterns that host a diversity of activities and intensity of use of the public space.

In Plaza de La República, on the other hand, limited social patterns are evident inside, with disproportionate relationships of spatial confinement and positive space. In contrast, there is a constant flow in the square's perimeter, since the public space is not considered a place of permanence and is faithful to the proposals of its functionalist design, as being a prelude to the predominant architecture of the place. This condition responds to what is described by Carmona (2010), where public areas in the functionalist perception, were designed as areas that operate

as a precursor to an architectural element, consequently, they constitute indefinite zones.

From the point of view of language, the space expresses the identity of the group (Augé, 2000). In this area, two practically opposite readings are observed concerning the findings: while Plaza La Merced constructs a notion of place, Plaza La República promotes a reading devoid of meaning. Plaza La Merced assumes an identity role from the historical dimension present in the layout or in the church since it relates the present and the past constituting a center with meaning (Ferrerias, 2021). Its morphological characteristics facilitate interaction, contributing to the construction of relational dynamics in the social setting.

In Plaza La República, the relationship of individuals with space is scarce and social interactions are almost non-existent. The

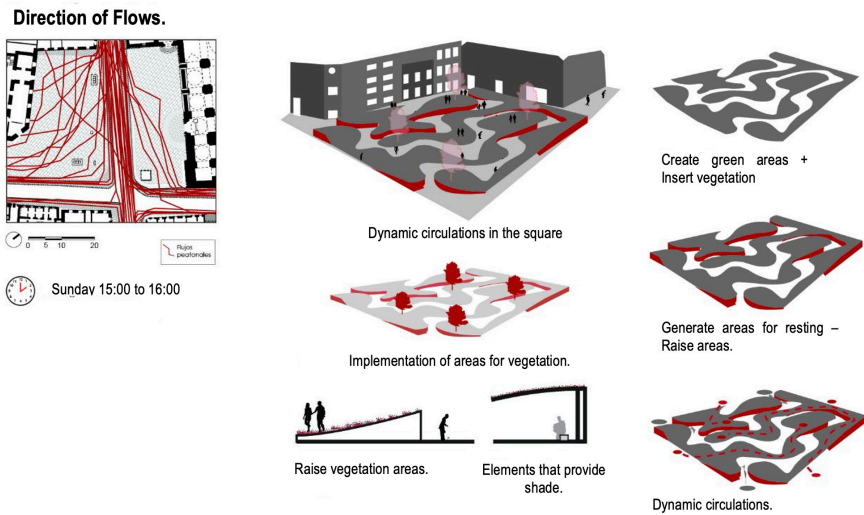


Figure 8. Scenario proposal number 1. Directionality of flows. Plaza La Merced. Source: López & Vaca, 2021.

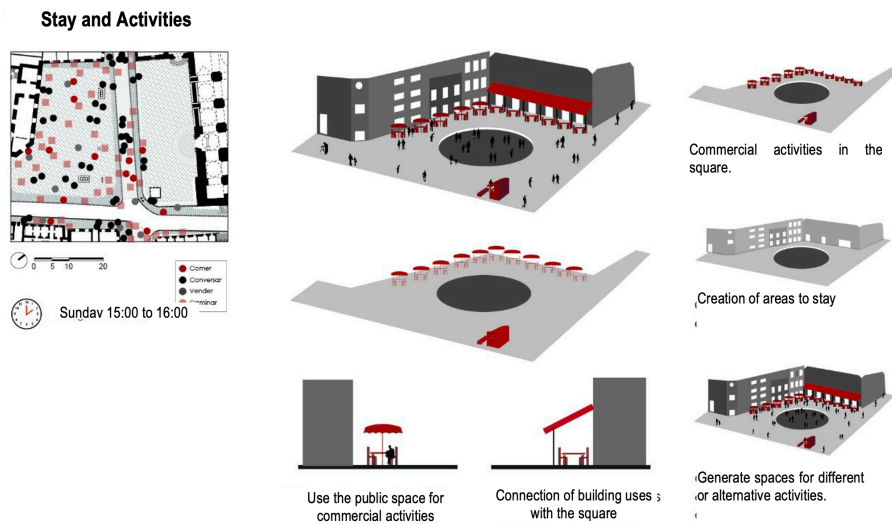


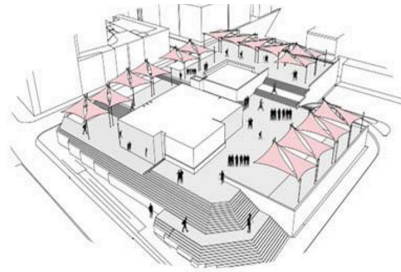
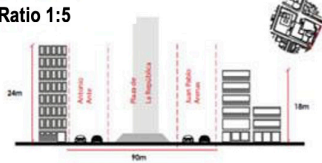
Figure 9. Scenario proposal number 2. Stay and activities. Plaza La Merced. Source: López & Vaca, 2021.

annexed location of the seat of the Government of Pichincha and the name of the square itself (in a clear nationalist allusion), are attempts at artificial identity construction, restricted to the physical-architectural plane. The space of the square is not unifying but is reduced to the coexistence of individuals motivated by a utilitarian and/or economic purpose (selling, waiting for public transport) (Krier, 1990). The non-appropriation of space promotes an enclosure of similarity, but not of identity (Augé, 2000).

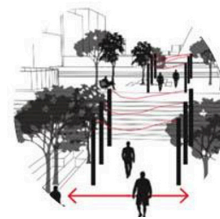
Plaza La Merced takes advantage of the pedestrian flows and generates an appropriate setup for the layout of urban furniture, with differentiation of the areas to stay and circulate. It is possible to arrange the areas of routes and stays in the public space considering the users' movement (Figure 8). Another possible recommendation as a scenario is to integrate commercial activities with the adjacent objects and resting spaces (Figure 9).

Confinement

Ratio 1:5



The space's design works on a human scale in the urban space.



Insertion of elements that promote confinement of space.

The space's design works on a human scale in the urban space.

Figure 10 .Scenario proposal number 1. Confinement. Plaza de La República Source: López & Vaca, 2021.

For Plaza La República and its main problems regarding geometry, the proportion of the void, and the layout of the architectural elements that do not form the perspective of positive space, the creation of positive space on a human scale is recommended. On one hand, a change of proportions and confinement with vegetation is suggested, while another possible alternative considers the construction of architectural elements as a boundary, to enhance the diversity of activities with different proxemic distances and increase flows in the center of the square. Newly built elements are understood as determinants that condition the behavior of space users (Altman & Wohlwill, 1977) (Figure 10).

VII. CONCLUSIONS

This research has evaluated the public space with a morphological approach, which has allowed correlating the information with its behavioral dynamics. The findings of this correlation arise between social and spatial patterns. The comparative study shows that the morphological configuration of the public space is directly linked to the behavior patterns, regardless of the regulatory and functional restrictions. Additionally, the geometric and spatial planning conditions are primarily grasped by the walking user. However, it is possible to optimize the public space to generate places to stay with transformations that not only radically modify the urban fabric, but also perform specific actions on a pedestrian scale. These considerations in morphological and behavioral terms constitute the diagnosis in terms of the performance of the public space. These are presented as recommendations for urban design decision-making (it is not an urban design exercise *per se*) and recognize that the city can be renovated despite its initial planning, in which the priority was marked by the optimization of road connections in the functional city. Both the study of the morphological aspects of space and the

behavior are extensive and have been deeply studied in the academic field; however, this research aims to contribute to the development of an integrated understanding, even though the findings may seem partial since the scale of analysis focuses on the elements of the built structure that form the square and the elements of a larger scale such as lot, block, and layout. Finally, this process allows showing that in the city of Quito, morphological structures are determinants of social patterns of appropriation and use of public space.

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SPACES OF OBESITY: ¹

EXPLORING CLUSTERS OF CHILDHOOD OBESITY, RESIDENTIAL SEGREGATION, AND FOOD ENVIRONMENT IN THE METROPOLITAN AREA OF SANTIAGO, CHILE

ESPACIOS DE OBESIDAD: EXPLORANDO CLÚSTERES DE OBESIDAD INFANTIL, SEGREGACIÓN RESIDENCIAL Y AMBIENTE ALIMENTARIO EN EL ÁREA METROPOLITANA DE SANTIAGO, CHILE

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En 2018, el 50,9% de todos los niños chilenos medidos por el “Mapa nutricional” elaborado por el Ministerio de Educación fueron categorizados con sobrepeso u obesidad, lo cual es evidencia de las crecientes tasas de obesidad en América Latina. Los debates sobre el tema giran en torno a la tensión entre determinantes de agencia, como los hábitos de alimentación y ejercicio, y estructurales, apuntando a las correlaciones entre altos niveles de obesidad y pobreza. Sin embargo, existe también una dimensión territorial que se destaca especialmente en los casos con altos niveles de segregación residencial, como sucede en muchas ciudades latinoamericanas. Aquí hay potenciales clústeres de ambientes alimentarios más o menos obesogénicos, en los que se correlacionan el nivel socioeconómico, el estado nutricional del sector y la oferta alimentaria del lugar. En este artículo mapeamos las dimensiones espaciales de la obesidad infantil argumentando que la segregación del estado nutricional se superpone a la naturaleza de las desigualdades multidimensionales en las ciudades chilenas. El estudio se hizo mediante la organización y combinación de bases de datos públicas y técnicas de análisis espacial para crear mapas de diagnóstico. Los resultados muestran una tendencia hacia mayores tasas de obesidad a medida que disminuye el nivel socioeconómico del barrio, mientras que los entornos alimentarios varían según la disponibilidad de diferentes combinaciones de oferta (ferias libres, cantidad y tamaño de supermercado, canal tradicional) para cada nivel socioeconómico, lo que sugiere la existencia de diferentes tipos de entornos alimentarios. El trabajo concluye con reflexiones sobre cómo ha cambiado el contexto nutricional desde la pandemia de Covid19 y abre una discusión sobre el rol en la planificación urbana en la creación de las condiciones de (in)equidad nutricional.

Palabras clave: Obesidad infantil, desigualdad nutricional, segregación urbana

In 2018, 50.9% of all Chilean children, measured by the “Nutritional Map” of the Ministry of Education, were categorized as overweight or obese, which is evidence of rising obesity rates in Latin America. Discussions on the subject revolve around the tension between agency-determining factors, such as eating and exercise habits, and structural ones, pointing to the correlations between high levels of obesity and poverty. However, there is also a territorial dimension that stands out, especially in cases with high levels of residential segregation, as is the case in many Latin American cities. Here there are potential clusters of more or less obesogenic food environments, where the socioeconomic level, the nutritional status of the sector, and the food supply of the place are correlated. In this article, the spatial dimensions of childhood obesity are mapped, arguing that the segregation of nutritional status overlaps with the nature of multidimensional inequalities in Chilean cities. The study was done by organizing and combining public databases and spatial analysis techniques to create diagnostic maps. The results show a trend towards higher obesity rates as the socioeconomic level of the neighborhood decreases, while food environments vary according to the availability of different combinations of supply (street markets, quantity and size of supermarkets, traditional channels) for each socioeconomic level, suggesting the presence of different types of food environments. The paper concludes with reflections on how the nutritional context has changed since the Covid-19 pandemic and opens a discussion on the role of urban planning in creating nutritional (in)equity conditions.

Keywords: childhood obesity, nutritional inequity, urban segregation.

I. INTRODUCTION

Childhood obesity, associated with a series of non-communicable diseases that reduce life expectancy and quality of life, is one of the greatest challenges for public health at a global level. Its prevalence has quadrupled in the last five decades⁴ and in Chile, it is estimated that 50.9% of all girls and boys fall into one of the nutritional status categories defined as malnutrition due to excess: overweight, obesity, or morbid obesity (JUNAEB, 2019). Although obesity tends to be understood by public policies as an individual problem - a view that is reflected in programs such as Choose To Live Healthily (*Elige Vivir Sano*), whose focus is to provide guidelines on diet and physical activity -, the World Health Organization warns that obesity is conditioned by structural factors, especially in developing countries⁵.

The nutritional situation in countries such as Chile, which have experienced rapid economic growth and food transition processes, is of particular concern (Popkin et al., 2006). This inequality in the global distribution of malnutrition due to excess is replicated at an intra-national level. From the biomedical and social sciences, an inverse correlation between socioeconomic status and childhood obesity has been observed, namely, girls and boys from families with fewer socioeconomic resources are more likely to be in the overweight categories (Salinas & Goldsmith Weil, 2020).

The objective of this work is to take the discussion on inequality in the distribution of childhood obesity to its spatial dimension by observing the case of Greater Santiago. Given the high levels of segregation in this city, the work started from the premise that in neighborhoods with residents of lower socioeconomic levels, there would be a higher rate of childhood obesity. To verify this, nutritional states, socioeconomic levels, and the food supply, expressed in their territorial dimensions, are organized and visualized. Then, the configurations that occur between the socio-economic conditions of the population, their access to the food supply, and nutritional states are explored, focusing on childhood obesity. Finally, the different food environments of Greater Santiago are identified.

The analysis was done by organizing and combining public databases and spatial analysis techniques, creating diagnostic maps that examine the food supply including, on one hand, street markets, supermarkets, and traditional channels, and on the other, the socioeconomic levels and

body mass indexes of children, to then make an integrated analysis of their spatial expression.

The findings reinforce the conclusions of previous studies, regarding the existence of a trend towards higher obesity rates as socioeconomic status decreases, enriching these discussions when viewing the neighborhood scale. At the same time, it is possible to find variations regarding the combination of the food supply that is also organized by socioeconomic level, suggesting the existence of more and less obesogenic urban food environments. This research is concluded by making recommendations regarding urban planning that seek to reduce nutritional gaps.

II. STATE-OF-THE-ART

Although much of the debate on obesity in the public sphere focuses on its causes at an individual level, such as diet and healthy habits, the scientific community, on the contrary, conceptualizes it as a multidimensional phenomenon. There are multiple approaches contained in the specialized literature, which reveals the complexity that this phenomenon raises. A small sample of this is the study of obesity as a measurable biomedical problem (Azar et al., 2015; Celis-Morales et al., 2017; Mönckeberg & Muzzo, 2015), or, research that tracks changes in consumption patterns (Crovetto & Uauy, 2014; Llorca-Jaña et al., 2020) and lifestyle habits (Olivares et al., 2007; Pontigo et al., 2016). There is even a more critical line from social science that focuses on the cultural constructs of "fatness" (Radrikan & Orellana, 2016; Rothblum & Solovay, 2009).

An empirical look at an aggregate level, shows that, in practice, childhood obesity is associated with socioeconomic status and, at the population level, has behaviors that resemble that of a hereditary and potentially contagious condition. At an international and national level, there is a higher concentration of overweight people in sectors with a lower socioeconomic status (Dinsa et al., 2012; González-Zapata et al., 2017; Herrera et al., 2018; Martelet et al., 2018; Ranjit et al., 2015).

The similarity to a hereditary condition refers to the fact that, both in international studies and preliminary analyses in Chile, the mother's weight appears as the best predictor of childhood obesity (Davison & Birch, 2001; Guillaume et al., 1995; Oken, 2009; Parsons et al., 1999; Salinas & Goldsmith Weil, 2020; Whitaker et al., 1997). As for its behavior similar to that of a contagious condition, there is a spatial concentration of nutritional states. This has

⁴ World Health Organization 2023: https://www.who.int/es/health-topics/obesity#tab=tab_1

⁵ Idem

led to a classification of food environments categorizing as obesogenic those urban sectors with less access to healthy foods (Black et al., 2014; Booth et al., 2005; Camargo et al., 2019; Casey et al., 2014; Martínez-Espinosa, 2017; Morland et al., 2002; Nogueira et al., 2020).

Within this line, some studies analyze the effects of the type of commercial offer (González-Alejo et al., 2019) and, for the case of Chile, there are indications that shopping in street markets provides opportunities to consume fruit and vegetables at a lower price than in supermarkets (PASO, 2016; Silva et al., 2021).

Regarding the discussion on socioeconomic inequality, this includes a spatial dimension that evidences the high segmentation of many Latin American cities, in terms of the separation of social groups within them. This fragmentation in space is reproduced in an unequal distribution of services and opportunities aggravating the consequences of segregation for the vulnerable population (Borsdorf, 2003; Massey & Denton, 1988; Sanhueza & Larrañaga, 2008). In Chilean cities, these processes have been accentuated in recent decades (Link & Fuentes, 2015; Rasse et al., 2015; Sabatini et al., 2010; Sabatini & Wormald, 2013). In the following analysis, the article seeks to build a bridge between findings on socioeconomic inequalities, nutritional states, and food environment for the case of Greater Santiago.

III. METHODOLOGY

Data used

Childhood Obesity: 2018 data obtained from JUNAEB from the "nutritional map" survey, which are biometric measurements applied in 1,169 public and subsidized schools out of a total of 1,508 establishments, i.e., they cover 77.5% of the establishments of Greater Santiago (57,816 measurements). They exclude the 224 paid private schools that cover 14.9% of the schools and that are concentrated in the sectors with the highest incomes. Data source: JUNAEB, Chile.

Household socioeconomic status (NSE, in Spanish): Socioeconomic classification of households with categories defined by the Association of Market Researchers (AIM Chile) based on data from the 2017 Population and Housing Census. The indicator by zone is calculated using methodological recommendations of the Chilean National Institute of Statistics. Data source: GfK Chile.

Food supply: Following the classification proposed by the Ministry of Health for food environments in Chile, the focus is paid to the "Supply Environment" (Gálvarez Espinoza et al., 2017) which here comprises supermarkets, traditional channels, and street markets. Restaurants (catering food environment), street or informal vendors (public food environment), institutional canteens (institutional and organizational food environment), and delivery services are not included.

- **Supermarkets:** The French National Institute of Statistics and Economic Studies (INSEE) defines supermarkets as non-specialized retail stores that make more than two-thirds of their turnover on the sale of food products⁶. In this analysis, the criteria for relevance in this category are two: i. Self-definition as supermarkets and ii. Having at least 150 m² of sales floor area⁷. Data source: GfK Chile.
- **Traditional channel:** neighborhood scale commerce with the sale of food products measured in their business amount. This includes grocers, butchers, delicatessens, greengrocers, and bakeries, although liquor stores and convenience stores are excluded. The latter are mostly chains, which have a supply mainly comprising prepared and ultra-processed meals intended for purchase and/or consumption on the go which were excluded from this analysis. Data source: GfK Chile.
- **Street Markets:** These are grouped in the National Trade Union Confederation of Organizations of Street, Flea, and Related Markets of Chile (ASOF C.G.) and the information about them is found in the databases of the Office of Agricultural Studies and Policies of the Ministry of Agriculture (ODEPA), which includes outreach (m) and days active in the week. Data source: ODEPA.

Data spatialization

Identification of territorial-socio-economic units.

The analysis required the integration of territory-related data to explore spatial relationships between the three variables: child weight category, socio-economic conditions of the population, and their access to food supply. A geostatistical analysis was made to identify territorial units with similar socioeconomic levels. These allow a more accurate analysis than at a communal level, which is particularly complex in those communes with greater socio-economic heterogeneity. A geographical clustering process was made using the GeoDa software,

⁶ INSEE. Définitions, méthodes et qualité en: <https://www.insee.fr/fr/metadonnees/definition/c1825> retrieved March 21, 2023

⁷ This second criterion was adopted in order not to consider small stores whose commercial name includes the word "supermarket".

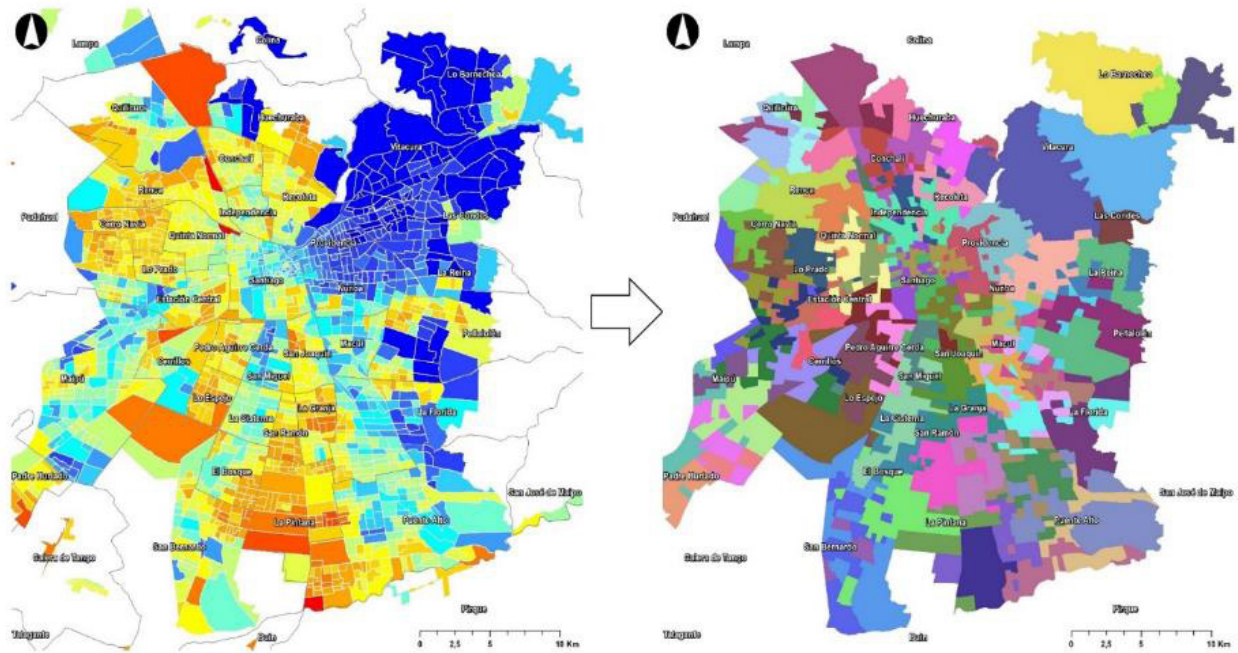


Figure 1. Spatial clustering. Source: Preparation by the authors.

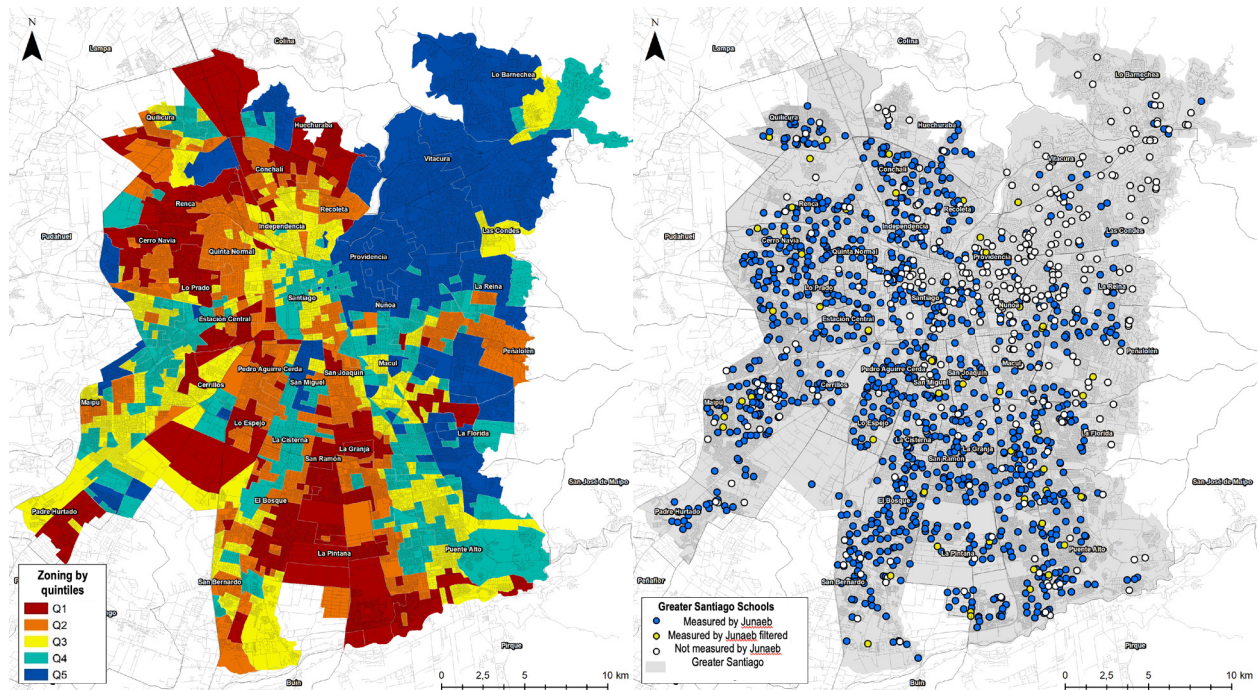


Figure 2: Map of quintiles by the average socioeconomic status of the area. Source: Preparation by the authors.

Figure 3: Coverage of the JUNAEB Nutritional Survey. Source: Preparation by the authors using JUNAEB data, 2019.

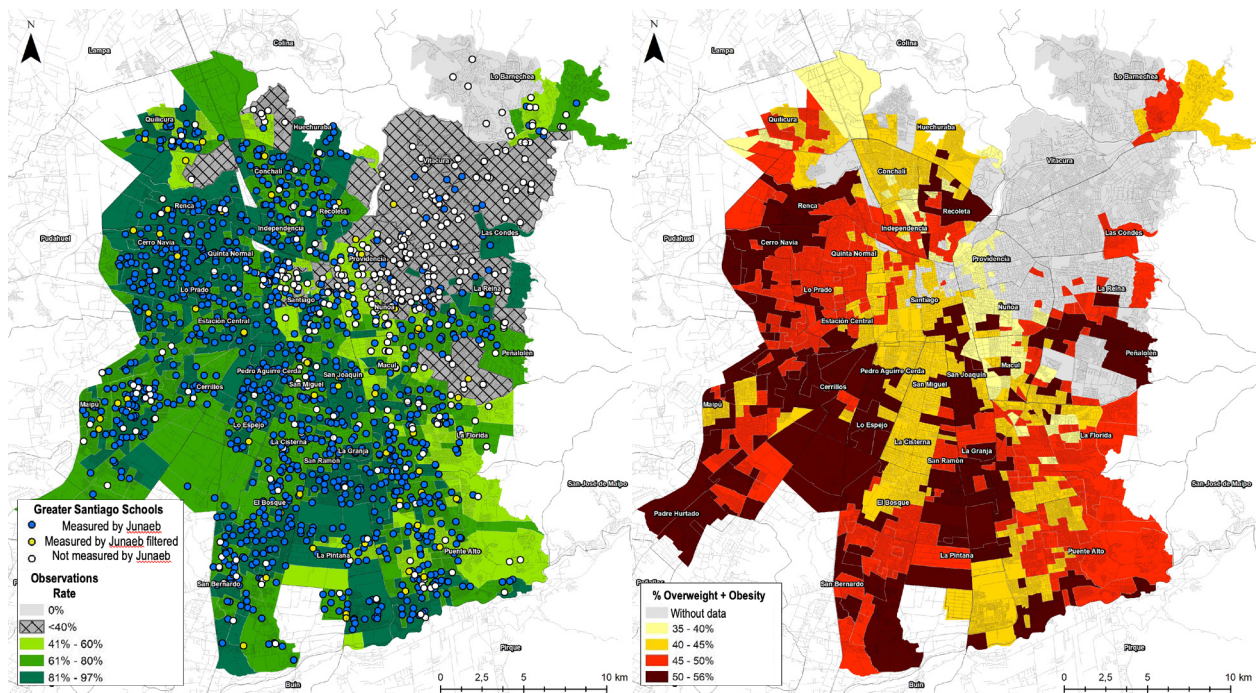


Figure 4: Observations rate by territorial-socioeconomic unit. Source: Preparation by the authors using JUNAEB data, 2019.

Figure 5: Percentage overweight + obesity by territorial-socioeconomic unit. Source: Preparation by the authors using JUNAEB data, 2019.

which allowed grouping areas by socioeconomic level and proximity, both equally weighted criteria (see Figure 1).

On the left, the socio-economic index prepared with geographical data from the national census is mapped for each block. These were grouped generating zones by socioeconomic level and proximity to each other. With this spatial clustering process, 80 territorial units of a similar socioeconomic level were generated. The child weight and food environment data were later mapped on these 80 territorial-socioeconomic units.

Each territorial-socioeconomic unit was assigned the average NSE of the households in the unit. Figure 2 graphs the territorial-socioeconomic units organized into NSE quintiles, where the first quintile (Q1) is the group with the lowest socioeconomic status. High levels of socio-economic segregation are observed in Greater Santiago.

Childhood obesity rate. The educational establishments were georeferenced using the Ministry of Education's geographical database, through their database number (RBD, in Spanish) as a binding field, and then transferred to their spatial dimension (Figure 3).

In Figure 3, all the educational establishments of Greater Santiago (circles) are included. The blues and yellows are those included in the JUNAEB (2019), nutritional list, the blues are those where at least three measurements are available at a Year 1 level, and the yellows, are those with two or less. From the 57,816 measurements, those from establishments with less than three measurements at the elementary school level were excluded, considering that mapping this IMC as an average of the area would skew the results randomly (Figure 2).

56 schools were filtered, leaving 1,113 (4.8% less) and a total of 57,741 students (0.13% less). As can be seen on the map (Figure 3), these seem to have a heterogeneous distribution throughout the city, which leads to thinking that their exclusion does not bias the results.

In Figure 4, the coverage of observations is mapped by territorial-socioeconomic unit. As can be seen, some sectors of the city's eastern quadrant have a larger unmeasured child population, who mainly are students from private schools. Given their level of concentration, it is considered that the assignment of the measurement's average IMC would not be representative of the territory and would generate a systematic distortion of the results. Therefore, the territorial-socioeconomic

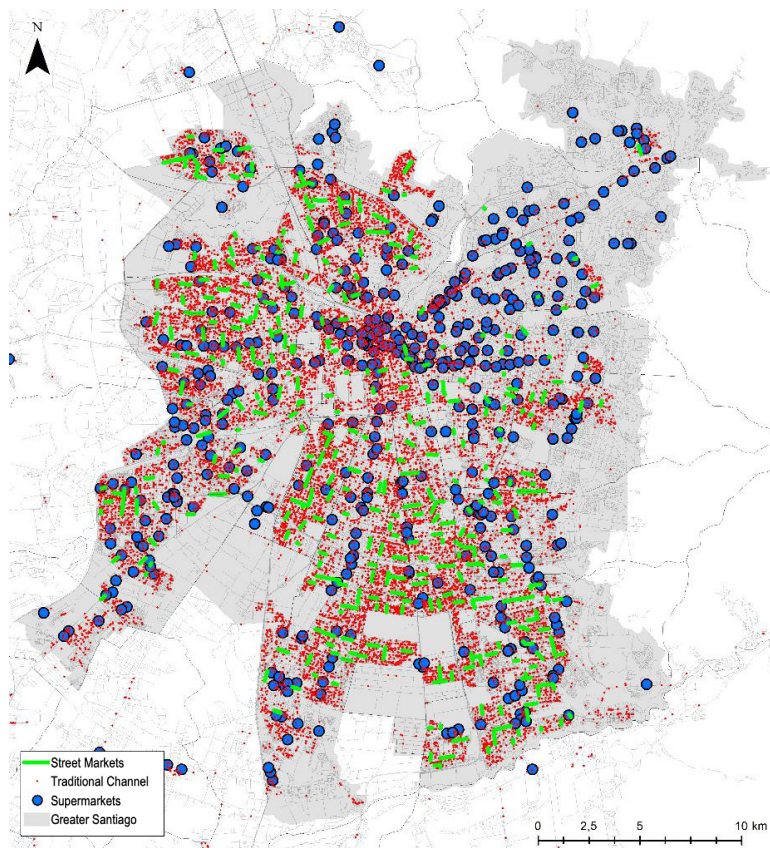


FigurE 6: Food supply by type of commercial establishment. Source: Preparation by the authors.

units where a coverage percentage of less than 40% is reached, are filtered. With this criterion, seven of the eighty territorial-socioeconomic units (12.5%) are classified as “without data for IMC”. For those territories with a measurement coverage above 40% (87.5% of Greater Santiago), it is deemed that with the measurements there are, a trend can already be observed (Figure 5).

The four JUNAEB weight categories were reorganized into two categories: “overweight + obesity” which is the total of girls and boys in the categories of overweight, obesity, severe obesity, and “not overweight + obesity”. The last one includes members of the normal weight and underweight categories. The infant overweight + obesity rate was estimated considering the total overweight-obesity compared to the total measured in schools for each territorial-socioeconomic unit.

Spatialization of the food supply

The supermarkets were mapped taking into account their location and size. Under the categorization of the French Institute of Self-Service, supermarkets over 2,500m² are called “hypermarkets” and it is estimated that, in general, their greater size does not mean only a greater food supply, but a greater offer of non-edible items. In order not to overestimate the effects of hypermarkets in terms of availability of food supply, in this analysis those stores that have a sales room greater than 2,500m² are counted as 2,500m² and, therefore, the total range is from 150-2,500m².

On the other hand, accessibility to street markets is mapped according to their linear meters by active days per week (7, 3, 2, or 1).

The food establishments are mapped in Figure 6, differentiating by type of supply (supermarket, street market, or traditional channel).

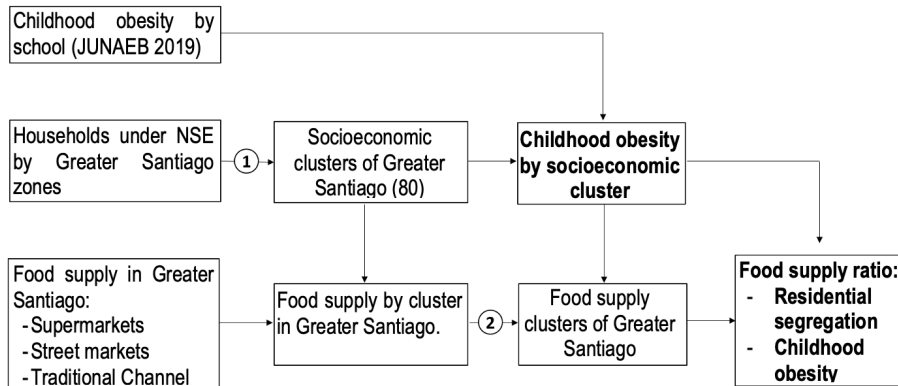


Figure 7: Methodological flow of the analysis. Source: Preparation by the authors.

Data integration

Figure 7 shows the data spatial integration process. This process allows integrating data of children measured by schools in the same geographical scale, observing child weight by socioeconomic category of the sector, that is, from the socio-spatial dimension, to then be analyzed according to the supply. All supply data were standardized as “per 100,000 households” in their respective area.

In this second step (2 in Figure 7), the food supply configurations in the city are identified using the zoning made, creating a synthesis of typologies from a clustering of K-means with the supply indicators by sector. The latter will be discussed in the next section.

IV. RESULTS

This section, first of all, addresses the results in terms of NSE of the territorial unit and nutritional category and, secondly, presents a typology of food environments. In general terms, total childhood obesity decreases as the socioeconomic level of the sector increases.

Figure 8 groups all the available biometric measurements by NSE. The NSE measurement allocation was made using the average NSE of the territorial-socioeconomic unit where the educational establishment is located. It was seen that

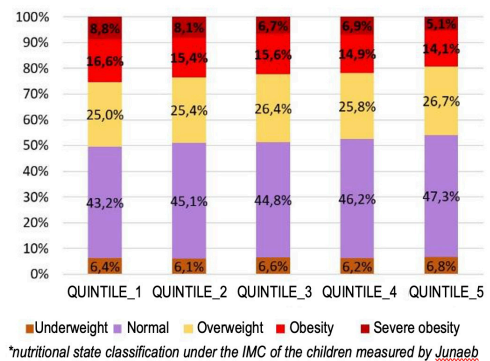


Figure 8. Nutritional classification in girls and boys in Year 1 by socioeconomic groups of their territorial unit-socioeconomic. Source: Preparation by the authors.

total childhood obesity is higher in the first quintile (lower income), with 25.4%⁹. At the same time, it was observed how the difference compared to severe obesity is accentuated for 40% of the lower socioeconomic status sectors (Q1- Q2), where it is 8.8% and 8.1% respectively.

Preliminarily, densely populated food environments¹⁰ are observed, which do not give any reason to suspect there are environments with insufficient levels of access because of proximity to supply channels for healthy eating in Greater Santiago¹¹. In the following figures (Figures 9, 10, and 11), the

⁹ For all the observations, there are statistically significant differences according to the Chi-square hypothesis test (X²).

¹⁰ The analysis of supply environments covers all of Greater Santiago, including those seven territorial-socioeconomic units where available biometric measures were insufficient for the analysis.

¹¹ Sometimes referred to as “food deserts” in the specialized literature. See Cooksey-Stowers et al., 2017 to examine further about this term.

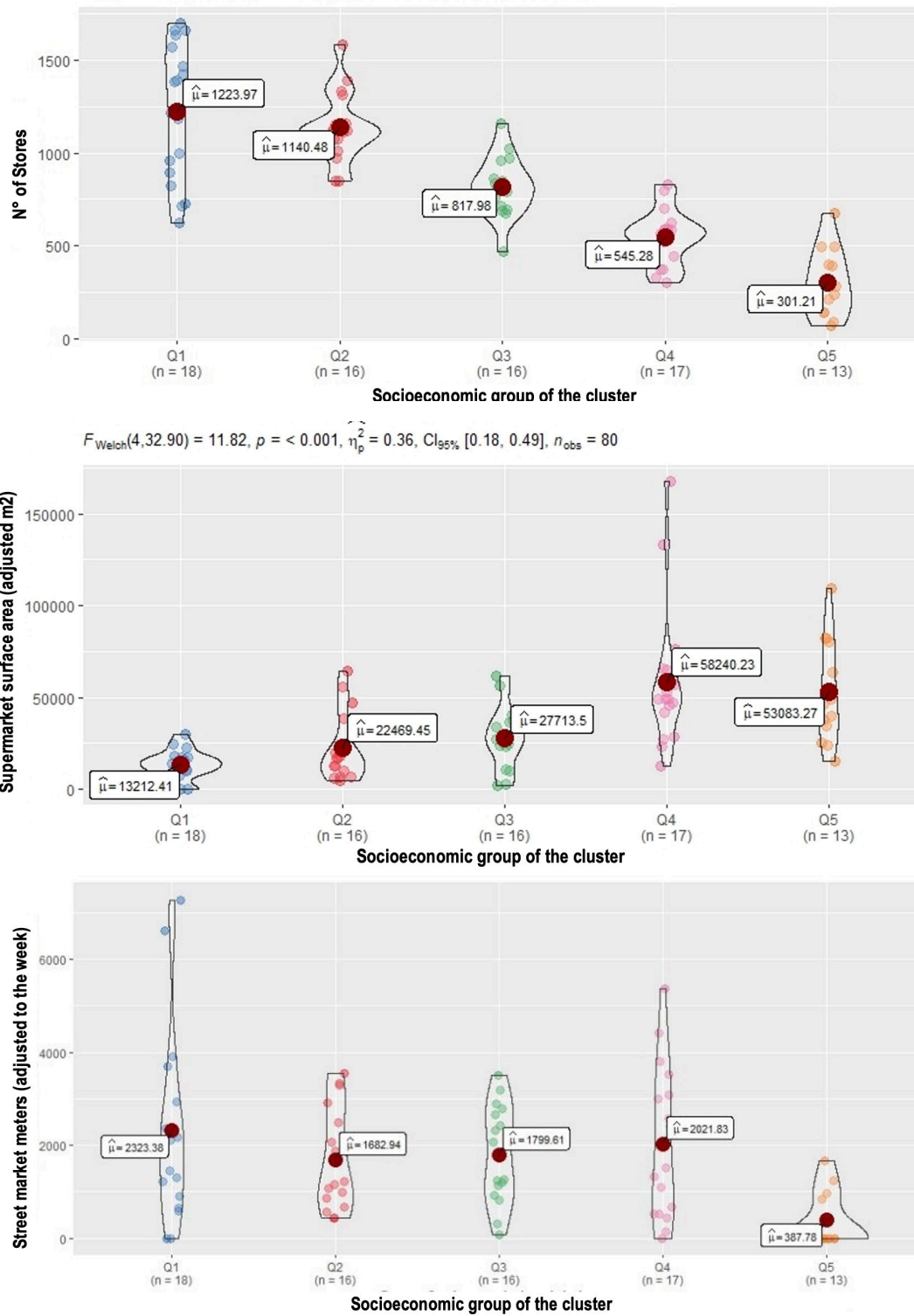


Figure 9: Traditional channel supply by territorial-socio-economic unit in Greater Santiago. Source: Preparation by the authors.

Figure 10: Supermarkets by territorial socio-economic unit of Greater Santiago. Source: Preparation by the authors with GFK data.

Figure 11: Street market by territorial-socio-economic unit of Greater Santiago. Source: Preparation by the authors with GFK data.

	1	2	3	4	5	6
m ² of supermarkets per 100,000 households	40,720	14,934	23,729	136,685	5,207	45,130
n traditional channels per 100,000 households	677	1,416	926	670	1,052	340
m street markets per week per 100,000 households	3,244	2,364	926	1,265	6,944	507

Table 1. Average food supply grouped by cluster. Source: Preparation by the authors.

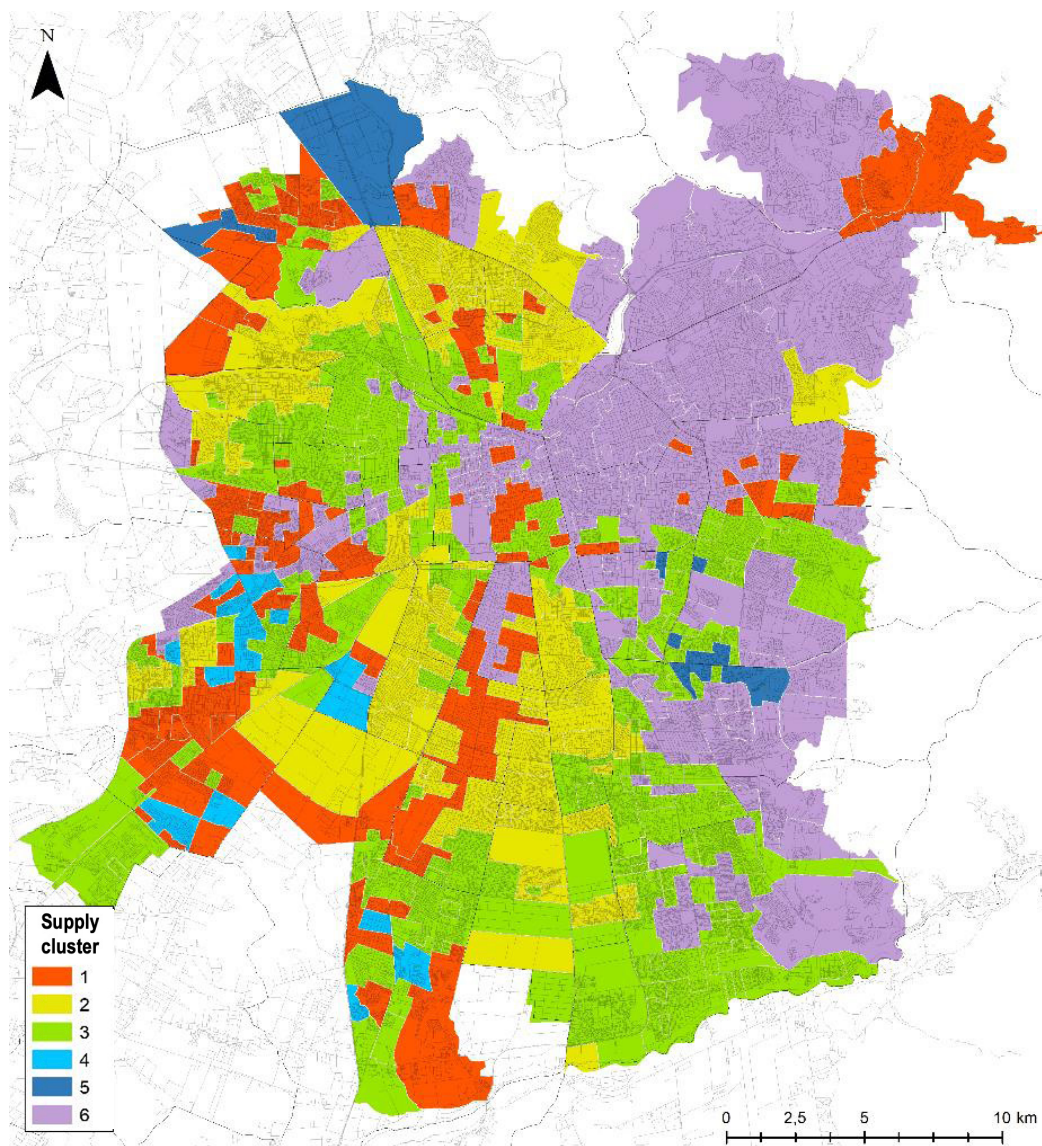


Figure 12. Map of food supply clusters in Greater Santiago. Source: Preparation by the authors.

concentration of the type of commercial establishment by NSE of the territorial unit is seen.

A greater supply of traditional channel establishments at a lower socioeconomic level of the sector is seen.

The opposite happens with supermarkets, whose concentration increases the higher the NSE is, with cases that reach extreme values (*outliers*) associated with central areas and trade poles with a greater floating population.

Finally, the only visible trend in the street market layout is their noticeable decrease in Q5, the one with the highest revenues.

Food supply clusters

Using the territorial-socioeconomic units as case studies, it is seen that different types of food supply are found in the city (Table 1).

In Table 1, a range of food environments can be seen that includes well-supplied sectors with a varied supply mix (*type 1*) and sectors where one type of supply predominates, such as *type 2* for the traditional channel or *type 6* with supermarkets.

The geographical distribution of the food supply clusters (Figure 12) points to a relationship between the socioeconomic distribution and the predominant type of supply.

In Figure 12, it can be seen that in the high-income sectors, there is a greater offer of supermarkets and a low presence of traditional channels and street markets. There is an inverse configuration (low in supermarkets, high in street markets and traditional channels) in lower socioeconomic status sectors.

V. DISCUSSION

Through the analysis it can be verified that the inverse relationship between socioeconomic status and child weight (the higher the socioeconomic status, the lower the obesity rate) has a spatial dimension in Greater Santiago, forming in practice, a segregation between areas with a greater number of obese children and those where normal weight boys and girls predominate. This territorial link between NSE and childhood weight is, in turn, related to distinctive urban food environments that are characterized by varied combinations of the type of supply.

It should also be noted that the study has significant limitations that will be addressed in the following paragraphs. In terms of coverage, there is a spatial concentration of unmeasured (private) schools in the eastern quadrant of the city, particularly in the municipalities of Providencia, Las Condes, Lo Barnechea, Nuñoa, and Vitacura; which are those that concentrate the highest levels of wealth. That means that this study does not cover the *food environment-childhood weight* ratio for those sectors of these communes where the measured school population is less than 40% of the total. Studies with data from other sources such as the National Health Survey or the National Socio-Economic Characterization Survey (CASEN) allow having the expectation that, as a general trend, the *child weight-socioeconomic status* correlation would be maintained (Herrera et al., 2018) and, along with this, suggest the existence of a relationship between high educational achievements in mothers and lower rates of childhood obesity (Salinas & Goldsmith Weil, 2020).

The limitations of this analysis - regarding accessibility understood as proximity to three types of supply channels - are visualized by adopting a view from the specific aspects that build local realities. For example, in the municipalities of Recoleta and Pedro Aguirre Cerda, where the La Vega and Lo Valledor wholesale markets are located, there were fewer street markets. This cannot be interpreted as a lack of access to fruit and vegetables since, in practice, these mega-markets offer better access than a street market (greater variety of products, prices, and longer opening hours).

On the other hand, observing the specific local aspects of supermarkets reinforces the idea that the proximity link cannot be assumed mechanically. For example, the Plaza Oeste Mall, located in the commune of Cerrillos, includes many square meters of supermarkets and stores. However, its design primarily considers vehicle access, making it difficult for residents of the surrounding sector to visit, which are characterized as low-income neighborhoods with high obesity rates.

A third limitation is that the impact of proximity on food access varies for different socioeconomic groups. It is reasonable to think that the relative absence of street markets in high-income sectors does not result in less access to healthy food, since residents can use private transport to travel to other communes to shop at these or in wholesale markets. They also have the resources to buy at organic markets¹², use *delivery* services, or pay the prices in greengrocers and/or supermarkets. Possibly, the lack of local street markets in these territories is partially due to a preference to avoid negative externalities in public spaces, such as an increased flow of people, vehicular congestion, and the need to deal with waste generated by the market. At the same

¹² To date, the authors have confirmed the existence of just two of these in greater Santiago, both in the eastern area of the capital. They are not in the map.

time, although there is a greater presence of street markets in middle- and low-income sectors, the possibility of accessing this greater supply is conditioned by the purchasing power, financial liquidity, and availability of time (in limited market schedules) of residents to be able to buy them.

Similarly, the greater penetration of traditional channels in lower-income neighborhoods opens up multiple interpretations. These offer a mixture of ultra-processed products and healthy meals, presenting a variety limited by their infrastructure and usually at higher prices. In these sectors, mobility is a determining factor for accessing supply spaces, namely, proximity probably has a greater predictive power of access than in more affluent sectors.

The analysis presented in this article is a diagnosis before the Covid-19 pandemic. Since March 2020, one could talk about coexistence with the so-called obesity pandemic.

The negative effects of the health pandemic were not homogeneously distributed but were added to existing urban inequities, exacerbating gaps in socioeconomic status, gender, and between those who can and cannot do their jobs remotely (Zazo & Álvarez, 2020), as there were higher rates of contagion in sectors that live with greater overcrowding and worse outcomes in obese patients, both factors inversely correlated with NSE (Mena et al., 2016).

The sanitary measures imposed to prevent Covid-19's spread included long quarantines that made it difficult to maintain healthy environments for the most vulnerable sectors, both due to the loss of income and the conditions in which the lockdown had to be lived. There were temporary breaks in the fresh food supply chains and channels and adaptations in school meal programs, from prepared fresh foods to food boxes.

Overall, the Covid-19 pandemic revealed high degrees of precariousness in terms of food security and also the role of urban planning in contributing to nutritional segmentation. The street markets, although they are key to food security, are regularly set up precariously on urban structures that do not contemplate them in their design. In addition, during the emergency, they had fewer possibilities than supermarkets to control their capacities and maintain social distancing. At the same time, the food supply exhibited variable levels of vulnerability considering the different territories and road infrastructure.

VI. CONCLUSIONS

The case of Greater Santiago, with a delimited high-income sector to the city's northeast and low-income neighborhoods to the south and west, is expressive of significant differences in all the variables analyzed. It highlights that the areas with the highest prevalence of childhood obesity are segregated neighborhoods

with low socioeconomic status. In turn, the presence and distribution of food supply categories vary according to these conditions and could constitute a fundamental factor for the analysis of opportunities to access healthy food in large cities.

Although this analysis of Greater Santiago does not identify causal mechanisms between the NSE supply and weight category, nor does it weigh the relative weight of the multiple determinants of childhood obesity, it does provide visibility of its spatial dimension that is linked to various elements of the city, looking further into the accessibility to food supply spaces. In this vein, the exploration of the relationship between proximity and access contributes to a reflection on the importance of urban space planning in generating healthy environments, with an emphasis on nutritional gaps.

In a macro-spatial analysis such as the one presented here, the items most purchased by local residents cannot be seen and, therefore, determine their likely effect on household supplies. In this way, this line of inquiry opens a series of questions about important aspects such as the management of food supplies, mobility practices for shopping, criteria when shopping, culinary knowledge, and the time available for preparations and if healthier ones fit the preferences of children, how tasks and food are distributed among family members, among others, which can only be solved by complementing with another type of research.

VII. BIBLIOGRAPHIC REFERENCES

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