

From Markers to Meaning: A Cognitive–Symbolic Model of Cultural Placemaking

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Abstract

This paper examines how cultural and artistic interventions contribute to the reappropriation of urban space by reorganizing attention, navigation, and the diffusion of place narratives. Comparing San Cristóbal de Las Casas (Mexico) and Le Panier (Marseille, France), we show that visible, meaning-rich markers act as attentional anchors, with micro-behaviours contributing to broader patterns of representation. Building on these empirical findings, we introduce a cognitive–symbolic model grounded in an anchor ontology that captures visibility, thematic resonance, persistence, and contextual relations, together with five indicators: Attentional Gain, Representational Reach, Neighbourhood Attentional Intensity, Counter-narrative Index, and Narrative Corridor that link micro-level salience to macro-level narrative prominence. Across both cities, the results reveal a dual regime in which curated, high-visibility anchors structure specific routes, while dispersed counter-narrative markers also persist. The model not only supports computable representations of place but also outlines pathways for integrating empirical data to better understand how cultural expressions shape the spatial narratives through which urban environments become meaningful.

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1 Introduction

Spatial information theory has undergone significant evolution over the past decades, expanding from its initial focus on geometric and topological representations of space to encompass cognitive, experiential, social and cultural dimensions. This shift reflects a broader epistemological transformation in the way urban environments are conceptualized, not merely as containers of physical infrastructure, but as dynamic arenas of meaning, memory, and social interaction [3, 9]. Central to this transformation is the notion of place, which contrasts with abstract conceptions of space. While space is often treated as a neutral, measurable entity, place is imbued with human experience, symbolic significance, and emotional resonance [19, 21].

In urban contexts, places are shaped not only by planning and architecture but also by the everyday practices, narratives, and cultural expressions of their inhabitants. Building on Jacobs’ critique of rationalist urban planning and her emphasis on lived experience [8], we adopt a perspective where urban environments are shaped by everyday practices and symbolic expressions. Contemporary urban design approaches similarly foreground walkability, visibility, and human-scale experience [1]. These ideas have been foundational to contemporary urban design movements such as New Urbanism and Smart Growth, which prioritize walkability, mixed-use zoning, and human-scale development. This foregrounds the political and symbolic dimensions of public space, highlighting that urban environments are



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sites of citizenship and collective identity. In this paper, we use the term cultural placemaking to denote placemaking processes specifically driven by symbolic and artistic expressions in public space.

Yet, despite these advances, a conceptual and empirical gap persists: we know comparatively less about how micro-level markers of meaning and visibility, such as murals, stencils, inscriptions, and other cultural-artistic interventions, relate to macro-level patterns that are observable at the city scale. These patterns include not only pedestrian/tourist movement but, crucially for today's information-rich cities, flows of attention and representation (e.g., tour itineraries, photography and social-media traces) through which places are experienced and communicated.

This paper addresses that gap through a comparative inquiry into two culturally layered urban contexts: San Cristóbal de Las Casas, a city in Chiapas, Mexico, and Le Panier, a historic neighbourhood in Marseille, France, representing distinct yet comparable environments where artistic expression functions as a form of urban reappropriation. A central question is: How can symbolic and cultural dimensions of placemaking be represented within a semantic enrichment of urban space? To address this question, we investigate how micro-scale cues of visibility and meaning relate to broader patterns of attention and representation observable at the neighbourhood and city scale. We adopt an exploratory and interpretative stance, aiming to develop and exemplify a conceptual and modelling framework rather than to provide a validated empirical assessment. The intention is not to infer individual perceptual states or subjective interpretations of urban environments. Instead, street art is approached as a publicly available and materially situated trace that operates at the interface between perception and meaning. The focus is on how such markers contribute to shared attentional environments and representational structures within neighbourhoods, rather than on how they are individually interpreted or experienced. We conceptualize artistic interventions in public space as cognitive cues, salient, meaning-rich anchors that shape how urban environments are experienced, represented, and communicated by humans. By acting as attentional anchors, murals, stencils, and inscriptions modulate perceptual salience, prompting micro-behavioural effects (pauses, detours, photo taking) that aggregate into macro-level flows of representation and movement (e.g., inclusion in guided tours, higher photographic density, greater narrative visibility across media). This positions cultural placemaking as a cognition-flows mechanism: symbolic markers influence cognitive processing (selection, memory, interpretation) and thereby reconfigure informational and mobility trajectories within the city. These effects are approached through qualitative observation and representational traces rather than through direct behavioural measurement.

The contribution of this paper is threefold. First, through detailed empirical analyses of San Cristóbal de Las Casas and Le Panier, it shows how cultural and artistic interventions organise attention in urban spaces, revealing distinct yet comparable attentional ecologies shaped by visibility, thematic resonance, and location. Second, drawing directly from these grounded observations, we develop a cognitive-symbolic model of cultural placemaking, articulated through an anchor ontology that captures the key properties governing the salience of cultural markers, together with a set of indicators that describe how they participate in local attentional fields and broader representational flows. Third, by demonstrating how the model emerges from and returns to empirical material, the study shows how street-art expressions can be transformed into formal representations of place, enabling a bottom-up account of how attention, visibility, and narratives propagate through urban environments and become comparable across distinct urban contexts.

The remainder of the paper proceeds as follows. Section 2 reviews the shift from abstract spatial representations toward experiential and meaning-rich conceptions of place and frames placemaking as cultural reappropriation in urban space. Section 3 develops the two case studies whose empirical material grounds the subsequent conceptual developments. Section 4 builds directly on these cases to derive the cognitive-symbolic model, introducing the anchor ontology and the associated indicators that formalize how micro-scale cues of meaning contribute to broader patterns of narrative prominence. Section 5 concludes by discussing the implications for spatial information theory and urban research, and outlines avenues for advancing cognitive-based representations of urban places.

2 Cognitive Foundations and Cultural Reappropriation

This section builds on the humanistic-geographical tradition of place, in which place is understood not merely as a location, but as a meaningful relation between people, environment, and experience [19, 21]. It provides the theoretical and conceptual grounding for the study; the concepts discussed here motivate the analytical framework developed later, rather than serving as direct empirical claims about individual experience. While we draw conceptually on humanistic notions of place, the present study does not seek to model place as lived experience; rather, it focuses on symbolic and perceptually mediated elements that participate in processes of cultural placemaking. Recent work in GIScience and spatial information theory has sought to revisit and operationalize this tradition by examining how place meaning can be represented, compared, and reasoned about in formal and computational terms [25, 17]. Our contribution aligns with this line of inquiry by approaching cultural placemaking as a process through which symbolic and perceptual cues contribute to shared configurations of meaning, while remaining attentive to the interpretative and context-dependent nature of place.

Urban space has traditionally been represented through cartographic models centred on geometric accuracy, topology, and navigational utility, approaches that, while indispensable for analysis and planning, largely overlook the experiential and symbolic dimensions of urban life [9]. In contrast, work in cognitive and social geography has emphasized that people construct mental and socio-spatial representations of their environments: Lynch highlighted the role of cognitive maps [15], and it has been shown how such representations are shaped by everyday practices and social position, revealing how places are perceived, contested, and reappropriated [5]. Human geography further stresses that places emerge through familiarity, emotion, and lived experience [21], yet remain inherently relational and difficult to formalize [3, 4]. Across disciplines, research underscores the multifaceted nature of place [7], motivating ongoing efforts within spatial information theory to incorporate semantic approaches that account for meaning, memory, and cultural interpretation [9, 24]. Previous research models place semantics from narrative and textual corpora, highlighting representational traces as first-class evidence for place meaning [11]. This attention to representational sources resonates with long-standing findings in spatial cognition, where it has been shown how landmark, route, and survey knowledge are anchored in salient environmental cues [12], and how such cues act as cognitively privileged reference points that structure how routes are perceived, retained, and communicated [2].

Cultural placemaking is defined as a functional logic of appropriation where cultural, social, and political expressions transform urban spaces. Reappropriation of urban space, particularly in informal and marginalized contexts, has emerged as a practice of selective emphasis: communities foreground certain surfaces, corners, and routes to make them legible

as part of their environment [22]. Artistic expression plays a pivotal role in the reappropriation of urban spaces, serving as both a medium of resistance and a tool for identity reconstruction. Cultural interventions, such as murals, graffiti, and performative installations, transform overlooked or contested spaces into sites of memory, dialogue, and belonging. Heritage-based street art, for example, challenges dominant narratives and reclaims visibility for marginalized communities [16, 20].

Public art projects not only beautify urban landscapes but also promote inclusivity, civic engagement, and social justice [13, 14]. Informal cultural placemaking reflects the dynamic interplay between cultural production and spatial transformation, enabling communities to reclaim agency over their environments [6]. In this context, artistic expression becomes a critical lens through which urban space is reimagined, not as static infrastructure, but as a living canvas of cultural meaning and social interaction. Post-pandemic urban dynamics have amplified the relevance of feminist and intersectional narratives in public space. Inspired by movements such as MeToo and third-wave feminism [23], artistic interventions, particularly street art, have emerged as symbolic acts of resistance and identity formation. Placemaking becomes a multi-scalar phenomenon: it operates locally through acts of inscription and globally through circuits of representation, where visibility and thematic resonance determine how places circulate in touristic itineraries and social media.

This conceptual synthesis highlights placemaking as a process through which cultural expressions reorganize perception and meaning in urban space. By representing how visibility, symbolism, and spatial practices interact, we establish a foundation for analysing how these dynamics unfold in specific neighbourhoods. The following section turns to two empirical contexts where these mechanisms become legible.

3 Markers and Spatial Reappropriation in San Cristóbal and Le Panier

To explore how cultural placemaking recalibrates perception and circulates meaning, we examine two contrasting yet thematically resonant urban contexts: San Cristóbal de Las Casas and the historic neighbourhood of Le Panier in Marseille. The two study sites were selected deliberately for their contrasting yet analytically comparable roles as culturally expressive urban environments. San Cristóbal de Las Casas was selected for its strong Indigenous heritage and the presence of political, feminist, and religious expressions embedded in local street-art practices, while Le Panier was chosen as a historic neighbourhood in Marseille characterised by a multicultural urban fabric, heritage-oriented works, and a diversity of cultural expressions. Such representations are approached analytically through publicly observable cultural markers, rather than being elicited directly from inhabitants.

The empirical material for both case studies was collected through targeted, one-day field campaigns. In San Cristóbal de Las Casas, the first author, together with a small group of students, conducted a systematic survey in spring 2025, walking all streets within the selected central and surrounding boroughs to ensure full coverage of visible street-art landmarks. In Le Panier, the second author carried out an analogous one-day survey in winter 2026, following a preliminary visit conducted by the first author, again aiming at exhaustive coverage of the neighbourhood's walkable street network. This difference reflects logistical circumstances rather than a methodological distinction, and the same data collection and classification protocol was applied in both cases. In both cities, all identified items were photographed, geolocated, and then classified according to their most prominent medium (e.g. mural, stencil, graffiti, sticker, poster) and thematic category (e.g. feminist, political, cultural/heritage, religious, commercial) (almost 50 street-art landmarks for San Cristóbal de Las Casas, 47

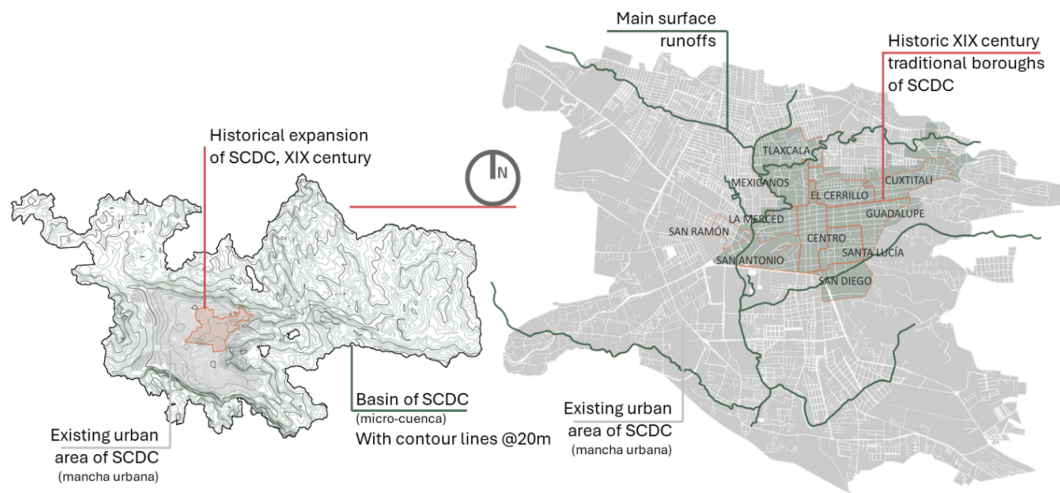
for Le Panier in Marseille). The empirical scope of the survey was intentionally limited to publicly visible cultural markers that appeared to be deliberately placed to communicate symbolic, artistic, or narrative content in public space. This included murals, stencils, posters, graffiti, and similar inscriptions oriented toward a general audience. Highly repetitive or incidental markings (e.g., small stickers related to commercial branding or sports fandom) were not systematically recorded, unless they formed part of a coherent or recurring symbolic ensemble. Markers located on private surfaces were included when they were clearly directed at public visibility, while ephemeral or ambiguous cases were discussed jointly by the authors and resolved through qualitative judgment, guided by the analytical aims of the study. Each cultural marker was assigned a dominant thematic category, defined inductively from the empirical material, for analytical consistency across both sites, despite the acknowledged possibility of multiple symbolic attachments and interpretations. In addition to in-situ field observations, the study draws on a limited set of publicly accessible representational sources; such as online tour descriptions, cultural blogs, and image-sharing platforms, to assess how selected markers circulate beyond their immediate location. The qualitative indicators introduced in Section 4 were subsequently assigned jointly by the two authors, based on this shared inventory and visual documentation, in order to maintain consistency across the two cases while acknowledging the interpretive nature of the assessments.

San Cristóbal, a highland city with rich Indigenous heritage and a vibrant tradition of feminist and political activism, has become a laboratory for creative reappropriation, where educational institutions and community groups blend poetry, visual arts, and digital cartography to reclaim public space and articulate local narratives. In contrast, Le Panier, Marseille's oldest district, presents a dense, historically layered fabric marked by gentrification, tourism, and grassroots resistance. Its steep alleys and façades host street-art landmarks that oscillate between institutional beautification and subversive expression, creating a dual regime of visibility: curated works along tourist axes and oppositional messages in marginal alleys. By comparing San Cristóbal and Le Panier, we explore how distinct urban anatomies configure contrasting circuits of visibility and meaning, embedding local identity within broader urban imaginaries.

3.1 San Cristóbal de Las Casas

San Cristóbal de Las Casas, located in the highlands of Chiapas in southern Mexico, is a city renowned for its rich Indigenous heritage, colonial architecture, and vibrant traditions of political and artistic activism. Its unique cultural landscape makes it an experimental setting for exploring how artistic practices contribute to urban placemaking. Figure 1 situates San Cristóbal geographically, and the location of the urban area and its historical expansion up to the 19th century.

A starting hypothesis is that boroughs possess not only distinct identities but also specific territorial and attentional orientations (or vocations), which can be visualized through patterns of cultural expression. Mapping murals, graffiti, stencils, stickers, and posters reveals not just where art exists, but where attention is recruited and retained with feminist, political, and religious motifs drawing different publics into distinct circuits of noticing and pause. As an exploratory analytical lens, we examine whether certain areas exhibit stronger concentrations of activist, feminist, or resistance-oriented expressions, while others lean toward touristic, cultural, or decorative forms. Figure 2 illustrates representative examples of each category, highlighting their stylistic and material distinctions, while Figure 3 presents a series of cultural expressions of San Cristóbal de Las Casas, visualizing the different graphic categories and illustrating the diversity of street art.



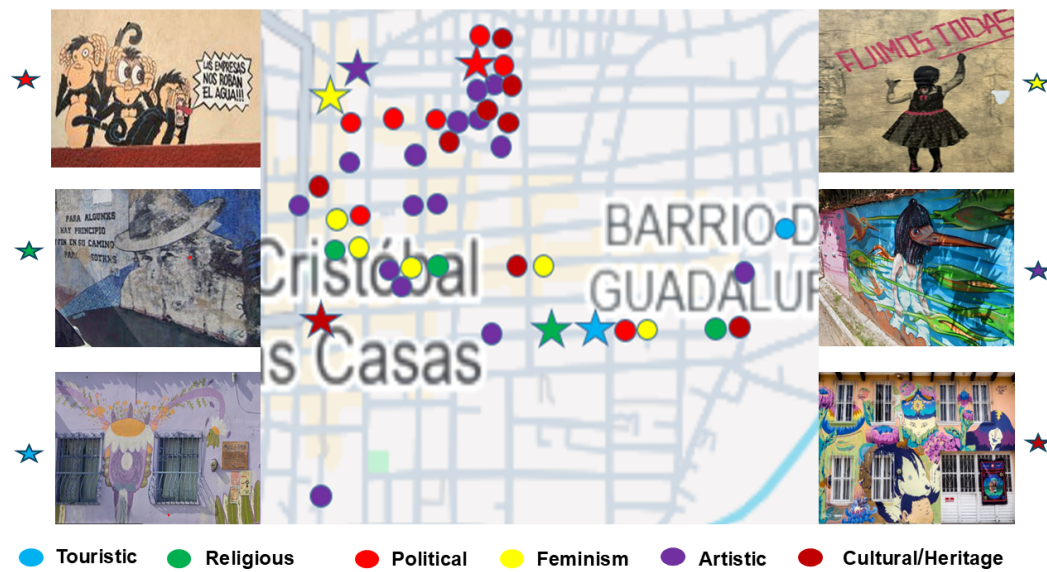
■ **Figure 1** San Cristóbal de Las Casas.



■ **Figure 2** Urban art categories in San Cristóbal de Las Casas.

The central historical area concentrates the high density of cultural murals alongside recurrent feminist and political messages (Historical centre and Barrio De Guadalupe), where visibility and footfall are greatest. The central boroughs operate as high-visibility attentional hubs in which large-format, legible imagery on façades and market fronts coexists with feminist stencils/posters, anti-Coca-Cola/water-rights critiques, and political iconography. While overtly feminist or politicized stencils are not the only forms present, they are consistently attested in the centre, and central murals still frequently display Mayan-inspired motifs, allegorical figures, and symbols of local belonging, feeding touristic circuits and public guides through repeated photographic capture and route inclusion [18]. The distribution is not spatially uniform: higher concentrations are observed in central areas characterized by high visibility.

In the northern neighbourhood of El Cerrillo (cluster to the top-left in Figure 3), a 17th-century historic area that acts as a threshold between the grid and the hills, resistance-oriented messages dominate the visual landscape, addressing autonomy, Indigenous memory, and social justice, often in continuity with political motifs observed in the centre. Feminist themes are also prominent, asserting gender equality and empowerment through bold imagery and slogans; religious-adjacent pieces appear where streets meet chapels or devotional routes, extending a sacred ambiance into the public realm. These expressions circulate through local networks and social media while remaining tightly embedded in neighbourhood life, producing resilient, memory-rich narratives [10]. This dynamic reflects a broader aspiration to reinvent the city according to collective desires, shaped by the practices of young people and artists.



■ **Figure 3** Examples of cultural art categories in San Cristóbal de Las Casas.

These findings indicate that urban art in San Cristóbal is not randomly dispersed but strategically positioned to reflect localized identities, contest dominant narratives, and reclaim space through visual storytelling. The data-driven baseline supports the hypothesis that media and themes correlate with borough vocation: central corridors combine cultural murals with recurrent feminist/political inscriptions; edge-of-centre neighbourhoods sustain resistance and devotional adjacencies; and peripheral sectors privilege cohesive community programs and long mural corridors. San Cristóbal de Las Casas does not exhibit a single canvas of cultural expressions, but a series of overlapping narratives that shape its strong social fabric.

3.2 Le Panier neighbourhood in the city of Marseille

The case of Marseille is centred on the historic district of Le Panier, a dense urban fabric characterized by steep alleys, layered architectural heritage, and vibrant street art (Figure 4). The quarter's morphology is a compact mesh of steep, narrow streets and tall buildings punctuated by places. The urban fabric retains fragments of medieval and early modern layers while accommodating contemporary commerce, galleries, and artisanal workshops.

Street art in Le Panier is remarkably diverse, encompassing murals, stencils, mosaics, posters, and ephemeral installations. Figure 5 illustrates the diversity of street art in Le Panier and showcases a range of themes, artistic and cultural heritage for the most prominent but also feminist, political, multicultural and touristic, reflecting the neighbourhood's layered identity and social dynamics. Framed as part of Marseille's "open-air museum", they blend decorative art with local heritage references to appeal to casual visitors and cruise-tourism audiences [10]. These works are often highlighted in artist-led, thematic tours focused on critical histories and alternative spatial narratives, which cater to niche publics and reinforce the alleys' mnemonic depth.

Le Panier exhibits a dual regime of attention: curated, large-format murals within the central belt and along tourist axes operate as institutional attention sources, repeatedly photographed and circulated in guides; while small-scale street-art landmarks serve as

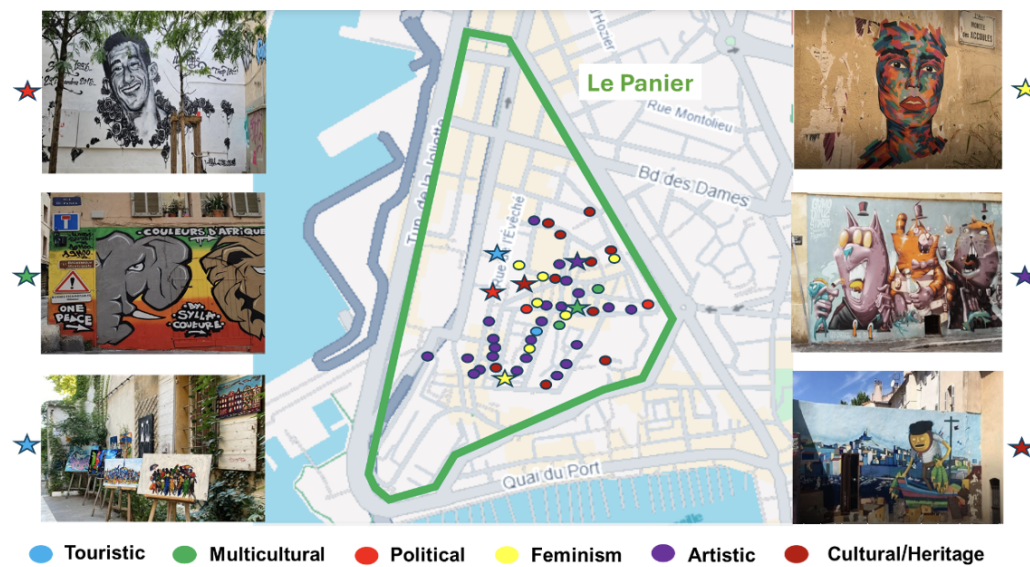


■ **Figure 4** Le Panier, Marseille.

attentional counter-sources, encoding feminist and anti-colonial narratives that attract niche publics and critical tours. The most visible works are concentrated around the streets extending north from Place de Lenche (from the feminist anchor example, Figure 5), and the vicinity of La Charité (cultural and artistic anchor examples, Figure 5), areas with high tourist traffic. Political, identity-driven messages and feminist anchors are often positioned close to the central areas of Le Panier, confirming that counter-messages are not displaced outward from the core. In the periphery of Le Panier, counts are lower, but surfaces are more cohesive (multi-artist or extended walls), yielding a distinct mode of legibility that contrasts with the centre's fine-grained density. This spatial pattern reflects a deliberate strategy: artists choose discreet locations to convey alternative narratives, creating a contrast with highly visible, tourist-oriented works. This duality between institutional visibility and grassroots subversion underscores the tension between urban branding and cultural authenticity [14]. However, this instrumentalization of street art by urban policies is accompanied by local resistance. This reveals a correlation between art forms (calligraffiti, stencil, collage) and territorial functions: decorative works tend to occupy tourist axes, while a few contestatory pieces are found on the margins of Le Panier [10].

The evolution of Le Panier, from a stigmatized zone to a tourist-facing “open-air museum”, illustrates the complex dynamics of urban transformation. Gentrification has also led to the displacement of long-term residents and the rise of luxury boutiques, raising concerns about cultural authenticity. Community gardens and grassroots initiatives offer resistance, reclaiming space for participatory citizenship and social cohesion.

This duality reveals how artistic media correlate with territorial role orientations, echoing the typological mapping observed in San Cristóbal. These activities transform public space into a medium for storytelling and symbolic negotiation, where art becomes a tool for reclaiming visibility and contesting gentrification. The juxtaposition of curated tourist ambiances and lived community routines underscores the tension between urban branding and cultural authenticity. Artistic interventions, spatial storytelling, and forms of community



■ **Figure 5** Urban art distribution and examples in Le Panier.

engagement can be described as contributing to configurations through which urban identities are expressed and sustained. The case underscores the need for inclusive policies that balance development with cultural continuity and support grassroots urbanism.

3.3 Discussion

The reappropriation of urban space through cultural expression in both San Cristóbal de Las Casas and Le Panier reveals deep social and territorial dynamics, and a distinctive logic. Many of the observed cultural markers appear informal and locally embedded, although the modes of production and governance of street-art practices vary and include both grassroots initiatives and institutionally supported interventions. The following discussion builds on qualitative patterns observed during fieldwork to interpret spatial configurations of cultural markers. In both cities, large, visually prominent murals situated along central or touristic axes serve as high-visibility anchors that stabilize dominant narrative heritage, identity, and civic symbolism. Conversely, peripheral or less travelled alleys host clusters of smaller, message-dense stencils, posters, and mosaics that sustain alternative or critical voices. These counter-narrative concentrations often mobilize themes such as feminism, resistance, and collective memory. In San Cristóbal, the coexistence of political, feminist, cultural, and artistic murals reflects a dense and activist-oriented social fabric in which Indigenous struggles, feminist mobilisations, and community-based initiatives collectively reclaim public space. In contrast, in Marseille's Le Panier, although feminist and multicultural expressions are also present and contribute to critical, often community-rooted voices, the visual field is more strongly structured by cultural-heritage and artistic motifs. This contrast highlights how differing social and cultural configurations in San Cristóbal and Le Panier are associated with distinct yet partly overlapping attentional logics and symbolic regimes. These thematic tendencies do not represent dominant categories, but they illustrate how cultural markers are embedded in, and expressive of, broader socio-territorial dynamics in each city.

These empirical patterns highlight a common attentional logic: visibility, thematic resonance, and spatial positioning interact to shape how cultural markers recruit perception and structure narrative pathways. Central anchors draw broad audiences through their

scale and accessibility, while dispersed micro-anchors attract attentive, often intentional engagement from more specific communities. Across both contexts, cultural markers thus operate not merely as decorative additions but as focal points that recode urban legibility, influencing pauses, detours, and the density of photographic or representational traces. Rather than claiming direct behavioural effects, our analysis proposes a conceptual link between micro-scale attentional salience at the level of individual markers and broader patterns of spatial organisation, such as recurrent narrative sequences. This interpretation is model-driven and exploratory rather than causal, and is intended as a conceptual basis for future work examining how such attentional configurations relate to practices in urban space. Accordingly, the patterns discussed here are not intended as generalizations of individual perception, but as ecological regularities emerging from the spatial distribution, visibility, and circulation of cultural markers in shared urban contexts.

Taken together, the findings point to the need for a formal account capable of capturing how micro-scale cues of meaning relate to broader representational and mobility patterns. The analysis does not aim to reconstruct artists' intentions or to validate meanings; instead, it focuses on how meaning-laden markers, once placed in public space, participate in shared attentional and representational dynamics. The recurrence of attentional hubs, counter-narrative clusters, and thematic concentrations suggests underlying regularities that warrant explicit modelling. Section 4 builds on these comparative insights by formalizing these dynamics through the anchor ontology and a set of indicators designed to operationalize how visibility, thematic content, and spatial relations contribute to urban attentional ecologies.

4 Toward a Computable Account of Cultural Placemaking

4.1 Ontology of cultural placemaking

Urban art and cultural placemaking practices foreground symbolic and perceptual dimensions of urban space by transforming otherwise unnoticed elements into focal points of attention and meaning. Rather than treating urban space solely as a geometric or functional entity, such practices highlight how visibility, placement, and symbolic content mediate how space is publicly encountered, attended to, and narratively articulated. We suggest an integration of cultural markers into a formal spatial ontology designed to support the semantic enrichment of urban space. The ontology introduced here is not intended to model place in the humanistic sense as lived experience or as a bond between individuals and the world. Instead, it provides a representational abstraction of culturally mediated symbolic and attentional configurations that participate in processes of cultural placemaking. It captures perceived, visible, and circulating meanings as they emerge through public exposure and spatial context, without attempting to encode authorial intent, individual interpretation, or local value systems directly.

The ontology is deliberately parsimonious and qualitative. It defines a minimal set of attributes and relations sufficient to represent how cultural markers function as attentional anchors within urban environments. Descriptive expressions used in the empirical sections (e.g. “symbolic corridors” or “heritage hubs”) are therefore treated as interpretative summaries of spatial configurations produced by the ontology, not as additional modelling primitives. The assignment of thematic categories and indicator values was conducted jointly by the two authors as part of an exploratory framework-building exercise aimed at applying and stress-testing the model, rather than producing validated or inter-subjectively calibrated measurements. Accordingly, the resulting classifications should be understood as illustrative instantiations of the framework.

This leads to the following guiding challenge: How can symbolic and cultural dimensions of placemaking be represented within a semantic enrichment of urban space? Addressing this question requires an abstraction layer capable of extending spatial representation beyond geometry and topology to include symbolic, perceptual, and contextual attributes. To address this challenge, cultural markers are modelled as anchors, that is, spatially situated symbolic entities endowed with a set of qualitative attributes and relations.

- Anchor: $A \subset \text{SymbolicMarker}$
- Attributes:
 - loc: geographic coordinates (point/segment), borough
 - vis: visibility class $\in \{\text{low, medium, high}\}$
 - theme: category $\in \{\text{feminism, heritage, political, artistic, religious, commercial}\}$
 - tech: tech $\in \{\text{mural, stencil, graffiti, poster, sticker}\}$
 - persist: persistence (ephemeral, seasonal, semi-permanent, permanent)
- Contextual relations:
 - near(civic_space), near(tour_axis), adj(church/place)
 - cluster_with(Anchor) (co-located anchors forming a local attentional field)

Together, these elements define a lower bound of formal description: a minimal structure required to represent how cultural markers become salient, clustered, and narratively connected within urban space.

The thematic categories used in the ontology are intentionally general and analytically motivated. They are not intended as normative or exhaustive cultural classifications, but as abstract descriptors chosen to support cross-city comparability across heterogeneous urban contexts. While these categories inevitably reflect interpretative conventions, the ontology is explicitly extensible: additional or context-specific thematic dimensions can be introduced when applying the framework to particular settings without altering its core structure. The visibility attribute (vis) reflects the combined effect of physical salience (e.g., scale, contrast, façade placement) and situational visibility during navigation (e.g., exposure along pedestrian paths or frequently traversed streets). These aspects are considered jointly and qualitatively rather than as separable metrics, in keeping with the exploratory nature of the approach. Persistence (persist) is treated as a generic descriptive property rather than as a fully observed temporal variable. Its valuation relies on material form and limited secondary indications rather than on longitudinal observation. More detailed temporal modelling would require repeated surveys and is left for future work.

Finally, the ontology deliberately adopts parsimonious descriptors. Adding further attributes could increase specificity but would reduce comparability across cities. For example, although aesthetic qualities play an important role in cultural placemaking, they are not explicitly modelled here. This reflects an intentional focus on attentional and representational properties that are more readily comparable across contexts. Aesthetic valuation could nevertheless be introduced as an additional attribute in future extensions of the model, without altering its overall structure.

The ontology proposes a lower bound of formal description for cultural anchors: a minimal set of attributes required to reason about meaning propagation without loss of generality. Building on this ontology, each anchor (A) is characterised by a set of basic indicators that describe how anchors participate in the attentional organisation of a neighbourhood. The indicators are qualitative by design to favour ordinal distinctions over continuous metrics. This approach supports cross-context comparability without relying on locally variable quantitative data. Next, several semantic indicators are defined and rely only on attributes already assigned to anchors (cf. appendix for valuation examples).

Attentional Gain (AG). AG expresses how strongly an anchor is likely to draw attention based on the properties already defined in its description. Attentional Gain thus distinguishes visibility from meaning by considering visibility as a composite, qualitative property grounded in both physical prominence and navigational exposure. It sharpens the separation between physical visibility and semantic resonance. AG offers a compact interpretation of an anchor's attention-pulling capacity directly grounded in its visibility, theme, and contextual relations. Attentional Gain is assigned using qualitative categories (Low, Moderate, High).

$$AG(A) = f(vis(A), theme(A), context(A)).$$

In practice, AG was valued qualitatively using a simple process applied to the two case studies. High AG was assigned to anchors that combine high physical visibility with thematically salient content (e.g., feminist, political, or emblematic heritage motifs) in exposed locations along main pedestrian axes. Moderate AG was used for anchors with intermediate visibility or less resonant themes (e.g., commercial), and Low AG for small or visually marginal anchors in peripheral locations. These categories were applied jointly by the two authors on the basis of the photographic inventory and contextual notes. For example, a large cultural heritage mural in Le Panier (Figure 5, MP6 in the Appendix), set on a wide and highly visible façade, with a heritage-oriented theme along a busy tourist corridor, gives a high Attentional Gain, making it a prominent anchor that consolidates a heritage-focused narrative.

Representational Reach (RR). RR extends the description beyond local visibility and accounts for the degree to which an anchor is likely to appear in public narratives. It reframes urban art as part of an informational ecosystem, combining *tour_presence(A)*, whether the anchor appears in guided itineraries and cultural paths, with *media_presence(A)*, its occurrence in publicly accessible visual or textual traces (e.g., photographs, blogs, or online listings).

$$RR(A) = g(tour_presence(A), media_presence(A)).$$

RR was assessed by cross-checking the field inventory with a light survey of publicly accessible materials (online tour descriptions, blogs, and photo-sharing platforms) for each city, supported by targeted keyword-based searches and assisted browsing, including the use of large language models to identify and aggregate relevant sources. Anchors explicitly mentioned in several tours and appearing across multiple distinct online media sources were assigned High RR; those present in one or two sources were given Moderate RR; and anchors with little or no trace in these materials were valued as Low RR. For example, a colourful artistic mural on the public market façade in the centre of San Cristóbal (Figure 3, SC3 in the Appendix) is regularly included in walking tours and widely photographed by both visitors and residents. This repeated presence in guided itineraries and visual traces gives the mural high RR. At the same time, smaller and less curated inscriptions persist in everyday neighbourhood spaces, circulating primarily through local networks and activist practices rather than through formal visitor-oriented narratives.

Neighbourhood Attentional Intensity (NAI). NAI denotes how clusters of anchors co-produce dense attentional fields within defined areas of interest, such as highly circulated streets, locations around key places (e.g., squares), or entire neighbourhoods (e.g., Barrio del Cerrillo, Barrio de Guadalupe and Le Panier as a whole). This metric captures the collective

attentional density generated when locally salient anchors (high AG) also circulate through broader narratives (high RR). For a given area N , Neighbourhood Attentional Intensity is valued as:

$$NAI(N) = h(\{AG(A_i), RR(A_i)\} \mid A_i \in AA)$$

where each anchor A_i within a street, block, or neighbourhood contributes through its Attentional Gain (AG) and Representational Reach (RR). h denotes a qualitative aggregation over all anchors within the area, where neighbourhood intensity increases with the number and co-presence of anchors exhibiting high AG and/or high RR rather than through numerical accumulation.

For a given area NN , NAI is valued qualitatively based on the distribution of AG and RR across its anchors: High NAI when multiple anchors show both high AG and high RR; Moderate NAI with mixed moderate values; Low NAI when most anchors have low AG and/or RR.

In the upper slopes of Le Panier near Place des Moulins (Figure 5, touristic MP2, political MP1, cultural-heritage MP6 in the Appendix), local streets combine several moderates to high visibility street-art anchors. Despite varying individual AG, their spatial co-presence and frequent inclusion in tours/photography yield high NAI, creating a dense symbolic field through cumulative interaction rather than a single dominant anchor. At the neighbourhood scale, Barrio del Cerrillo similarly exhibits high NAI from clustered resistance-oriented anchors along its devotional and activist circulation routes.

Counter-narrative Index (CI). Using the thematic categories assigned to anchors, CI highlights areas where alternative or critical voices are spatially concentrated within defined areas of interest, streets, locations around key places, or entire neighbourhoods. It combines $NAI(N)$ (attentional density) with $prop_opp(N)$ (proportion of anchors expressing oppositional themes such as feminism or political resistance):

$$CI(N) = q(NAI(N), prop_opp(N)).$$

CI is valued qualitatively: High CI when an area shows high NAI and many counter-narrative anchors; Moderate CI with moderate NAI and moderate proportions; Low CI when NAI is low and/or few counter-narrative anchors. For example, El Cerrillo (San Cristóbal) combines clusters of feminist stencils, Indigenous-rights graffiti, and political posters, representing several oppositional themes, while exhibiting high NAI. This yields high CI, marking El Cerrillo as a prominent counter-narrative hub. At street scale, similar clustering around the central Place de La Charité and Place des Pistoles in Le Panier also produce high CI from concentrated feminist anchors.

Together, AG, RR, NAI, and CI describe the Attentional Ecology of an area, that is, the configuration of anchors and the ways they influence what becomes noticeable, lingered upon local interpretation, photographed, or incorporated into local narratives. This ecology arises directly from the attributes and relations already encoded in the ontology, without requiring additional modelling layers. In Le Panier, the attentional ecology shows a mixture of high-visibility heritage anchors near La Vieille Charité and political micro-anchors in secondary alleys. In San Cristóbal, it alternates between cultural murals (high AG, high RR) and local political clusters (moderate AG, high CI).

Narrative Corridor. It is defined as a path through the street network along which a recognizable sequence of anchors. A Narrative Corridor formalizes how meaning and visibility propagate along walkable paths through sequences of anchors, bridging micro-scale salience

to meso-scale abstractions. A Narrative Corridor denotes a sequence of symbolic anchors made salient by meaning, thematic coherence, and representational attention rather than geometric form or path landmarks:

$$C = (A_1, e_{12}, A_2, e_{23}, \dots, e_{(k-1)k}, A_k)$$

where $A_1, \dots, A_k \in AA$ are successive anchors encountered in order along contiguous street segments. A path C is derived from a description that narrates or implies this ordered succession of locations and anchors. Once modelled, C can be summarized by path level descriptors such as:

$$RR(C) = (RR(A_1), RR(A_2), \dots, RR(A_n)).$$

Corridors are extracted empirically from publicly available narrative descriptions (tour itineraries, blogs, guides) rather than constructed artificially. The process follows three steps: (1) Extract named streets/places from tour descriptions mentioning sequential street art or landmarks; (2) Match these to street segments containing ontology anchors; (3) Order anchors along the route to form $C = (A_1, \dots, A_k)$.

Numerous available walking tours describe a classic street-art path: “Après avoir découvert le bas du Panier, on monte par la montée des Accoules, on flâne place de Lenche [...], puis [...] la rue des Pistoles et la vieille Charité”. This yields the corridor MP-feminist (Place de Lenche) → MP6 (Montée des Accoules) → MP-central (La Vieille Charité) with uniform $RR(C) = (\text{High}, \text{High}, \text{High})$, illustrating a tourist axis (from the feminism to the central anchors in Figure 5, cf. Figure 6 right). In San Cristóbal de Las Casas free walking tour reviews note routes weaving from the centre through “street art in neighbourhood El Cerrillo” toward “Santo Domingo market” along “Real de Guadalupe”. This produces SC-central → SC4/5/6 (El Cerrillo cluster) with $RR(C) = (\text{Moderate}, \text{Low}, \text{Moderate})$, showing rising attentional intensity through political/religious anchors (cf. Table 1).

These path descriptors reveal how micro-salience propagates: tourist corridors maintain high RR uniformity; resident/alternative corridors show thematic variation. Established corridors attract new anchors, creating path-dependent symbolic structures and semantics (touristic vs. local) within the same street fabric. Areas with higher NAI and anchors with higher RR are likely to anchor these corridors, linking cognitive effects to observable representational flows in tours, blogs, and media.

4.2 Analytical contribution and applicability

The anchor-oriented ontology and its associated indicators offers a structured representational framework for describing how symbolic, perceptual, and attentional dimensions are configured and related within urban space. Figure 6 articulates this framework as a four-level attentional mechanism, linking perception, local meaning patterns, narrative sequences, and city-scale representational flows. At the micro scale, anchors operate as perceptual attractors that can redirect navigation processes. This moves beyond the purely visual descriptors common in place ontologies by integrating perceptual, symbolic, and situational properties into a single qualitative index that denotes what is cognitively impactful. The meso-level concerns how multiple anchors jointly structure the attentional ecology of an area. Such ecological modelling formalizes how clusters of anchors co-produce local meaning fields such as dense symbolic corridors, resistance-oriented alleys, or heritage-oriented hubs, and why specific micro areas become influential in shaping neighbourhood identity. The last level organizes anchors into narrative corridors. While cognitive routes foreground legibility or navigational



■ **Figure 6** From perception to micro-macro levels, movements and narratives.

structure, these street-art narrative corridors foreground semantic and cultural properties. This makes it possible to reason about representational trajectories, how cultural meaning propagates along a route and to compare curated corridors with those that emerge organically.

Overall, the four-level structure provides a semantic and cognitive representation in which perceptual cues, local anchor configurations, and narrative pathways are related across scales within urban representational context. The proposed framework makes the following contributions:

- It integrates perception and semantics by treating meaning as an attention modifying property directly encoded in the ontology.
- It formalizes relationships across scales by representing how micro-scale cues are associated with meso-level configurations and broader representational patterns, rather than treating these levels as analytically independent.
- It introduces representational dynamics, allowing reasoning about how places become visible, remembered, or narratively prominent through cultural markers.

In doing so, the model expands the expressive capacity of spatial ontologies: not only where street-art things are, but how they are noticed, interpreted, sequenced, and circulated. Although derived from two empirical contexts, San Cristóbal and Le Panier, the ontology is intentionally abstract. Because all anchors share a common structure, attentional ecologies become structurally comparable across cities. Such comparisons move beyond descriptive analogies: they allow cities with distinct histories, morphologies, or artistic grammars to be examined through a shared symbolic vocabulary. This opens pathways for identifying recurrent spatial logics across cities: whether feminist inscriptions systematically gravitate toward transitional areas, whether heritage-oriented murals consistently anchor touristic corridors, or whether counter-narrative clusters tend to form in morphologically marginal pockets.

5 Conclusion

This paper examined how artistic and cultural expressions reorganize perception, attention, and meaning in urban space through a comparative study of San Cristóbal de Las Casas and Le Panier. The study illustrates how cultural markers can be represented as attentional anchors that participate in what becomes noticeable, memorable, and narratively salient within the city. Building on these empirical observations, we introduced a cognitive-symbolic model of cultural placemaking that formalizes how micro-scale cues of visibility and meaning aggregate into broader spatial patterns. The anchor ontology and its indicators provide a unified way for describing attentional ecologies within urban environments. It contributes a representational perspective in which cultural place is approached not merely as a physical location but as a dynamic configuration of expressive relations articulated through cultural markers. Together with narrative corridors and the four-level attentional mechanisms, the model links perceptual salience, local clustering, ordered sequences, and macro-level representational flows. Theoretically, this work contributes to spatial information theory by advancing a street-art model that integrates cognitive, symbolic, and narrative dimensions of place. Beyond aesthetics, an attention-based view of placemaking suggests new metrics, captured by the indicators developed here, that supports a semantic representation of urban cultural meaning. Cultural markers participate in the symbolic and attentional infrastructure of the city, influencing what is foregrounded in shared narratives and representations.

In both cities, despite their divergent socio-cultural and geopolitical contexts, common trends emerge: the emergence of feminist and heritage-based themes, the strategic placement of art in contested or transitional zones, and the tension between grassroots expression and institutional visibility. We observed recurrent spatial configurations: central anchors with high visibility and thematic prominence structure widely shared narratives. Peripheral or marginal clusters form dense counter-narrative fields that sustain alternative or resistant expressions. Narrative corridors, in turn, channel meaning along walkable paths.

The model still encompasses several limitations to address. First, the indicators are based on qualitative expert assessment rather than quantitative measurement of visibility, flows, or media propagation. Their value lies in conceptual clarity, but future empirical validation is needed. Second, the model abstracts from the temporal volatility of cultural expressions: markers appear, fade, are erased, or replaced, and this dynamism is only partially represented in our current framework. Through these developments, the model can contribute to a representation of cultural urban places not simply as spatial containers, but as dynamic, meaning-laden environments shaped by cultural expressions, narrative practices, and the collective reappropriation of space. By formalizing the links between perception, meaning, and representation, the model contributes a semantic and cultural-based representation of urban spaces.

Ethical note. All street-art markers analysed are publicly displayed works created for open visibility in urban space. The documentation process involved no interaction with individuals, no collection of personal data, and no recording of sensitive or private contexts. Our analysis operates at the level of aggregated spatial patterns and symbolic categories, ensuring that actors or communities are not identifiable. As such, the study does not raise significant ethical risks and adheres to standard principles of respectful and non-intrusive research in public environments.

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A Appendix

The following tables illustrate the indicators applied to representative anchors discussed earlier (Figure 3 for San Cristóbal; Figure 5 for Le Panier). Anchor attributes (visibility, theme, contextual relations, persistence) were jointly assessed by the two authors based on field observations, in-situ positioning, and systematic photographic documentation. Attentional Gain (AG) reflects the authors' interpretation of perceptual and semantic prominence as observed during fieldwork, taking into account scale, clarity, and thematic distinctiveness. Representational Reach (RR) was established using a light survey of its presence across publicly accessible online materials, including walking-tour descriptions, cultural blogs, user-generated photo platforms, and image-rich search results. This provided a simple but consistent approximation of whether an anchor circulates beyond its immediate location and enters broader representational flows. Neighbourhood Attentional Intensity (NAI) and Counter-Narrative Index (CI) were derived from the distribution and thematic attributes of anchors within each area, providing a qualitative description of how visibility and thematic concentration are configured locally. Table 1 summarizes anchor values while Table 2 evaluates neighbourhood values for Barrio del Cerrillo and Centro for San Cristóbal de las Casas, and Le Panier in Marseille.

■ **Table 1** Anchor-level indicators.

Anchor	City	Location	Media	Theme	AG	RR
SC1	San Cristóbal	Centro	Muralism	Heritage	High	High
SC3	San Cristóbal	Barrio del Cerrillo	Muralism	Artistic	High	High
SC2	San Cristóbal	Centro	Stencil	Feminism	Moderate	High
SC4	San Cristóbal	Barrio del Cerrillo	Graffiti	Commercial	Low	Low
SC5	San Cristóbal	Barrio del Cerrillo	Muralism	Political	High	Moderate
SC6	San Cristóbal	Barrio del Cerrillo	Muralism	Religious	Moderate	Low
MP1	Marseille	Le Panier	Muralism	Political	High	Moderate
MP3	Marseille	Le Panier	Mosaic	Multicultural	High	High
MP2	Marseille	Le Panier	Poster	Touristic	Low	Low
MP4	Marseille	Le Panier	Poster	Feminism	Moderate	Moderate
MP5	Marseille	Le Panier	Muralism	Artistic	High	High
MP6	Marseille	Le Panier	Muralism	Cultural heritage	High	High

■ **Table 2** Place and neighbourhood-level indicators (NAI and CI).

City	Area	Anchors	NAI	Counter-narrative anchors CI
San Cristóbal	Barrio de Guadalupe	10	High	Moderate
San Cristóbal	Barrio del Cerrillo	26	High	High
Marseille	Place de la Charité & Place des Pistoles	22	High	High