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Intersecting perspectives: A participatory street review framework for urban inclusivity

Rashid Mushkani [a,b,*], Shin Koseki [a,b]

[a] Université de Montréal, Canada
[b] Mila– Quebec AI Institute, Canada

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ABSTRACT

Urban demographic changes, evolving multiculturalism, and heightened tourism flows have underscored the importance of designing public streets that serve heterogeneous populations. Despite municipal policies advocating equity and universal access, many streetscapes still fall short of accommodating the wide-ranging practical and cultural differences that exist among diverse user groups. This paper introduces and applies a participatory methodology—"Street Review"—designed to capture how individuals from varying social positions evaluate an array of streets within a multicultural metropolis. Grounded in the context of Montréal, known for its overlapping layers of historic and modern neighborhoods, multilingual communities, and continual inflows of short-term visitors, this framework draws upon qualitative interviews, focus groups, and a systematic rating of street images by 12 participants. The analyses focus on perceived inclusivity, accessibility, aesthetics, and practicality for both long-term residents (post-occupancy) and newcomers or suburban visitors (pre-occupancy). Findings from examining 20 selected streets (represented through 60 vantage points) indicate that most streetscapes offer moderate levels of user-friendliness, with only a handful of locations scoring especially low on supporting vulnerable populations or signaling cultural welcome. A smaller subset approached higher performance in certain areas but rarely satisfied all participant groups. In situating these results within global debates around inclusive urban design, public space, and the interplay of tourism with social equity, we illustrate how group-based deliberations can generate constructive insights and spotlight deeper conflicts rooted in identity, memory, and everyday mobility. These reflections inform planners and policymakers in striving for streets that address the convergence of diverse user experiences and emerging global challenges in urban policy.

1. Introduction

Rapid demographic shifts, sustained immigration, and increasing international tourism trends have prompted many global cities to revisit how their streets can equitably cater to diverse users (Abbasi et al., 2016; Adams et al., 2021; Anttiroiko & De Jong, 2020; Carmona et al., 2019). Similar demands emerge worldwide, from historic European centers seeking to balance heritage with accessibility, to sprawling megacities in Asia working to integrate pedestrian pathways amid intense urban growth. Against this international backdrop, the city of Montréal exemplifies a context where older neighborhoods, contemporary developments, and culturally distinct enclaves coexist (LaFerrière, 2021; Lawton Smith, 2023; Litman, 2024; Margier, 2013; Sylvestre, 2010). Critics often note that city planners rely on standardized design solutions—such as uniform sidewalk widths or ramp installations—that fail to account for how culture, ability, or identity intersect in everyday life (Anttiroiko & De Jong, 2020; Lesan & Gjerde, 2021; Low, 2020; Madanipour, 2010; McAndrews et al., 2023; Talen, 2012).

Existing scholarship on public life demonstrates that such spaces, streets included, can systematically exclude segments of the community if local norms or historical inequities are unaddressed (Anttiroiko & De Jong, 2020; Beebeejaun, 2017; Biljecki et al., 2023; Bondi, 1998; Carnemolla et al., 2021; Crenshaw, 1997; Dhasmana et al., 2022, pp. 221–226; Doiron et al., 2022; Johnson & Miles, 2014; Kraycheva et al., 2025; Madanipour, 2010; Mandeli, 2019; McAndrews et al., 2023; Mushkani & Ono, 2021; Qiu et al., 2021; Roberson, 2022; Sadeghi & Jangjoo, 2022; Stark & Meschik, 2018; Tandogan & Ilhan, 2016). From Jacobs's (1961) seminal observations of sidewalks as the fundamental

* Corresponding author. School of Urbanism and Landscape Architecture, Faculty of Environmental Studies, University of Montreal, 2940 Côte-Saint-Catherine, Montreal, Quebec, H3S 2C2, Canada.
E-mail address: rashid.ahmad.mushkani@umontreal.ca (R. Mushkani).

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"public realm," subsequent studies worldwide have underscored the significance of streets and sidewalks in shaping social bonds and collective well-being (Anttiroiko & de Jong, 2020b; Carmona, 2021; Sennett, 2018). Yuval-Davis (2006) notes that questions of belonging and identity loom large in how communities negotiate who can occupy and define urban space. This negotiation is further complicated by the presence of short-term visitors or suburban dwellers whose experience of a street might be largely visual and transitory, with little long-term attachment (Antonsich, 2010; Armstrong & Greene, 2022; Gillespie et al., 2022; McAndrews et al., 2023). The interplay between everyday users, who adopt a post-occupancy perspective based on prolonged familiarity, and pre-occupancy visitors, who gauge inclusivity from initial impressions, is central to understanding how a city's spaces truly function (Anttiroiko & De Jong, 2020; Ginting et al., 2018; Mitrašinović & Mehta, 2021; Murphy and O'Driscoll, 2021). Contemporary approaches to evaluating streets thus require a methodology that can capture how different social groups perceive the same site, highlight points of convergence and divergence, and yield actionable data for planners (Alwah et al., 2021; Gehl & Svarre, 2013; Mehta, 2019; Mushkani, Berard, & Koseki, 2025).

Montréal represents an ideal case for examining how diverse identities and mobilities converge in shared spaces (LaFerrière, 2021). The city encompasses a variety of street profiles, ranging from dense commercial corridors to historic avenues, and from culturally vibrant streets to quiet suburban-like enclaves (Litman, 2024; Margier, 2013). Multiple language communities coexist, while the built environment includes both century-old lanes and contemporary architecture (Jian et al., 2020; Rayside, 2021; Sylvestre, 2010). These circumstances offer a comprehensive backdrop for testing a multi-method approach that seeks to gather perspectives from older residents, suburban commuters, new immigrants, youth, and tourists, among others.

This paper offers a qualitative and quantitative framework—referred to here as "Street Review"—for collecting and analyzing user feedback on diverse streetscapes. Anchored in the lens of participatory planning (Low, 2020; Lund, 2018; McAndrews et al., 2023), it examines how a small cohort of 12 participants assign ratings for accessibility, aesthetics, inclusivity, and practicality to 20 chosen streets in Montréal. Each street was sampled at three distinct points, producing a total of 60 city spots, with two images per spot in order to capture different perspectives. The approach merges individual interviews, group-based deliberations, and systematic scoring in an effort to reflect both personal experiences and collective insights (Creswell & Creswell, 2022; Krueger, 2002). It also explores how individuals with a long-term relationship to a given street differ from those who assess it based on initial or infrequent visits (Evans et al., 2019; Mehta, 2014).

The next sections review pertinent conceptual frameworks surrounding inclusive design, multicultural urban life, and the impact of tourism on shared spaces. The research then outlines the methodological steps undertaken to engage participants in ratings and discussions, including the significance of both post-occupancy and pre-occupancy standpoints. Subsequent portions of the paper focus on the findings of the rating experiment, detailing how each street location in the sample performed. Many sites ended up in the "average" range, offering partial strengths in certain dimensions but shortfalls in others. Some emerged as "poor," underscoring deeper structural or cultural impediments to equitable use. While a few streets approached higher levels of user satisfaction in aesthetic qualities or universal accessibility, none was recognized as unambiguously good for the entire participant group. These results point toward nuanced interactions between objective design features and subjective impressions shaped by identity and memory (Carmona & Sieh, 2004; Costanza-Chock, 2020; Fainstein, 2010; Qiu et al., 2021; Yuval-Davis, 2006). The paper closes by reflecting on the implications for urban planners, local organizations, and tourism officials who aspire to create environments that serve both local and external user populations.

2. Conceptual framework

Public space has historically been regarded as a cornerstone of civic life, where individuals from different backgrounds can encounter one another and where collective practices of belonging are forged (Carr, 1992; Gehl, 2011; Lefebvre, 1992; Whyte, 2021). Yet myriad factors—socioeconomic inequality, cultural hierarchies, identity politics—routinely interfere with inclusive processes, leading certain segments of the population to feel disempowered or threatened (Gehl, 2011; Harvey, 2003; Johnson & Miles, 2014; Stenou, 1998; Zhao et al., 2023). Scholars of intersectionality highlight how design and policy decisions often ignore the overlapping identities that shape the user experience (Cipolla & Bartholo, 2014; Costanza-Chock, 2020; Crenshaw, 1997; Stark & Meschik, 2018). For instance, a street might be physically navigable for most pedestrians but fail to accommodate disabled persons who need accessible ramps, or it might provide universal curb heights but inadvertently neglect signage in multiple languages that would help newly arrived migrants (Alwah et al., 2021; Chitrakar et al., 2022; Jordan, 2023; Saha et al., 2019; Talen, 2012).

Understanding how urban spaces foster inclusivity requires distinguishing between what we term pre-occupancy and post-occupancy perspectives. Pre-occupancy viewpoints arise from individuals—often tourists, newcomers, or suburban visitors—who rely on initial impressions (e.g., visible signage, open spaces, navigational cues) to evaluate whether a street appears welcoming and functional. These assessments can overlook long-standing tensions or structural inequalities embedded in the built environment (Anttiroiko & De Jong, 2020; Dhasmana et al., 2022, pp. 221–226). By contrast, post-occupancy views emerge from long-term residents whose memories include historic conflicts, prior policy changes, or enduring socio-spatial disparities (Ginting et al., 2018; Low, 2020). Residents may identify hidden accessibility barriers or subtler forms of exclusion—such as the absence of multilingual signage in predominantly immigrant neighborhoods—that newcomers might not perceive. The divergence between these two perspectives is a powerful lens for assessing inclusivity, as it illuminates layered experiences of urban spaces shaped by identity, mobility patterns, and extended familiarity with local governance (Mitrashinović & Mehta, 2021; Mushkani, Berard, & Koseki, 2025). In proposing the Street Review framework, we bridge these viewpoints by capturing both immediate reactions and historically informed critiques. This dual approach advances existing urban assessment models by explicitly comparing how distinct social groups, defined by both identity and duration of local engagement, interpret the same street features.

Tourism adds complexity to these discussions by introducing a flux of visitors who do not necessarily share the local community's social expectations. Inskeep (1988) suggests that tourism-based planning frequently aims to enhance aesthetics, beautification, and entertainment in certain corridors, drawing on heritage attractions or festival branding, and sometimes marginalizing the needs of long-term residents (Ginting et al., 2018; Rahmafitria et al., 2020; Shahraki, 2022; Stenou, 1998). In contrast, visitors who arrive from suburban areas or other regions may experience a street from a pre-occupancy standpoint, evaluating it on the basis of immediate impressions, visual cues, or the convenience of navigation (Dhasmana et al., 2022, pp. 221–226; Quinn et al., 2021; Talen, 2012). Such experiences can differ dramatically from those of residents whose post-occupancy perceptions incorporate memories of past conflicts, personal tragedies, or community triumphs (Jacobs, 1961; Low, 2020). Overlooking these variations risks implementing design interventions that serve certain categories of the public while perpetuating exclusion for others (Anttiroiko & de Jong, 2020a; Mehta, 2014; Varna, 2016).

Sennett (2018) emphasizes that "building and dwelling" in modern cities requires balancing the ethics of open interaction with the desire for safe, coherent spaces. This tension emerges pointedly in streetscapes, where design elements (e.g., sidewalks, crosswalks, benches) interweave with intangible cultural signals and informal norms (Banerjee, 2001;

Gehl, 2011). Similarly, scholars contend that the sense of belonging in public space demands more than physical infrastructure; it requires cultural recognition and a form of symbolic acceptance that cannot be reduced to ramps and wide walkways alone (Antonsich, 2010; Armstrong & Greene, 2022; Gillespie et al., 2022; Robinson, 1982; Yuval-Davis, 2006). Such recognition arises from local narratives, cultural signs, and a general ethos of hospitality or respect (Watson, 2006).

The Street Review methodology presented in this paper engages with these theoretical insights, aiming to measure experiences across multiple social dimensions and bridging top-down design guidelines with bottom-up user perspectives. By structuring a rating process around concepts that emerged from participant interviews, it prioritizes locally meaningful criteria (Calhoun, 2017; Carmona & Sieh, 2004; Creswell & Creswell, 2022). The approach further distinguishes how subgroups or individuals who possess different amounts of familiarity perceive identical places differently. In so doing, the project speaks to broader scholarship on participatory planning, which stresses the need for deeper engagement with residents and visitors, as opposed to purely technical audits of the built environment (Al-Kodmany, 1999; Cipolla & Bartholo, 2014; Lund, 2018; McAndrews et al., 2023; Mehta, 2019).

3. Context

Montréal's distinctive urban fabric and sociocultural complexities make it an instructive setting for this research. The city's core and adjacent neighborhoods vary considerably in architectural style, density, and cultural expression, reflecting both French and English historical influences, as well as more recent global migration (Margier, 2013; Rayside, 2021; Sylvestre, 2010). Visitors drawn by festivals, conference tourism, and cultural events concentrate in districts like downtown, the Old Port, and the Quartier des Spectacles (Kraycheva et al., 2025; LaFerrière, 2021; Litman, 2024), while local residents commute from surrounding boroughs with distinct characters. Some suburbs have strong commercial ties to the city center, resulting in daily or weekly inflows of people who may be less familiar with local cultural norms but who rely on central sidewalks for transport or leisure (Kraycheva et al., 2025; LaFerrière, 2021).

In addition to visible changes in land use, there exist subtle sociopolitical tensions around language, religious expression, and identity that often emerge in the public realm (Sylvestre, 2010). Some streets reflect robust signage in French, English, or other languages, signaling pluralistic acceptance (Kraycheva et al., 2025; Margier, 2013), while other corridors display only minimal signals of diversity. Accessibility features also vary: while certain major avenues have undergone redesign to improve curb ramps, crosswalk signals, and sidewalk widths, some older neighborhoods frequently struggle with uneven pavement, limited crossing times, or insufficient signage (Litman, 2024; Margier, 2013; Ross et al., 2004). This heterogeneity intersects with deep-rooted disparities tied to socio-economic status (Fainstein, 2010; Robinson, 1982). Affluent enclaves sometimes have well-maintained trees and street furniture, whereas lower-income or industrial districts remain under-served (Kraycheva et al., 2025; LaFerrière, 2021; Margier, 2013; Youngbloom et al., 2023).

Montréal's status as a multilingual city also makes it a laboratory for investigating how cultural symbols and localized identity markers mediate the experience of street users (Appelbaum et al., 2015; Kraycheva et al., 2025; Margier, 2013; Youngbloom et al., 2023). Tourists who pass through for a short while might find certain spaces visually appealing or historically resonant but might not perceive issues that local communities have been grappling with for years (Broderick, 2022; Inskeep, 1988; Quinn et al., 2021; Rahmafitria et al., 2020). Conversely, suburban residents who rarely visit downtown might be uncertain about navigating major avenues, seeking signage clarity, functional transit stops, or safe pedestrian crossings (Qian, 2020; Talen, 2012), while local residents are already attuned to unspoken rules or knowledge networks (Low, 2020; Varna & Tiesdell, 2010). These overlapping frames of reference—post-occupancy for insiders, pre-occupancy for outsiders—shape the multiple vantage points that the Street Review framework aimed to capture (McAndrews et al., 2023; Murphy and O'Driscoll, 2021).

4. Related literature

The inclusive design of urban public spaces has become an important global topic, reflecting broader commitments to social sustainability in cities (Carnemolla et al., 2021; Liang et al., 2022). Such design aims to ensure that spaces are available and welcoming across different socio-economic backgrounds, cultures, and physical capabilities (Anttiroiko & De Jong, 2020; Zhu et al., 2025). By correlating inclusivity with collective well-being and civic identity, scholars have advanced frameworks for systematically measuring and promoting equitable urban development (Adams et al., 2021; Anton & Lawrence, 2014; Bernabeu-Bautista et al., 2023; Broderick, 2022; Carnemolla et al., 2021; Laurenson & Collins, 2006; Robinson, 1982). Initiatives to enhance inclusivity often involve participatory planning processes, where input from marginalized and vulnerable populations is integral to the design and management of public spaces, thereby democratizing urban planning and ensuring spaces genuinely reflect the needs and aspirations of their diverse users (Carmona, 2021; Carnemolla et al., 2021; Fan et al., 2023; Varna & Tiesdell, 2010; Young, 2002).

Accurate measurement of inclusivity and the overall quality of public spaces is necessary for informed urban planning and policy-making (Anttiroiko & De Jong, 2020; Carmona & Sieh, 2004). Mehta's Public Space Index (PSI) is a foundational tool in this domain, providing a quantitative assessment based on five key dimensions: inclusiveness, meaningful activities, safety, comfort, and pleasurability (Mehta, 2014). The PSI employs a combination of user surveys, expert evaluations, and observational data to generate comprehensive scores that reflect the multifaceted nature of public space quality. Building upon this framework, Zamanifard et al. (2019) developed the Public Space Experiential Quality Index (PSEQI), which integrates additional user-centric variables such as perceived accessibility, sense of safety, climate comfortability, walking convenience, and social interactions. The PSEQI offers a more nuanced evaluation by capturing both tangible and intangible aspects of user experiences, thereby providing a deeper understanding of how different elements of public spaces contribute to their overall inclusivity and functionality.

The criteria for measuring public space quality are inherently multidimensional, encompassing physical, social, and experiential factors. Mehta's PSI and Zamanifard's PSEQI delineate these criteria into distinct dimensions, each capturing essential aspects of public space functionality and user satisfaction (Mehta, 2014; Zamanifard et al., 2019). Additionally, Varna & Tiesdell (2010) Star Model introduces meta-dimensions such as ownership, control, civility, physical configuration, and animation, offering a comprehensive framework for benchmarking the publicness of urban spaces. These criteria are operationalized through various indicators and metrics, enabling systematic evaluation and comparison across different public spaces. By leveraging these well-defined criteria, researchers and practitioners can identify strengths and weaknesses in public spaces, facilitating targeted interventions to enhance inclusivity and user satisfaction (Alwah et al., 2021; Anttiroiko & De Jong, 2020; Zamanifard et al., 2019).

Methodological innovations have further advanced the assessment of public space quality. Traditional methods, including observational studies and user surveys, while valuable, often face limitations related to scalability and subjectivity (Creswell & Creswell, 2022; Mehta, 2019). Recent studies have incorporated advanced analytical techniques such as machine learning and semantic segmentation to enhance the accuracy and efficiency of public space evaluations (Nagata et al., 2020; Zhu et al., 2025). For instance, Nagata et al. (2020) utilized semantic segmentation of Google Street View images combined with statistical modeling to objectively score streetscape walkability. Additionally,

integrating participatory methodologies with quantitative tools like PSI and PSEQI can yield richer, more actionable data. The Street Review methodology, as presented in this study, exemplifies such an integrative approach by combining individual interviews, focus groups, and systematic scoring of street images, thereby capturing both qualitative insights and quantitative measures to reflect diverse user perspectives (Bruschi, 2017; Calhoun, 2017; Creswell & Creswell, 2022; de Raadt et al., 2021; Ellis, 1968).

While the PSI, PSEQI, and Star Model provide robust and multidimensional frameworks for evaluating public spaces (Mehta, 2014; Varna & Tiesdell, 2010; Zamanifard et al., 2019), the Street Review method introduced here complements and extends these approaches. In particular, the Street Review foregrounds a participatory process wherein evaluators co-define criteria through interviews and focus groups. This allows for the incorporation of localized and context-specific descriptors that may be absent from the standardized dimensions employed in PSI or PSEQI. Furthermore, the Street Review distinguishes between pre-occupancy and post-occupancy perspectives, offering a structured means to capture evolving perceptions shaped by lived experience. This temporal orientation enables the generation of dynamic, user-informed insights that can be integrated with the more quantitative, observational data typical of existing indices. As such, the Street Review serves as a critical supplement to established assessment tools by introducing an interpretive dimension that reveals how diverse identities engage with and are shaped by the physical environment.

5. Methodological approach

5.1. Diversity sampling

This study employed a multi-phase design—interviews, focus groups, and a structured rating exercise—to understand how Montréal's streetscapes are perceived in terms of inclusivity, accessibility, aesthetics, and practicality (Bryman, 2012; Creswell & Creswell, 2022). Fig. 1 depicts the overall design, illustrating the interrelation of different data collection and analysis steps. The three main components include establishing dimensions, sampling diverse streets, and sampling diverse urban residents.

First, the dimensions for studying streets were established through focus groups and interviews, initially generating over 600 public space adjectives (e.g., impersonnel [impersonal], artificiel [artificial], tout à la voiture [car-centric], chaud-brûlant [hot-boiling], touristique [touristic], limiter la vitesse [speed-limiting], sombre [dark]). Through hierarchical semantic similarity clustering, these adjectives were narrowed down to 35 and subsequently refined into four key criteria (Tong et al., 2007; Yim & Ramdeen, 2015). Second, diverse streets were selected using a diversity sampling matrix based on land use, history, socio-economic factors, density, and pre-occupancy and post-occupancy conditions, resulting in the selection of 20 streets and 60 data points from various parts of the metropolitan region of Montréal (Calhoun, 2017; Kraycheva et al., 2025; Murphy and O'Driscoll, 2021; Ross et al., 2004). Third, 100 community organizations were initially contacted to ensure diverse representation, leading to a final sample of 28 individuals

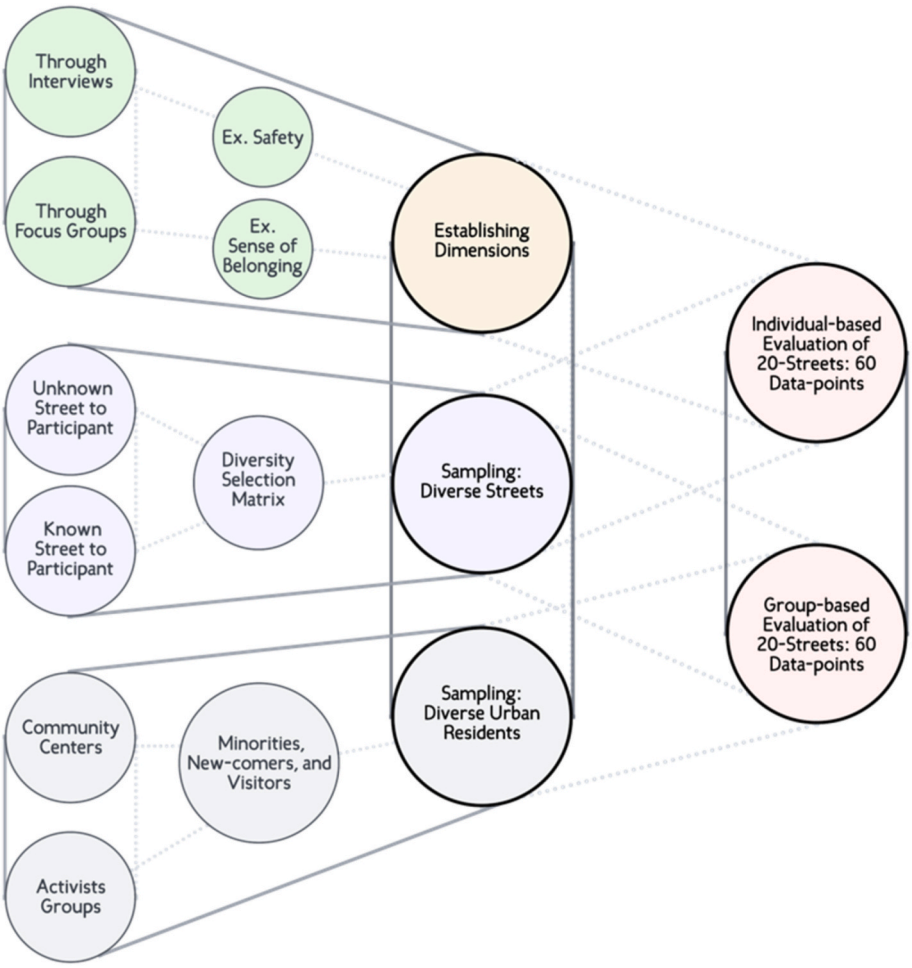

Fig. 1. This diagram shows how the study integrated multiple data collection phases—recruitment, interviews, focus groups, and rating sessions—leading to a comprehensive view of how diverse populations interpret Montréal streets.

for interviews and focus groups and 12 for the rating exercise (Creswell & Creswell, 2022; IRCGM, 2018). Fig. 2 highlights this demographic distribution by cross-referencing identity categories with age groups.

5.2. Participant recruitment

To maximize representativeness, we engaged with over one hundred community organizations in spring–summer 2023, prioritizing those serving seniors, newcomers, persons with disabilities, and LGBTQIA2+ communities (Cooke & Kothari, 2001; IRCGM, 2018; Koseki et al., 2024). This approach included participants from various cultural backgrounds, mobility levels, and social identities (Carmona & Sieh, 2004; Fan et al., 2023). Thirty-five citizens expressed interest in the study, with twenty-eight participating in interviews and focus groups and twelve contributing to the final rating stage. Recruitment targeted long-term residents, newcomers, and suburban visitors who travel downtown infrequently, capturing a wide range of perspectives (Low & Smith, 2005; Talen, 2012). Participants ranged in age from 18 to over 65 and included women, elderly residents, religious or ethnic minorities, newcomers, and LGBTQIA2+ individuals. Fig. 2 presents a chart of self-declared identities by age group.

While the final rating exercise comprised 12 participants, this number was selected to foster deep, iterative conversations that might be less feasible in larger cohorts. The broader recruitment involved 28 participants for interviews and focus groups, ensuring that the final subset reflected a multiplicity of experiences, including gender, mobility, cultural backgrounds, and LGBTQIA2+ identities. The smaller group size allowed us to observe and document how each participant's perspective evolved during group interactions, especially when confronted with viewpoints they had not previously considered (Krueger, 2002). However, we acknowledge that this approach limits broader statistical generalizability; larger samples would yield more robust quantitative inferences and could capture additional demographic variations—particularly teenagers, Indigenous populations, and recent immigrants with language barriers. Future studies can scale up the Street Review framework by incorporating on-site assessments with bigger participant pools to improve representativeness while maintaining the qualitative depth needed to understand intersectional experiences in urban spaces.

5.3. Interviews

Semi-structured interviews were conducted in summer 2023 with 28 participants, each lasting between 40 and 80 min, to examine their experiences using Montréal's public streets (Creswell & Creswell, 2022). By encouraging open reflections on everyday mobility, cultural expressions, and personal memories, these sessions provided an expansive view of urban encounters. Thematic analysis revealed recurring themes such as "safety and functionality," "accessibility and inclusivity," and "community engagement," while also highlighting the pivotal role of "management and the city's responsibility" in linking functional aspects (e.g., design utility, aesthetic value) with broader cultural and historical elements (Braun & Clarke, 2006; Mitrašinović & Mehta, 2021). This interconnection underscores the complexity of evaluating public spaces, where operational features intersect with sociocultural considerations that shape users' sense of belonging and comfort (Low, 2020; Varna & Tiesdell, 2010; Yuval-Davis, 2006).

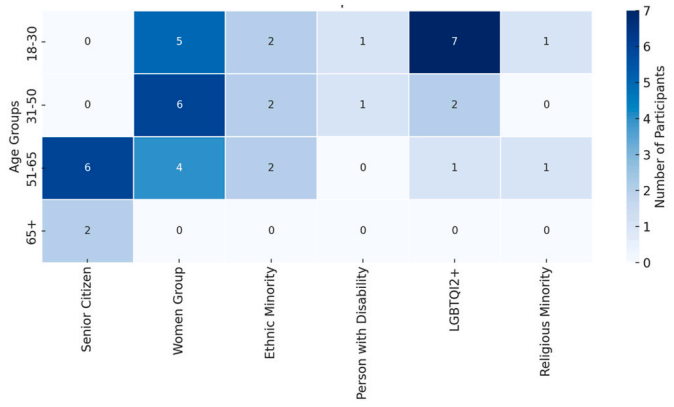

Fig. 2. This chart displays the distribution of participants' self-declared identities, organized by age group. The darker cells indicate a higher number of individuals within specific identity categories, emphasizing the study's inclusive recruitment strategy (Mushkani, Berard, Ammar, & Koseki, 2025).

To deepen the inquiry, Latent Dirichlet Allocation (LDA)—a topic modeling approach developed by Blei et al. (2003)—was applied to the transcribed interviews, identifying underlying topic structures and thematic clusters. The resulting visualizations, generated with Plotly (an open-source Python library) and presented in Fig. 3, illustrate how concepts like safety, usage, appeal, and inclusivity interrelate, highlighting the multifaceted nature of public street use in Montréal. Recurrent references to physical accessibility and cultural openness guided the selection of four principal dimensions: inclusivity, accessibility, aesthetics, and practicality (Mehta, 2014; Varna, 2016; Zamanifard et al., 2019). By merging thematic analysis with LDA, the research team developed a comprehensive framework that accounts for both tangible and intangible influences on urban street evaluations (Braun & Clarke, 2006; Creswell & Creswell, 2022).

Each analytical step built systematically on the previous one. The semi-structured interviews generated an initial set of recurring themes—safety and functionality, accessibility and inclusivity, community engagement, and city responsibility—reflecting participants' direct experiences. We then applied LDA to these interview transcripts to identify deeper connections among the thematic clusters, allowing us to see how words linked together in participants' discussions. These insights were used to refine and consolidate core categories, ensuring that the subsequent focus groups concentrated on dimensions most salient to participants. Thus, the interviews and LDA served as a foundation for the focus groups, which validated and expanded upon the emerging categories, culminating in the four evaluative dimensions used in the final rating exercise. In this way, each method's outcomes directly informed the next, aligning the study's qualitative and quantitative components around consistent thematic anchors.

5.4. Focus groups

Six focus group sessions, each comprising 4–6 participants, were conducted during the summer and autumn of 2023. These sessions built on the interview findings within a group environment (Braun & Clarke, 2006; Krueger, 2002). The images used in these discussions were selected based on the street image selection matrix (Table 1), which covered a range of street types (Abbasi & Pourjafar, 2015; Al-Kodmany, 1999; Biljecki et al., 2023; Mushkani, Berard, Ammar, & Koseki, 2025). Some images aligned with multiple criteria, while others addressed only one. Each cell in the matrix had at least one corresponding image, broadening the conversation by exposing participants to diverse urban conditions (Kraycheva et al., 2025; Talen, 2012; Varna, 2016).

During these sessions, participants wrote down their feelings, impressions, or adjectives on sticky notes while examining the images (Braun & Clarke, 2006; Creswell & Creswell, 2022). This process generated a pool of more than 600 descriptors, which were systematically refined using semantic clustering, lexical similarity analysis, and participant validation (see Figs. 4 and 5) (Majewska et al., 2020; Yim & Ramdeen, 2015). Hierarchical semantic clustering grouped related ideas (e.g., "welcoming," "friendly," "open") into conceptual families; lexical similarity analysis streamlined synonyms, and participant validation confirmed whether merged terms retained essential meanings (Braun & Clarke, 2006; Krueger, 2002; Majewska et al., 2020; Yim & Ramdeen, 2015). As shown in Fig. 4, this iterative approach led to a consolidated

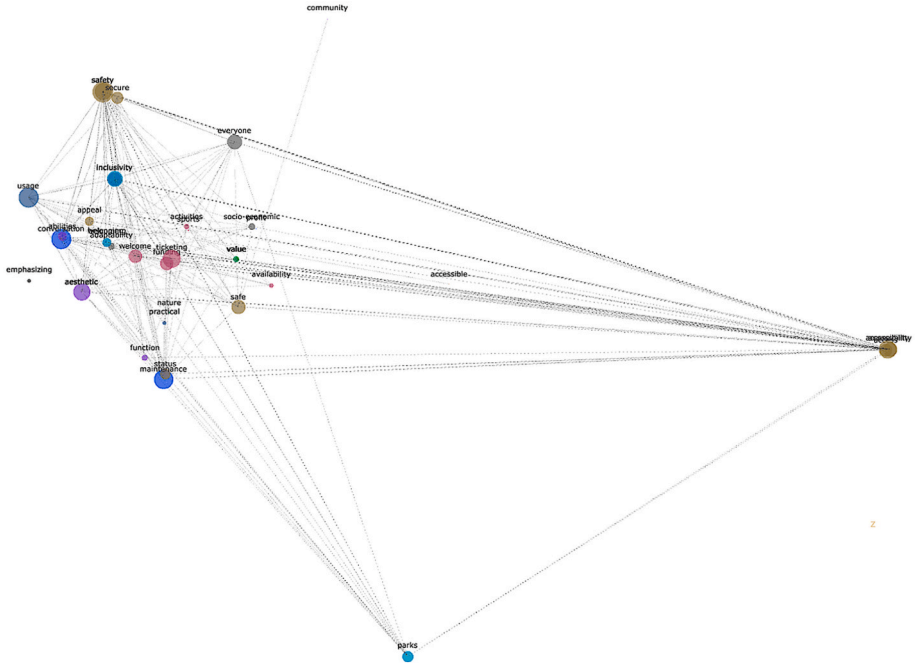

Fig. 3. This network diagram illustrates thematic connections drawn from interview data. Nodes represent the most frequently discussed concepts (e.g., "safety," "inclusivity"), while edges indicate the connections participants made between these concepts in their responses. For instance, an edge linking "safety" and "usage" signifies that interviewees frequently mentioned these ideas together.

Table 1
Street image selection matrix.

Characteristic	Type I	Type II	Type III
Land-use	Predominantly residential	Mixed use	Predominantly commercial
History	Historic neighborhoods (1920s)	Modern neighborhoods (1970s)	Post-modern neighborhoods (2010s)
Urbanization spectrum	Suburban	Urban	City center
Socio-economic status (income)	Low	Medium	High
Density	Low	Medium	High
Space-to-user relationship	Not occupied	Occupied	Well known place
Greenery	Minimal	Moderate	Abundant
Affordance (activities & amenities)	Limited	Basic	Diverse

set of 35 qualifiers, organized into four evaluative dimensions: accessibility, aesthetics, inclusivity, and practicality. Recurrent themes from the literature resonated with participant feedback, reinforcing these final categories (Carmona et al., 2019; Mehta, 2014; Varna & Tiesdell, 2010; Zamanifard et al., 2019). Participants' discussions on their emotional reactions further honed these descriptors into cohesive dimensions, which then guided the subsequent rating exercise on Montréal's public streets (Braun & Clarke, 2006; Creswell & Creswell, 2022).

5.5. Rating exercise

In autumn 2023, participants were presented with 120 images representing 20 different streets. Each street featured 3 points with 2 images per point, resulting in 6 images per street and a total of 60 distinct data points. The selection of these data points was guided by multiple factors summarized in Table 1. This matrix considered land use, historical context, socio-economic status, density, greenery, and other attributes to classify streets as Type I, Type II and Type III (Bondi, 1998; Fan et al., 2023; Gillespie et al., 2022; Ross et al., 2004; Talen, 2012; Varna, 2016; Youngbloom et al., 2023).

To ensure representative sampling, we selected points randomly while deliberately safeguarding variance. Each random point was cross-checked with the matrix to confirm coverage of diverse streetscape attributes. Fig. 6 situates these locations geographically across neighborhoods with varying demographic and economic characteristics (Gehl, 2011; Kraycheva et al., 2025; Litman, 2024; Mushkani, Berard, & Koseki, 2025; Ross et al., 2004; Varna & Tiesdell, 2010; Youngbloom et al., 2023). Fig. 7 presents sample photographs from the final selection, featuring commercial corridors, suburban avenues, and historic blocks.

All participants were asked to rate each image on a four-point scale for inclusivity, accessibility, aesthetics, and practicality. The rating table below details the scoring framework, where "Score 1" denotes low performance on a particular dimension and "Score 4" represents strong performance: Table 2 details the four-point scale.

The scoring rubric for each dimension was developed in collaboration with participants, ensuring that indicators resonated with lived experiences. For inclusivity, participants were explicitly guided to consider: (1) visible acceptance (multilingual or presence of diverse cultural elements); (2) social comfort (whether the space felt safe and open to different gender, age, and ethnic groups); and (3) symbolic affirmation (whether design or signage actively recognized marginalized groups). Accessibility comprised not only physical infrastructure like curb ramps and sidewalk width, but also communication features such as legible crossing signals or wayfinding for non-French speakers. Aesthetics spanned visual harmony, greenery, cleanliness, and the perceived coherence of building facades. Finally, practicality measured day-to-day functionality, including well-maintained sidewalks, seating availability, shelter from weather, and ease of pedestrian movement across vehicular traffic. Each participant assessed the presence or absence of these specific indicators, giving a four-point score for each dimension. This structured yet context-attuned approach balances comparability (via numeric ratings) with qualitative richness (through free-form discussions and participant-driven categories).

During the rating sessions, participants assigned scores

Fig. 4. Word cloud representation of street space perceptions: A visualization of diverse terms (more than 600) describing street environments, capturing sentiments from accessibility and inclusivity to aesthetics and safety.

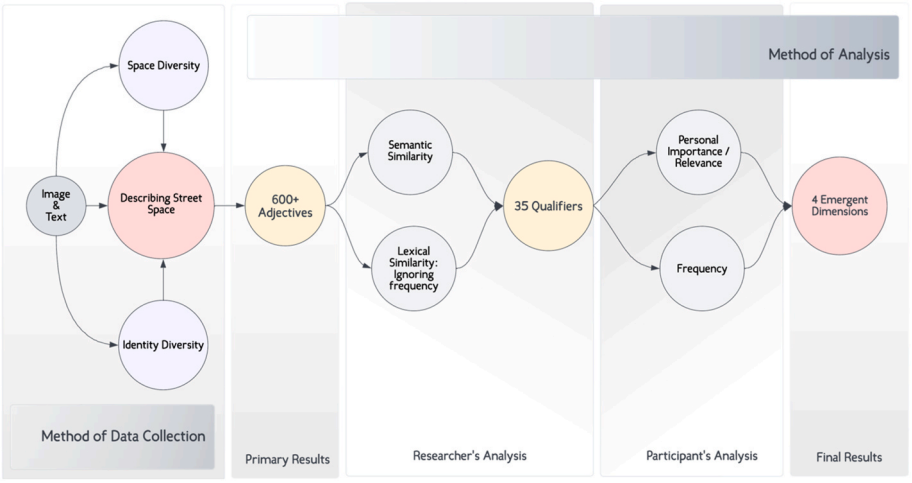

Fig. 5. This flowchart outlines the development of four major assessment dimensions by clustering over 600 initial descriptors into core themes. It reflects the iterative process through which participants' vocabulary was consolidated and refined (Mushkani, Nayak, et al., 2025).

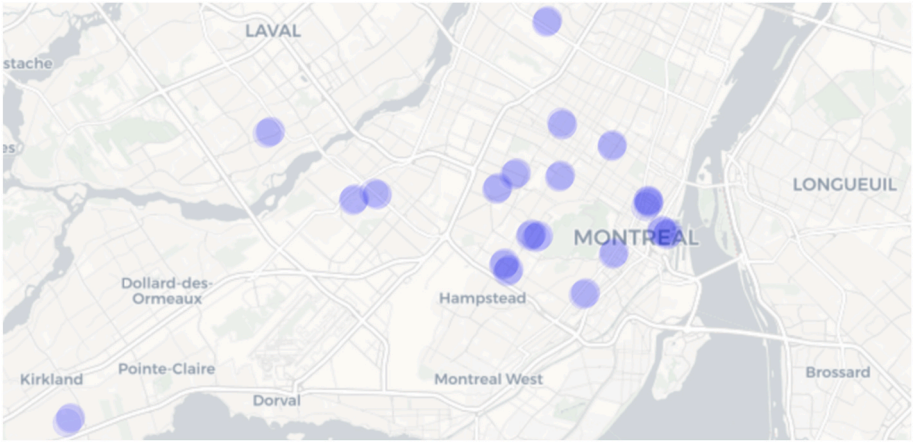

Fig. 6. This map-based figure shows the geographical distribution of selected streets in Montréal, capturing neighborhoods of varying density, age, and socio-economic levels. Each point highlights a location from which photographs were taken for the rating exercise. The base map data is sourced from OpenStreetMap (Mushkani, Berard, & Koseki, 2025).

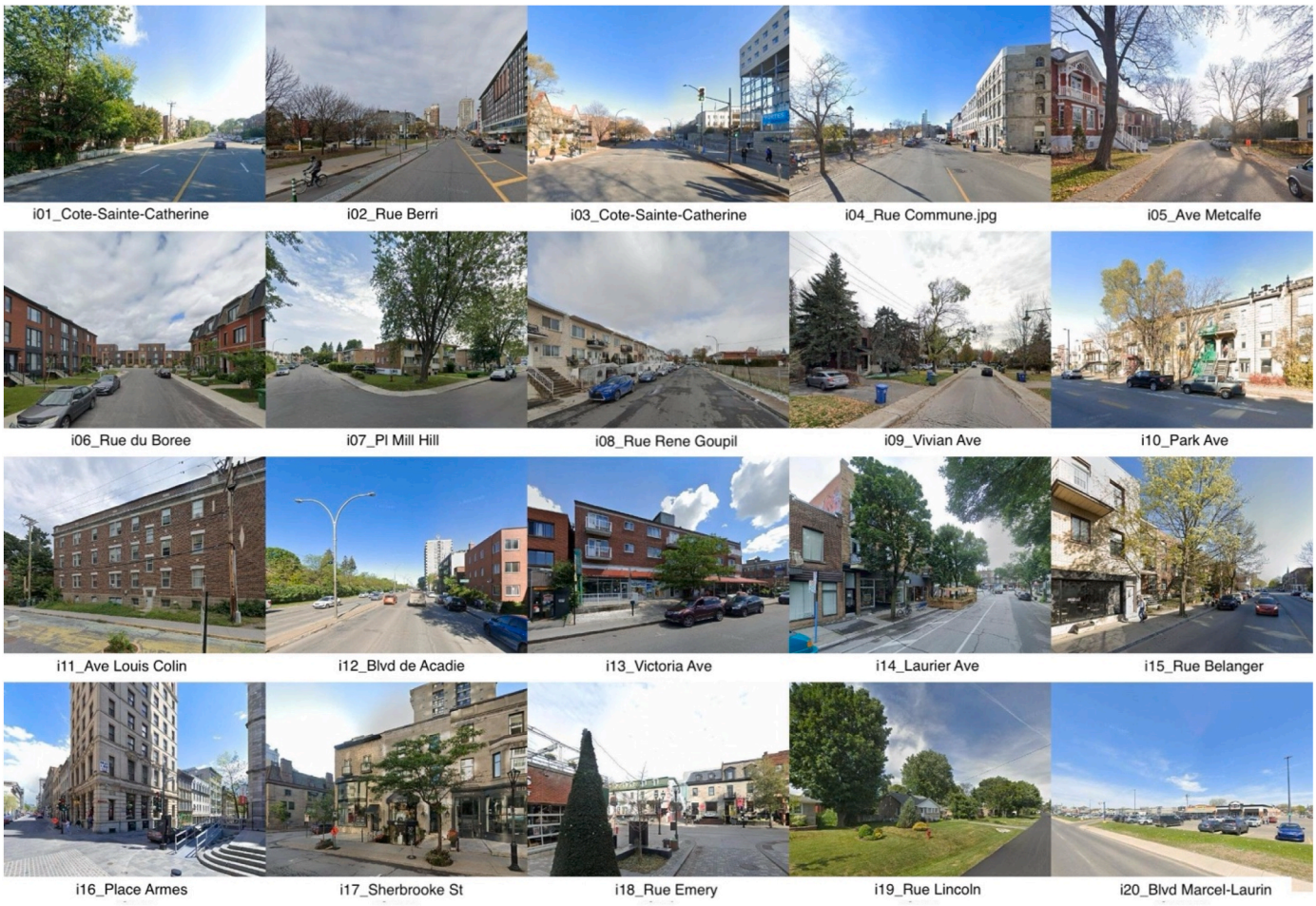

Fig. 7. This figure presents 20 examples of the 120 final images used in the rating exercise. The photographs depict varying building styles, greenery levels, and pedestrian amenities, illustrating a broad spectrum of Montreal's streetscapes (Mushkani, Berard, & Koseki, 2025; Mushkani, Berard, Ammar, & Koseki, 2025).

Table 2
Rating scores.

Dimension	Color	Score 1	Score 2	Score 3	Score 4
Inclusivity	Yellow	Not inclusive or welcoming	Some inclusivity measures present	Broadly welcoming and inclusive	Fully inclusive and welcoming to all
Aesthetics	Green	Poor design and minimal greenery	Basic design with limited greenery	Appealing design with abundant greenery	Highly attractive with rich, diverse greenery
Practicality	Red	Non-functional and poorly maintained	Barely functional, maintenance lacking	Adequately functional with regular upkeep	Highly functional with proactive maintenance
Accessibility	Blue	Inaccessible	Limited accessibility	Generally accessible, some difficult areas	Fully accessible for all users

independently and then discussed their perspectives in small groups. These conversations provided qualitative context for why a particular dimension—such as inclusivity—might receive a lower or higher score, revealing how design details, cultural signage, or memories of social experiences shaped participant impressions (Creswell & Creswell, 2022; Krueger, 2002; Mehta, 2014; Mushkani, Berard, & Koseki, 2025; Tong et al., 2007).

5.6. Analysis

Audio recordings and transcripts from the focus groups and rating sessions were assembled for qualitative analysis during summer and autumn 2024 (Krueger, 2002). A thematic approach was employed to organize references to specific design elements, cultural markers, personal safety concerns, and other intangible factors (Braun & Clarke, 2006). Concurrently, the numeric scores from the rating sessions were subjected to descriptive statistical analysis, including measures such as means, standard deviations, and frequency distributions, to summarize participant assessments and identify patterns across the 20 streets (Creswell & Creswell, 2022; Ellis, 1968). Fig. 8 displays an interconnected map of key themes—such as cultural representation, sense of community, and maintenance standards—indicating how various concerns converged or diverged for different groups of participants.

Close examination of the transcripts, focus group notes, and rating data revealed where participants identified gaps in practical amenities (e.g., sidewalks, seating) or inclusivity measures (e.g., signage in multiple languages) (Alwah et al., 2021; Bruschi, 2017; Qiu et al., 2021). This approach aligns with the study's intent to incorporate the viewpoints of both long-standing residents and those less familiar with the city (Creswell & Creswell, 2022; Talen, 2012). It also situates the

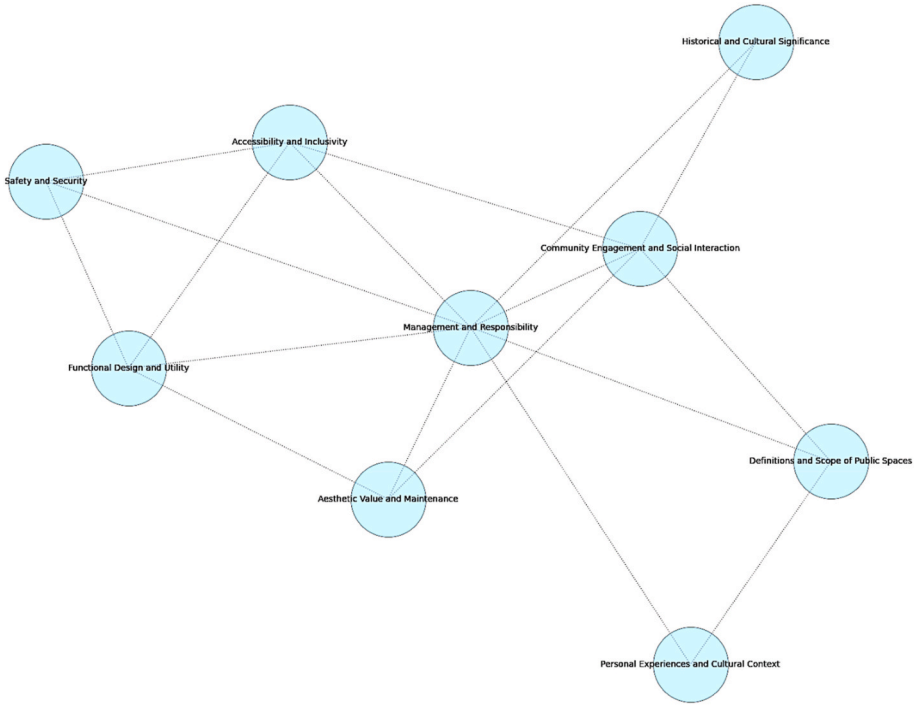

Fig. 8. This thematic map highlights the interconnectedness of identified concerns, including cultural representation, maintenance, and accessibility. It underscores how user perceptions cut across multiple urban design dimensions.

findings within broader debates about inclusive design, especially in multicultural or tourist-intensive urban contexts (Anttiroiko & De Jong, 2020; Broderick, 2022; Ginting et al., 2018; Low, 2020; Sennett, 2018).

Overall, Fig. 1 portrays how these components—participant recruitment, interviews, focus groups, and the structured rating—interact in a single framework. Many participants suggested that public spaces can only be truly welcoming if they recognize a spectrum of identities and lifestyles, an observation consistent with insights from other urban studies (Dhasmana et al., 2022, pp. 221–226; Johnson & Miles, 2014; Koseki et al., 2024; Li et al., 2022; Varna & Tiesdell, 2010; Zamanifard et al., 2019). While certain Montréal streets scored favorably for greenery or aesthetic vibrancy, their ability to signal cultural

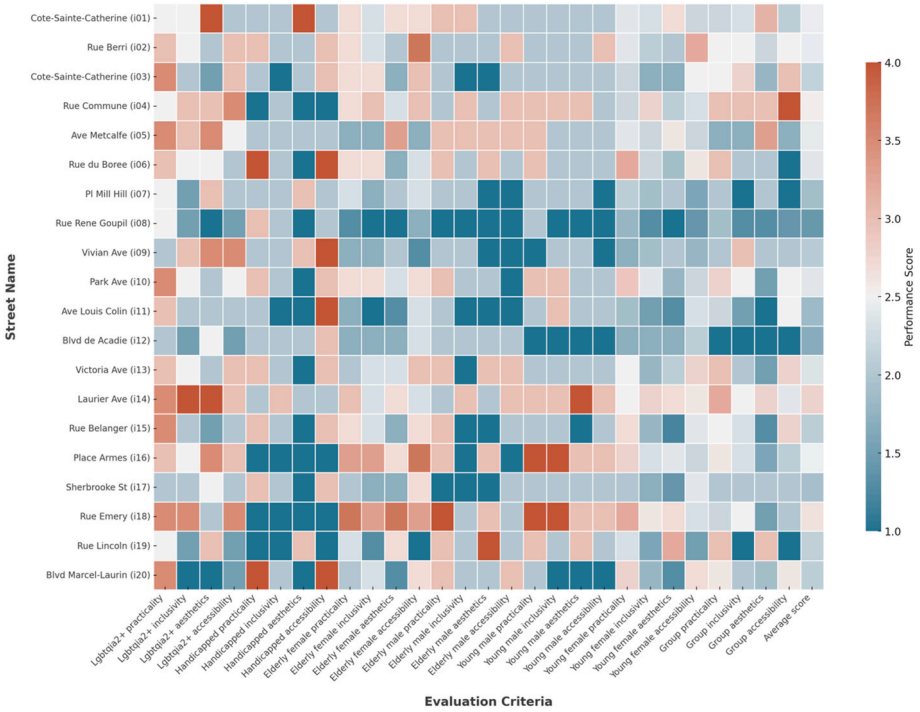

Fig. 9. Heatmap displaying aggregated performance scores across four evaluation dimensions for the 20 streets, segmented by demographic categories. A gradient from blue (low) to red (high) highlights divergent perceptions among different user groups, illustrating how some streets uniformly rate well while others show wide variations in inclusivity or practicality (Mushkani, Berard, & Koseki, 2025).

warmth or everyday functionality varied. These observations indicate that thoughtful design interventions and policy measures may be required to foster streetscapes that accommodate a more diverse user base (Low, 2020; Mehta, 2014).

6. Results

6.1. Diversity and dimensions

After participants completed their initial individual scoring of the 60 city spots, the study conducted a round of group-based evaluations. Although quantitative correlation measures were computed to gauge alignment, the discussion component provided a richer understanding of how certain locations triggered consensus while others elicited divergent viewpoints (Krueger, 2002). The four focal criteria—accessibility, aesthetics, inclusivity, and practicality—yielded varying degrees of consistency across both individual and group assessments.

Fig. 9 provides a heatmap depicting how each of the 20 selected streets performed along these dimensions, as rated by different demographic groups. The rows represent individual streets, and the columns reflect evaluation categories for groups such as "LGBTQIA2+ Inclusivity" or "Elderly Male Accessibility," among others. The color gradients help visualize where participant scores converged or diverged significantly.

During the rating process, several participants noted the existence of "non-spaces"—areas that are nominally public yet lack design features that encourage people to linger. As one participant observed: *"We have a lot of 'non-spaces'—like empty patches of grass or metro corridors. They're technically public, but no one really wants to stay there. The design doesn't invite you to sit, and there's often no sense of welcome. People only end up there if they have nowhere else to go"* (Participant 11, Rating Exercise). This observation underscores how the absence of seating, amenities, or inclusive design elements can diminish the perceived inclusivity and practicality of otherwise accessible spaces.

In the domain of accessibility, many participants spoke about physical infrastructure: the condition of sidewalks, the availability of curb cuts or ramps, the visibility of crossing signals, and the extent to which sidewalks appeared wide enough for two people to pass comfortably. Individuals using strollers or wheelchairs found potential barriers—like blocked curb ramps—especially salient (Mehta, 2014; Varna & Tiesdell, 2010; Zamanifard et al., 2019). Suburban visitors, who lacked day-to-day familiarity with certain neighborhoods, often based their scores on easily visible signals of safety, such as conspicuous crossing lights or protective buffers between vehicles and pedestrians (Mehta, 2019). Group conversations led to moderate agreement in several cases, reflecting how some initially overlooked issues became more evident once brought to the group's attention (Forsyth, 2014). These trends are consistent with Figs. 10 and 11, which show moderate positive correlations between accessibility and inclusivity. In certain demographic breakdowns, however, outliers emerged, highlighting variations in how different groups experienced accessibility challenges (Costanza-Chock, 2020; Mushkani, Berard, & Koseki, 2025; Talen, 2012).

Aesthetics evoked references to greenery, building upkeep, facade harmony, and overall cleanliness. Some focus groups reached high levels of consensus when images displayed well-landscaped streets with appealing furniture or cohesive architectural styles. In other cases, participants disagreed about whether a location that seemed "quiet" or "empty" was calming or uninviting. Fig. 12 reveals that aesthetic scores generally fell into moderate ranges, though some participants placed greater emphasis on visual vibrancy, resulting in scattered higher or lower scores. Notably, the correlation matrices (Figs. 10 and 11) indicate a weaker association between aesthetics and other criteria, suggesting that perceived visual appeal may not align straightforwardly with physical functionality or inclusiveness (Biljecki et al., 2023; Mehta, 2014; Varna, 2016).

Figs. 10 and 11 provide visual correlations among the four

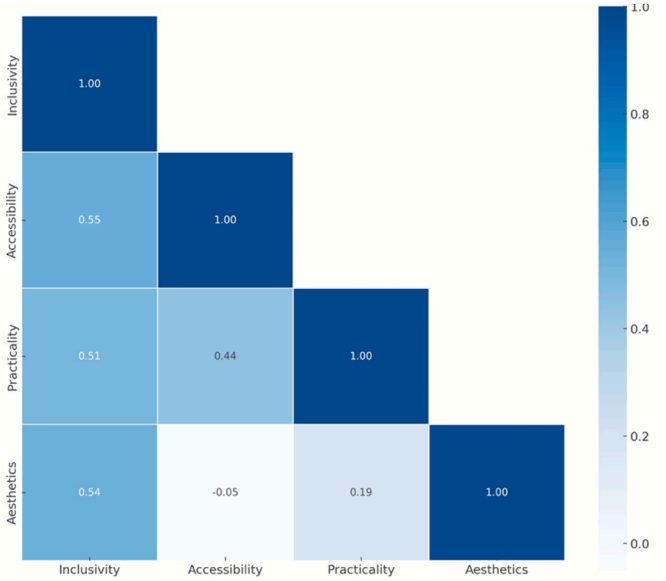

Fig. 10. This matrix presents the relationships between inclusivity, accessibility, aesthetics, and practicality. Darker blue squares correspond to stronger positive correlations, illustrating where dimensions tend to move in tandem. Lighter squares indicate weaker or near-zero correlations.

criteria—accessibility, inclusivity, aesthetics, and practicality—and between specific demographic subgroups. Strong positive correlations (darker cells) suggest that improvements in one domain (e.g., accessibility) often coincide with gains in another (e.g., practicality), likely reflecting well-maintained infrastructures that simultaneously enhance walkability and everyday utility. By contrast, near-zero or negative correlations indicate latent tensions; for instance, a highly aesthetic street might still feel unsafe to certain user groups if it lacks accessibility elements. This finding highlights how physical beautification efforts, while valuable, do not inherently translate to higher accessibility. The correlation matrices thus reinforce the importance of integrated design strategies—i.e., addressing multiple street attributes in concert rather than optimizing isolated features. Where subgroups show divergent correlation patterns, it suggests that intersectional identities can significantly affect how dimensions of street quality interact, underscoring the need for nuanced policy approaches (Mushkani, Berard, & Koseki, 2025).

Inclusivity generated the most divergent viewpoints and extended discussions. Some participants highlighted subtle signs—such as bilingual or multilingual signage, rainbow flags, or culturally specific decorative elements—as evidence of openness. Others considered intangible dynamics: whether the environment felt safe for older adults, visible minority groups, or individuals identifying as LGBTQIA2+. These differences are apparent in Fig. 13, where certain groups (e.g., "Young Male," "LGBTQIA2+") exhibit wide variability in ratings, pointing to diverse internal experiences even within the same demographic. Group deliberations affirmed that inclusivity hinges on multiple interpretive layers—tangible (e.g., signage) and symbolic (e.g., local histories of policing). Comments from newcomers underscored that immediate sensory impressions (e.g., no visible hostility, a few diverse signs) often shaped their ratings, whereas long-term dwellers referenced deeper local knowledge, resulting in lower correlations for inclusivity when aggregated at a group level (Costanza-Chock, 2020; Crenshaw, 1997; Lefebvre, 1992).

The variability in inclusivity ratings was most pronounced when considering intersectional identities. Older LGBTQIA2+ participants, for instance, drew on experiences of subtle or overt discrimination in public spaces, detecting exclusionary signals (or the absence of welcoming ones) that younger participants or those outside the LGBTQIA2+

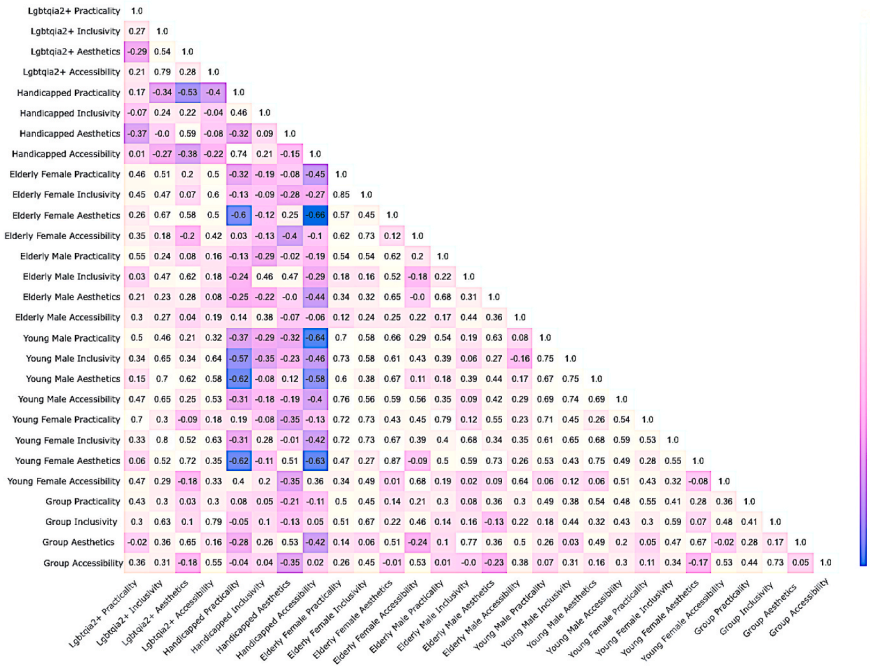

Fig. 11. A more granular correlation matrix highlighting differences in how specific demographic groups prioritize the four criteria. Negative values (darker blue squares) reflect potential tensions (e.g., elderly female aesthetics and young male practicality vs. handicapped accessibility), while moderate positives illustrate domains of convergence (e.g., young male inclusivity vs. elderly female practicality) (Mushkani, Berard, & Koseki, 2025).

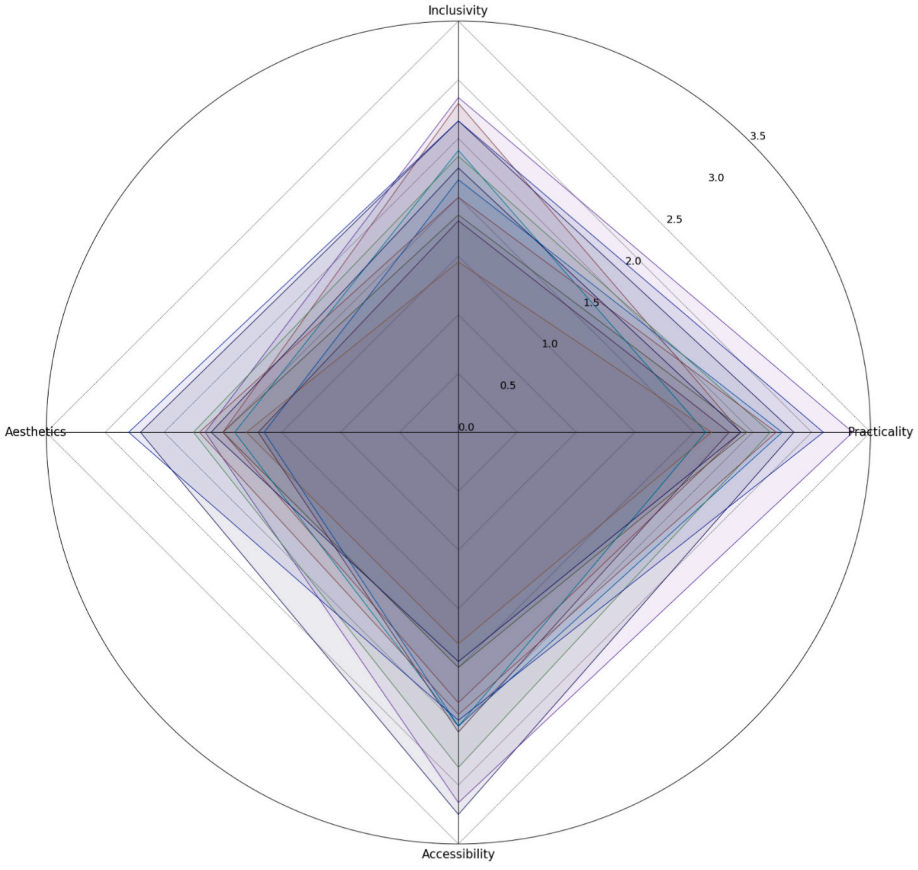

Fig. 12. A chart depicting how major demographic groups rate each dimension, with axes for accessibility, inclusivity, practicality, and aesthetics. Score lines that stretch farther outward indicate higher valuations of a criterion, visually revealing disparities in priorities.

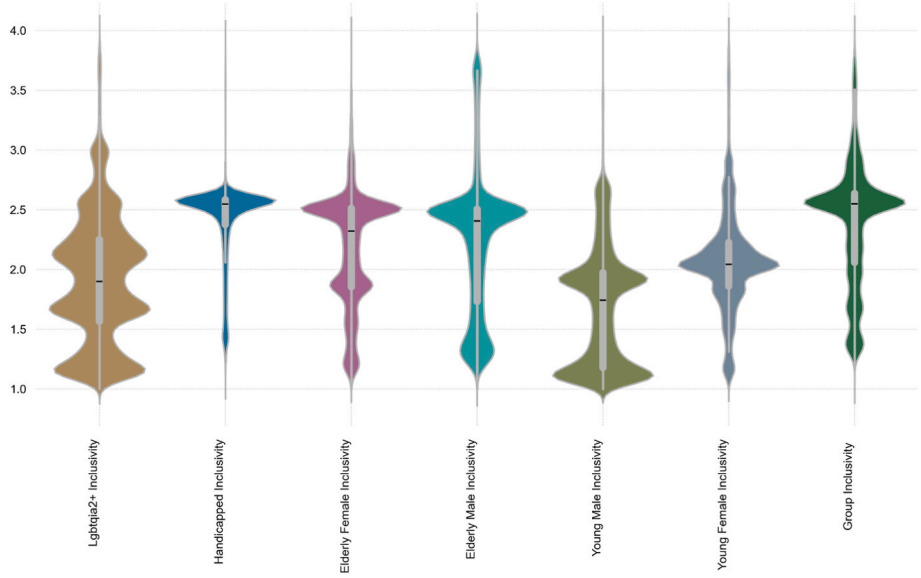

Fig. 13. This plot illustrates the distribution of inclusivity ratings across different demographic segments. Wider shapes point to greater variability within a group, highlighting the multifaceted nature of perceived openness and symbolic acceptance (Mushkani, Berard, & Koseki, 2025).

community might not notice. Similarly, individuals who navigate the city in wheelchairs noted that accessible ramps do not necessarily guarantee cultural acceptance—some streets might be physically navigable but psychologically unwelcoming if bystanders display stigmatizing behavior. These layered realities underscore how various identity markers converge to shape perceptions, illustrating that inclusivity cannot be reduced to a single policy intervention. Instead, it requires multidimensional strategies that address both physical design and sociocultural recognition.

Practicality examined basic daily utilities: ease of movement, protection from harsh weather, availability of seating or rest stops, proximity to public transit, and access to essential services. Participants with mobility requirements frequently assigned lower practicality scores if vantage points lacked protective awnings or seating (Mehta, 2014; Varna, 2016). Certain busy commercial strips drew criticism for offering minimal rest infrastructure, whereas narrow side streets sometimes fared better if they had little vehicle congestion and safe crossing zones. Fig. 9's heatmap shows moderate to high practicality scores for several vantage points in residential or mixed-use settings, matching other findings from the rating exercise that indicated general alignment once group members compared their practical needs (Francis, 2003; Mehta, 2014).

Overall, as these discussions evolved, group evaluations sometimes reconciled disparate scores—particularly in accessibility—when participants learned about barriers that they had not initially noticed. By contrast, personal histories or cultural positions often introduced persistent divergences in inclusivity assessments. The dendrogram in Fig. 14 further illustrates how the 12 participants in the rating exercise, sharing similar demographics or life experiences, clustered together. This clustering indicates parallel concerns about inclusivity or accessibility among these groups. These patterns are consistent with research demonstrating that inclusive design must contend with varied intersectional identities (Anttiroiko & De Jong, 2020; Costanza-Chock, 2020; Crenshaw, 1997).

6.2. *Performance of selected streets*

The study's 20 chosen streets were distributed across multiple boroughs, each subdivided into three vantage points, and each vantage point illustrated by two images. From these collective scores, an overall

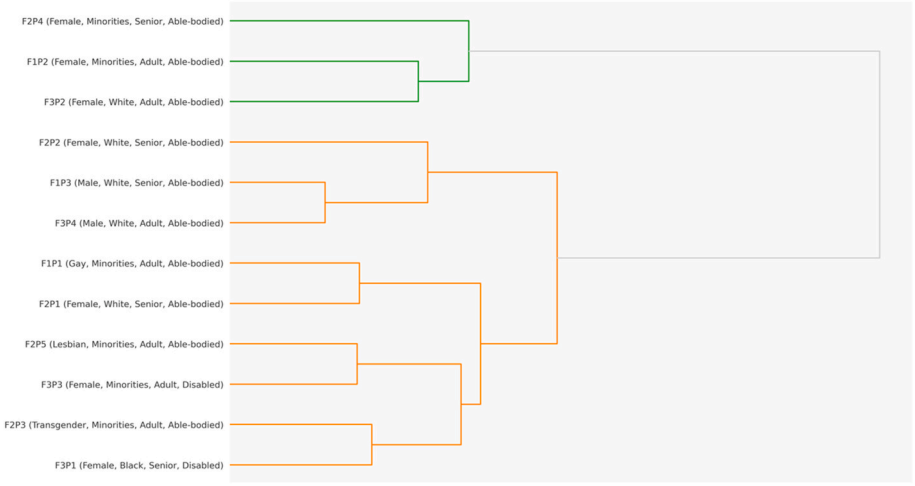

Fig. 14. A hierarchical diagram grouping participants with similar scoring patterns by demographic attributes. Clusters often show that individuals with parallel life experiences (e.g., female, minorities, LGBTQIA2+) share convergent perspectives on inclusive design.

rating was derived for each street. Most fell into an "average" category—performing adequately in some domains yet leaving notable gaps in others. Fig. 9 confirms this trend, with predominantly mid-level color gradients signaling moderate results (Kraycheva et al., 2025).

Some streets emerged as underperformers. Rue René Goupil, located in the Saint-Leonard borough and constructed in 1990, consistently scored low in both inclusivity and aesthetics. Although physically navigable to a point, participants described it as unwelcoming, placing it among the "poor" outcomes. Similarly, Boulevard de l'Acadie was cited for limited cultural openness and minimal appealing features, especially by older adults or immigrants, who described it as visually hostile. A newcomer from Saguenay (a city in northern Québec, Canada) observed stark contrasts in wealth and user experience along Boulevard de l'Acadie, noting that a green barrier separates affluent neighborhoods from poorer ones, such as Mount Royal from Park-Extension. This highlights social inequalities that local residents often accept as "normal." Conversely, Rue du Boree, constructed in 2012 and located in Bois-Franc—a residential neighborhood in the borough of Saint-Laurent—performed strongly in practicality (near 4.0 for disabled users) but was criticized by LGBTQIA2+ participants for a lack of cultural or aesthetic signals of acceptance (Costanza-Chock, 2020; Lefebvre, 1992; Logan et al., 2004; Rayside, 2021; Salesses et al., 2013; Stenou, 1998).

The comparative perspective also illustrated that a few streets, such as Laurier Avenue, approached "good" ratings in certain domains (e.g., aesthetics). Yet participants disagreed on whether it fully met the needs of those preferring quieter environments or specialized amenities. Park Avenue received moderate ratings across practicality and aesthetics, but concerns emerged around limited signage and crossing intervals. In sum, no street scored unambiguously "good" for every subgroup. This aligns with Figs. 10 and 11, which show moderate to weak correlations among the criteria, hinting that a street can excel in one dimension (e.g., accessibility) while falling short in others (e.g., inclusivity) (Kraycheva et al., 2025; Lefebvre, 1992; Youngbloom et al., 2023; Zamanifard et al., 2018).

6.3. Pre-occupancy versus post-occupancy

A key feature of this study lies in contrasting newcomers' or suburban visitors' "pre-occupancy" impressions against the "post-occupancy" perspectives of longer-term residents. Participants who lacked familiarity with certain boroughs often rated them based on immediate visual cues—clear signage, open spaces, or visible diversity. Fig. 11 underscores that their inclusivity scores sometimes weakly intersected with practicality, as ephemeral impressions rarely accounted for hidden amenities or social tensions. By contrast, locals remembered disruptive construction, inconsistent upkeep, or profiling incidents that lowered their evaluations of accessibility or inclusivity (Costanza-Chock, 2020; Low, 2020; Mushkani, Berard, & Koseki, 2025; Sennett, 2018; Stenou, 1998). To clarify these differences, Table 3 juxtaposes priorities often emphasized by newcomers with those foregrounded by experienced residents.

Table 3
Contrasting pre-occupancy and post-occupancy orientations.

Dimension	Pre-occupancy (newcomers)	Post-occupancy (long-term residents)
Overall orientation	Bases judgments on immediate visuals, such as signage, crowd density, and apparent order.	Draws on accumulated local knowledge, including past policing practices, maintenance patterns, and socio-spatial disparities.
Inclusivity	Focuses on visible markers of openness.	Considers historical instances of discrimination and subtle signals of marginalization.
Accessibility	Emphasizes readily observable elements, such as crossing lights, and basic sidewalk width.	Evaluates recurring infrastructure concerns, factoring in longer-term reliability of accessible routes.
Aesthetics	Values landscaping and overall cleanliness, often forming impressions from brief observations.	Reflects on the evolution of design interventions, identifying long-standing neglect behind surface-level beautification.
Practicality	Prioritizes clear layout and basic amenities that are immediately visible.	Weighs day-to-day usability across varying conditions to judge sustained practicality.

A vivid example involved a vantage point near Avenue Metcalfe: newcomers praised its open layout and vibrant ambiance, awarding high marks for both aesthetics and inclusivity, whereas a longtime resident recalled the deep urban inequalities and the exclusive nature of the Westmount neighborhood, where the street is located, awarding a notably lower inclusivity score. Other participants, who possessed extensive local knowledge, noted persistent infrastructure issues that hinder true accessibility: *"Sometimes Montreal tries to promote inclusion, but it's superficial. There's always construction and detours, and it feels like there's no coordination for people who actually need ramps or clear sidewalks. You can't really move around if you're in a wheelchair"* (Participant 8, Interview). Their comments suggest that, while newcomers or suburban visitors may offer favorable initial impressions of a streetscape, repeated encounters with uncoordinated construction or difficult detours color the assessments of those more familiar with daily conditions. These divergences highlight the layered knowledge that shapes perception, emphasizing the potential for overly positive assessments from visitors who have not experienced the deeper socio-spatial context (Armstrong & Greene, 2022; Gibbons et al., 1994, pp. 1–192; Giddens, 1984; Laurenson & Collins, 2006; Lefebvre, 1992; Mushkani, Berard, & Koseki, 2025).

6.4. Group dynamics

Structured conversations frequently led to recalibrated scores in domains like accessibility, where physically able participants revised initial ratings after hearing from wheelchair users. The dendrogram in Fig. 14 demonstrates such alignment, clustering individuals with shared priorities or life experiences. By contrast, inclusivity continued to display greater variability across groups, as seen in Fig. 13. Personal histories—ranging from racial incidents to negative responses from other pedestrians—prompted some participants to retain low inclusivity scores, even when the physical environment appeared safe or benign to others (Jian et al., 2020; Piazzoni et al., 2022). These divergences underscore the intersectional complexities that underlie street design, indicating that universal standards are insufficient for truly inclusive urban experiences (Carnemolla et al., 2021; Stenou, 1998; Sylvestre, 2010; Zhao et al., 2023).

One participant recounted experiences of selective enforcement in public spaces, illustrating how deeper social dynamics remained central to group discussions on inclusivity: *"The first discriminatory behavior for me is from the police coming at midnight to kick everybody out, and they don't kick everyone out equally. They definitely target young people making noise, or people drinking, or folks who look homeless. Others get a pass. It's basically legal discrimination"* (Participant 1, Focus Group). Such encounters often led to firm stances on inclusivity scores, as participants who felt targeted were less likely to revise their assessments even when group members highlighted other positive attributes of the same location.

At the quantitative level, moderate-to-high correlations were evident among certain tangible features—particularly between accessibility and practicality—while inclusivity and aesthetics revealed more nuanced patterns (see Figs. 9 and 11). Together, these findings reinforce insights from the methodology regarding the significance of both physical and symbolic dimensions in shaping how individuals perceive urban streets. Although standardized guidelines for physical infrastructure can enhance universal design, more reflexive, context-specific processes are essential for recognizing cultural or identity-based preferences (Banerjee, 2001; Mehta, 2014, 2019; Mushkani, Berard, & Koseki, 2025;

Varna & Tiesdell, 2010; Zamanifard et al., 2019).

Figs. 9 and 13 indicates that group-based evaluations introduced more calibrated and nuanced assessments compared to simply averaging individual evaluations. This underlines the negotiative nature of an inclusive city, where individuals continuously express and negotiate their perceptions. As city planners, tourism officials, and community organizations collaborate on inclusive street initiatives, the Street Review approach demonstrates that combining multiple perspectives—especially those from historically overlooked groups—provides a deeper and more accurate gauge of urban space performance (Francis, 2003; Harvey, 1989; King, 2012; Lund, 2018; Mushkani, Berard, & Koseki, 2025; Piazzoni et al., 2022; Stenou, 1998; Young, 2002; Zamanifard et al., 2018).

7. Limitations

This study has several limitations related to its methodology and sample composition. Reducing over 600 initial street space qualifiers to 35 and then to four dimensions made the analysis manageable but may have excluded subtle aspects of Montréal's streetscapes (Anttiroiko & De Jong, 2020; Mehta, 2014). Additionally, the image-based evaluation approach, while consistent and comparable, cannot fully capture dynamic environmental factors such as noise, odors, or interpersonal interactions that influence real-life user experiences (Gehl & Svarre, 2013; Qian, 2020; Varna, 2016). Furthermore, the small sample size is a significant limitation, as it reduces the statistical power of the findings and may not adequately represent the diversity of Montréal's population. Compounding this issue, Indigenous populations and teenagers were entirely absent from the study, resulting in significant demographic gaps. This lack of representation caused us to miss their input and to account for their social realities and cultural practices, which may differ markedly from those included in the study (Costanza-Chock, 2020; Sen, 2000).

Additionally, capturing street characteristics through few photographs per vantage point cannot represent the varied conditions that may exist from block to block. Streets often exhibit localized differences due to construction, changes in land use, or neighborhood-specific modifications. Consequently, the images provide only a partial glimpse of complex environments. Future research could expand the number of images or incorporate longitudinal walk-through assessments, ensuring a richer depiction of each street's diverse segments.

Another limitation concerns the selection of vantage points for pre-occupancy and post-occupancy profiles. By choosing locations unfamiliar to some participants, the study aimed to obtain objective impressions but missed opportunities to explore personal histories or long-term attachments that could have provided deeper insights into accessibility, inclusivity, aesthetics, and practicality (Carmona, 2021; Talen, 2012). Conversely, not including vantage points familiar to participants limited the ability of local or frequent users to discuss changes in infrastructure and social norms (Low, 2020; Varna & Tiesdell, 2010). For instance, Côte-Sainte-Catherine Street was selected twice to ensure participants were familiar with it before focus groups and rating sessions. This approach was necessary to maintain consistency but may have restricted the diversity of perspectives on this particular street (Talen, 2012).

Furthermore, the study does not claim that different identity groups use space differently solely based on their identities. Instead, it recognizes that individuals have intersecting identities that influence their use of space alongside other factors (Benjamin, 2019; Crenshaw, 1997; Stenou, 1998). This nuanced understanding acknowledges the complexity of how various identities interact to shape experiences in public spaces (Fainstein, 2010; Varna, 2016). Future research should aim for a more bigger and diverse participant pool, incorporate on-site visits to gather real-time environmental feedback, and employ an iterative image selection process that includes both new experiences and established local knowledge to provide a more comprehensive evaluation of public streetscapes (Creswell & Creswell, 2022; Fischer, 2000; Gibbons et al., 1994, pp. 1–192; Sen, 2000; Stenou, 1998).

8. Governance, policy, and adaptability discussion

Municipal governance plays a critical role in shaping inclusivity and accessibility on urban streets (Litman, 2024; Low, 2020; Margier, 2013; Sylvestre, 2010). Borough-level bylaws regarding signage, bench placement, and the installation of wheelchair ramps, for example, directly affect users but are often enforced inconsistently (Margier, 2013). Infrastructural deficits—such as broken sidewalks or irregular crosswalk signals—frequently persist in lower-income or immigrant-majority areas, suggesting that budgetary decisions sometimes prioritize prominent tourist corridors at the expense of underserved neighborhoods (Fainstein, 2010; Litman, 2024; Margier, 2013). Addressing these challenges involves coordinated funding, joint planning processes, and equitable regulations that reduce barriers for diverse groups. Fragmented governance in areas such as bicycle infrastructure or sidewalk expansions was frequently noted by participants. One individual stated: *"I bike everywhere, and I've heard seniors complain about speed. But from my side, construction or narrow bike lanes push me closer to pedestrians. It feels like the city never coordinates these projects"* (Participant 5, Interview).

Participants also observed that seemingly minor urban design details can create significant barriers for individuals using mobility devices. One participant commented: "*Oftentimes in Montreal I'll be walking on the sidewalk, and there just isn't enough room for two people in wheelchairs to pass. You've got trash cans, telephone poles, snowbanks—all pushing you into this narrow path. To be truly inclusive, sidewalks need to be wide enough for everyone"* (Participant 3, Interview). These accounts highlight how policies governing construction permits and street furniture placement directly shape inclusive design. Even well-intended projects can produce unintended consequences if not addressed holistically. A coordinated approach among municipal departments, developers, and community organizations is necessary to integrate core design features—such as bike lanes, accessible sidewalks, seating areas, and curb ramps—into one coherent system. Aligning resources and schedules across agencies, supplemented by insights from underrepresented groups, may enhance both inclusivity and functionality in street environments (Mehta, 2014; Varna & Tiesdell, 2010; Zamanifard et al., 2019).

While this study focuses on Montréal, the Street Review framework can be adapted to various contexts, including cities with different governance structures or more limited economic resources. In mid-sized or less multicultural urban areas, local adaptations might emphasize socio-economic disparities over cultural diversity, allowing residents to specify which aspects of accessibility or practicality they consider most urgent. Larger cities such as Toronto, London, or Berlin could implement the pre-occupancy versus post-occupancy perspective to compare transient visitor assessments with the experiences of long-term residents. In jurisdictions with hybrid governance or informal settlements, adapting Street Review could reveal grassroots perspectives on infrastructure, leading to more equitable and context-sensitive design interventions. In each case, careful calibration of metrics and targeted stakeholder engagement can deepen collective understanding of urban streets as shared spaces (Anttiroiko & De Jong, 2020; Carnemolla et al., 2021; Litman, 2024; Margier, 2013; Sylvestre, 2010).

Despite the study's limited sample, the findings suggest several strategies for improving inclusivity. First, physical upgrades—including better sidewalks, ramps, and crossing signals—can be implemented on a short timeline to alleviate immediate barriers. Second, symbolic and cultural enhancements, such as multilingual wayfinding or culturally representative art, may foster belonging among diverse user groups in the medium term. Third, coordinated governance and consistent maintenance—encompassing crosswalks, lighting, and seating—can address persistent infrastructural issues over the long term, particularly when backed by stable inter-departmental commitments. Finally, regular

community participation in the design process enables sustained feedback from both long-time residents and newcomers. This practice can prevent the oversight of neighborhood-specific issues and incorporate perspectives on safety, cultural identity, and practical convenience. In combination, these efforts can translate the data produced by participatory evaluations like Street Review into tangible improvements that align with the needs of heterogeneous urban populations (Anttiroiko & De Jong, 2020; Beebeejaun, 2017; Biljecki et al., 2023).

9. Concluding reflections

This research examined how 12 participants deployed the Street Review methodology to evaluate 20 Montréal streets through a total of 60 vantage points. By integrating interviews, focus groups, and systematic rating, the approach brought forward how physical design and symbolic recognition intertwine to shape street experiences. Participants commonly noted that while certain streets offer moderate accessibility and aesthetic appeal, they may lack inclusive cultural markers, or vice versa. Consequently, few locations achieved uniformly positive ratings. This underscores the complexity of designing for multiple user groups—a challenge paralleled in multicultural and rapidly urbanizing cities worldwide.

Our results underscore that no single street meets all needs. Among physically disabled participants, for example, wide sidewalks and clear ramps were praised, yet some LGBTQIA2+ respondents felt the same areas offered little cultural or symbolic welcome. Similarly, newcomers sometimes viewed a street favorably if it felt superficially inviting, while longtime residents cited deeper inequalities or memories of conflict. This tension, reflecting local realities, echoes patterns documented in other global metropolises where short-term visitors and long-term dwellers perceive space through different lenses (Armstrong & Greene, 2022; Low, 2020; Sennett, 2018).

Moreover, while this study is situated in Montréal, the Street Review approach can be effectively adapted to urban contexts in developing regions or cities experiencing hybrid governance. In such areas, rapid urbanization, budgetary constraints, and reliance on non-motorized transit often intensify challenges related to accessibility and inclusivity (Watson, 2009). Many informal settlements lack basic infrastructure such as safe sidewalks or clear signage, making participatory audits essential for identifying and addressing localized needs. Adapting Street Review in these contexts might involve collaborating with community-based organizations to conduct walk-through surveys and image-based evaluations that capture context-specific priorities while emphasizing universal criteria like accessibility for people with disabilities. Studies on hybrid governance structures, which navigate between formal and informal planning systems, indicate that inclusive design frameworks can help reduce social inequities by incorporating marginalized perspectives into the co-design of public spaces (Jian et al., 2020; Muchadenyika, 2015). The flexible and participatory methodology of Street Review provides a valuable tool for assessing, improving, and co-creating streetscapes in diverse urban environments worldwide.

Planners, policymakers, and community organizations worldwide may find that adopting a similar Street Review approach can deepen their understanding of street performance. Key steps include systematically identifying vantage points that represent a diverse range of contexts, recruiting participants from historically underrepresented groups, and engaging in repeated feedback loops so that design or policy interventions evolve alongside community input. In cities where tourism and ongoing migration are reshaping urban life, distinguishing between the immediate impressions of newcomers and the embedded experiences of residents is essential to crafting more adaptive and inclusive spaces. These considerations resonate with broader frameworks in inclusive urban design, social sustainability, and global challenges, where acknowledging multiple perspectives increasingly defines equitable policymaking (Harvey, 1989; King, 2012; Lund, 2018; Varna & Tiesdell, 2010).

Looking forward, larger-scale or cross-regional implementations of Street Review can accelerate the conversation, building a global evidence base of how intersectional user needs manifest in public streets. By intertwining post-occupancy and pre-occupancy insights, the methodology reveals subtle nuances often missed by one-size-fits-all approaches. Crucially, the negotiation of scores in group settings demonstrates the potential for constructive dialogue that can empower communities to critique and co-create their urban environments. It is in these collective processes—not merely in the metrics themselves—that we find the most promising directions for shaping streets that truly foster both functional accessibility and cultural belonging. Through context-specific yet broadly comparable findings, this study contributes to ongoing international dialogues on how best to design and govern urban streets in ways that meet the needs of diverse, mobile, and evolving populations.

CRediT authorship contribution statement

Rashid Mushkani: Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Shin Koseki:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Funding acquisition.

Data availability statement

The datasets generated during the current study are available in a Hugging Face repository: https://huggingface.co/datasets/rsdmu/streetreview.

Ethical statements

This study was approved by the appropriate Research Ethics Committee of the Université de Montréal—Project # 2022-3925.

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Declaration of competing interest

None.

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