

Between pause and pulse: How travel time shapes opt-out preferences in Hong Kong's urban street experiments

Ho-Yin Chan^{1,2,3}, Chloe Lai^{3,4}, Enrica Papa³ and Anthony Chen²

¹ Transport Studies Unit, School of Geography and the Environment, University of Oxford, Oxford, UK

² Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Kowloon, Hong Kong, China

³ School of Architecture and Cities, University of Westminster, London, UK

⁴ Department of Psychology, University of Exeter, Exeter, UK

Abstract

Street experimental interventions are increasingly used to test alternative street functions, yet their impacts on travel time and their trade-offs with aesthetic and social benefits remain poorly quantified, particularly in dense urban environments. Existing approaches rely heavily on qualitative, trial-and-error experimentation, offering limited empirical guidance for intervention design. This study introduces a quantitative framework combining generative artificial intelligence (GenAI) and stated preference modeling to assess public acceptance of street experiments in Hong Kong. GenAI-produced photorealistic visualizations were used in a survey of 150 participants (1,200 observations). A nested logit model was estimated, extending the multinomial logit (MNL) approach by relaxing the Independence of Irrelevant Alternatives (IIA) property inherited from MNL. This structure captures correlated preferences among intervention types while treating the opt-out alternative as a distinct manifestation of status quo bias. Preferences were examined across road types (alleys, pavements, minor, major), temporality (temporary vs. permanent, time of day), intervention forms (bike lanes, shared spaces, pocket parks, outdoor dining), and travel time impacts. Results indicate strong aversion to travel time disruptions, with even minor delays significantly reducing acceptance. Visually appealing, socially vibrant interventions featuring seating and greenery are preferred, while bike-related infrastructure encounters cultural and spatial resistance. Opt-out behavior is particularly pronounced among older adults, residents of high-density areas, individuals with lower educational attainment, and frequent public transport users, reflecting heightened time sensitivity, space constraints, and reliance on existing transit networks. Findings underscore the importance of explicitly modeling opt-out choices and provide a transferable, data-driven framework for designing incremental and socially accepted street experiments suited to high-density Asian cities, thereby advancing the evidence base for tactical urbanism.

Keywords: Urban street experiment; Travel time trade-offs; Generative AI visualizations; Discrete choice experiments; Landscape preference

1. Introduction

Street experiments have gained traction as an innovative urban strategy for reclaiming road space and fostering more inclusive, people-centered environments (Bertolini, 2020; Zhao et al., 2024). Often temporary and tactical in nature, these interventions challenge car-centric planning norms and aim to transform streets into vibrant public spaces (Chan et al., 2025a; Fan and Loo, 2021; Loo, 2021; Vasilev et al., 2022). However, despite their growing popularity, many street experiments still rely heavily on trial-and-error and qualitative assessments, which limit our understanding of their broader impacts and effectiveness. There remains a notable gap in systematic, quantitative approaches to evaluating street experiments, especially in dense, fast-paced cities like Hong Kong where space is contested and time is a critical factor in daily routines. A key challenge lies in balancing the multiple demands placed on streets—as corridors of movement, social spaces, and environmental buffers. Addressing this complexity requires methods that can rigorously analyze trade-offs among diverse design features, including travel time, aesthetics, and socio-cultural context.

To address this gap, this study adopts a stated preference (SP) approach enhanced with AI-generated photorealistic visualizations. This method provides a scalable, data-driven framework for understanding how residents weigh physical, functional, and perceptual attributes when deciding whether to support proposed street interventions. Travel time is explicitly incorporated as an attribute, responding to findings by Salazar-Miranda et al. (2025) that city streets are increasingly perceived as conduits for movement rather than spaces for social connection—a critical factor in contemporary urban design trade-offs.

Generative AI (GenAI) is employed to create realistic images of hypothetical street interventions, helping participants better visualize and evaluate the scenarios presented (Salazar-Miranda et al., 2024; Valença et al., 2025). The survey also includes an opt-out option, reflecting the possibility that residents may prefer no intervention, particularly where resistance to change or temporary disruptions impose high personal costs. Data are analyzed using a nested logit model, which captures the complexity of individual decision-making and hierarchical choice structures. To test model robustness, results are compared with four alternative specifications—mixed logit, multinomial probit, conditional logit, and separate binary logit—each handling opt-out behavior differently. Findings indicate that the nested logit model offers superior fit and interpretability, especially for capturing opt-out choices in the context of temporary or experimental street interventions. By integrating SP methods with GenAI visualizations, this study advances the evaluation of tactical urbanism projects, offering actionable insights for designing street interventions that are both socially accepted and context-sensitive.

2. Literature review

2.1 Evaluation of street experiments

Street experimental interventions—often framed within the concept of tactical urbanism—have become a widely adopted strategy to reimagine urban streetscapes by reallocating space from vehicles to pedestrians and community uses (Smeds and Papa, 2023; VanHoose et al., 2022; VanHoose and Bertolini, 2023; Verhulst et al., 2023; Zhao et al., 2024). These temporary interventions aim to provoke lasting change by challenging conventional planning practices and promoting streets as vibrant, people-oriented environments (Bertolini, 2020; Marcheschi et al., 2022; VanHoose et al., 2022; Zhao et al., 2024). While such initiatives offer the potential to transform built environments, they face notable limitations in design, evaluation, and scalability. A significant challenge lies in the reliance on trial-and-error and qualitative design approaches (Bertolini, 2020; Verlinghieri et al., 2023), which, although useful for local engagement and exploratory insights, often lack the objectivity and scalability required for broader policy application. Quantitative evaluations remain rare—with few exceptions (e.g., Casier et al., 2025; Ceccarelli et al., 2023)—leaving gaps in understanding the measurable impacts of street experiments on mobility, perception, and social interaction. Compounding this is the inherent complexity of balancing competing demands, such as minimizing travel time disruption, improving aesthetic appeal, and fostering social cohesion (Kinigadner et al., 2024; Smeds and Papa, 2023).

While evaluation methods have diversified, a coherent and systematic framework is still lacking. Observational studies and post-intervention surveys offer real-world feedback on behavioral and perceptual changes (Carlson et al., 2019), but they often remain context-bound and lack generalizability. Focus groups provide in-depth understanding of local needs and cultural dynamics (Beyazit et al., 2023), yet their insights are difficult to scale. Similarly, video monitoring captures objective spatial behavior such as pedestrian flow and vehicle interactions (Ceccarelli et al., 2023), but cannot assess subjective preferences or long-term attitudinal shifts. To address these limitations, researchers have turned to virtual simulation tools—including virtual reality (VR) and manipulated images—to replicate street scenarios under controlled conditions (Figueiredo et al., 2025; Patterson et al., 2017; Scerri and Attard, 2023; Swetnam and Korenko, 2019). For instance, while VR can generate immersive experiences and reveal physiological responses (e.g., Nazemi et al., 2025), it often struggles to simulate abstract or cumulative variables such as travel time or social grammar (e.g., Chan et al., 2025b). VR's limitations in representing duration and trade-offs, combined with its high cost and technological barriers, restrict its applicability in large-scale evaluations.

Stated preference (SP) methods provide a more scalable and flexible alternative, particularly when paired with AI-generated visualizations. These methods allow researchers to present structured trade-offs—such as between travel time, safety, and aesthetics—through carefully designed choice experiments. The explicit representation of travel time as a numerical attribute, for example, allows for the quantification of mobility impacts in ways VR cannot. AI-generated images further strengthen SP methods by producing photorealistic, context-specific street scenarios rapidly and at low cost (Dubey et al., 2024; Littlefield, 2022), making them well-

suitable for testing diverse design configurations across large populations. Although VR provides sensory immersion, its dependence on SP to capture intangible preferences highlights SP's comparative advantage for policy-relevant evaluation (Battista and Manaugh, 2019; Herrmann-Lunecke et al., 2021; James et al., 2025; Jin et al., 2025).

Still, traditional visual methods—such as static photographs (Dramstad et al., 2006), image manipulation (Van Cauwenberg et al., 2016), or robotic imaging (Savela et al., 2024)—often fall short in depicting the temporal, conceptual, and interactive nature of street interventions. GenAI has recently emerged as a powerful tool to bridge this gap. Valença et al. (2025) emphasize GenAI's potential to facilitate collaborative design through real-time visualizations but also highlight concerns around image realism and integration into formal planning. Building on this potential, our study leverages GenAI to generate realistic, site-specific images of street interventions that support the design of stated preference choice experiments. This allows participants to engage more meaningfully with hypothetical scenarios and better evaluate trade-offs across physical, functional, and socio-cultural dimensions. In the dense, mobility-driven context of Hong Kong, such an approach enables a more nuanced understanding of public preferences. To address the underexplored use of GenAI in this domain, our study introduces a novel methodological framework combining GenAI-based visualizations with an orthogonal experimental design and nested logit modeling. This integrated approach enhances our ability to assess the effectiveness of temporary interventions in reshaping urban landscapes and supports the development of more inclusive, evidence-based urban planning tools.

2.2 Assessment of landscape and streetscape preferences

Landscape preference assessment has traditionally played a key role in understanding how individuals perceive and value natural and built environments. Image-based methods, such as Likert-scale ratings (Basu et al., 2023; Cai et al., 2022; Dickinson et al., 2024; Gu et al., 2025) and visual selection tasks (Arriaza et al., 2004; Barroso et al., 2012), have long been used to evaluate the aesthetic appeal of various landscapes. These approaches typically focus on features like greenery, scenic beauty, or visual harmony (Daniel, 2001; Frank et al., 2013). While effective in identifying visually attractive attributes, such methods often fall short in capturing the diversity of individual preferences. The reliance on average scores tends to obscure the variation in how different people perceive and value landscapes (Cai et al., 2022; Fan et al., 2023; Schirpke et al., 2019; van Zanten et al., 2016).

To overcome this limitation, discrete choice models have become increasingly prominent. Grounded in Random Utility Theory (Anas, 1983), these models estimate how specific landscape attributes—such as vegetation cover or openness—and respondent characteristics like age or experience influence preferences (Immerzeel et al., 2022; Patterson et al., 2017; Schirpke et al., 2023; van Zanten et al., 2016). For example, van Zanten et al. (2016) mapped the aesthetic values of Dutch agricultural landscapes by linking individual preferences to spatial data, such as livestock presence and land cover type. Similarly, Schirpke et al. (2023) used a photo-based conjoint analysis to evaluate the stability of landscape preferences in the

Central Alps, finding consistency over time but variation across different sets of images, suggesting difficulties in generalizing visual preferences.

Despite their success in rural or natural settings, such models are less commonly applied to urban streetscapes, which present additional complexity due to their multifunctional nature. Streets are not only aesthetic environments but also serve as transport corridors and social spaces. In high-density cities like Hong Kong, streets must simultaneously support mobility, economic activity, and community life (Loo and Fan, 2023; Loo and Zhang, 2024). Unlike traditional landscapes, streetscapes are judged not only on their visual quality but also on functional factors such as travel time, accessibility, and safety, as well as socio-cultural dimensions like inclusivity and vibrancy (Harvey and Aultman-Hall, 2016; Smeds and Papa, 2023).

Recent research has begun to acknowledge this complexity. Talen et al. (2023), for example, used crowdsourced image ratings to explore perceptions of walkability, imageability, and enclosure. While respondents showed strong preferences for certain design features, agreement on what constituted “walkability” remained low, highlighting the subjective nature of such judgments. In a different context, Lesan and Gjerde (2020) combined visual preference surveys with ethnographic fieldwork to investigate how street features influenced social activities among culturally diverse groups in New Zealand. Their findings showed that cultural preferences—such as a tendency among Pacific Islander communities to favor larger seating arrangements—strongly shaped how public space was perceived and used. Similarly, Dubey et al. (2024) demonstrated that AI-generated visuals of car-free urban streets in the U.S. increased public support for sustainable transport interventions by making these changes more tangible and relatable, particularly among politically diverse respondents.

Together, these studies underscore the importance of incorporating functional and socio-cultural considerations alongside visual appeal when assessing streetscapes. However, few existing studies integrate these dimensions holistically, particularly in fast-paced, non-Western urban contexts. In Hong Kong, where streets are critical to both mobility and public life, failing to consider how travel time, cultural norms, and aesthetic factors interact may hinder the effectiveness of design interventions. Addressing this gap requires new methodological approaches that better reflect the realities of complex urban environments.

2.3 The current study

In response to these gaps, the current study adopts a quantitative approach to assess public preferences for streetscape interventions by integrating aesthetic, functional, and socio-cultural dimensions. Special emphasis is placed on travel time, a critical factor in high-density, mobility-oriented cities like Hong Kong. The study uses a stated-preference experiment embedded in a questionnaire survey to collect data on how individuals perceive different street design scenarios. To enhance the realism and relevance of these scenarios, GenAI techniques are used to generate photorealistic visualizations of potential street transformations. These

visuals are grounded in local narratives (Chan, 2024; Smeds and Papa, 2023) and international case studies (Zhao et al., 2024), offering respondents a more immersive way to engage with alternative futures.

An orthogonal experimental design is employed to create diverse combinations of street features, including both visual elements and functional attributes like travel time. One key feature in this design is the inclusion of an opt-out option, allowing respondents to reject both intervention scenarios and choose to maintain the status quo. This reflects real-world decision-making, where residents may resist change or prefer familiar conditions—especially when proposed designs involve trade-offs such as longer travel times or unfamiliar street features. Including the opt-out captures disengagement or resistance, adding depth to the analysis of public support or opposition. To analyze the data, a nested logit model is used. This structure accounts for correlations among choices and reflects the hierarchical nature of decision-making, distinguishing between the initial decision to accept or reject change (opt-out versus opt-in) and the subsequent selection between different design options. **Figure 1** illustrates the nested logit model structure, as well as multinomial and binary logit models for comparison, emphasizing how the opt-out choice is embedded within the model. This approach allows for a nuanced understanding of how different factors—visual appeal, travel time impacts, and cultural or social expectations—shape public preferences for urban interventions.

By combining AI-generated visualizations with discrete choice modeling and an opt-out structure, this study offers a comprehensive method for evaluating streetscape designs in dense, mobility-driven cities. It moves beyond traditional landscape assessment frameworks by addressing the layered and sometimes conflicting expectations placed on urban streets. The findings aim to support more inclusive, responsive, and evidence-based urban planning that reflects the real preferences and constraints experienced by city dwellers in complex environments like Hong Kong.

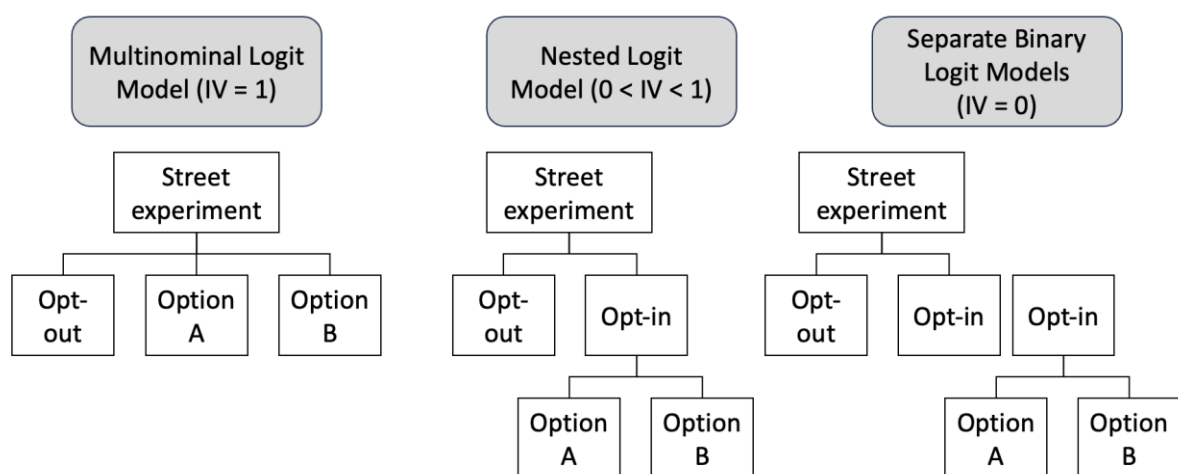
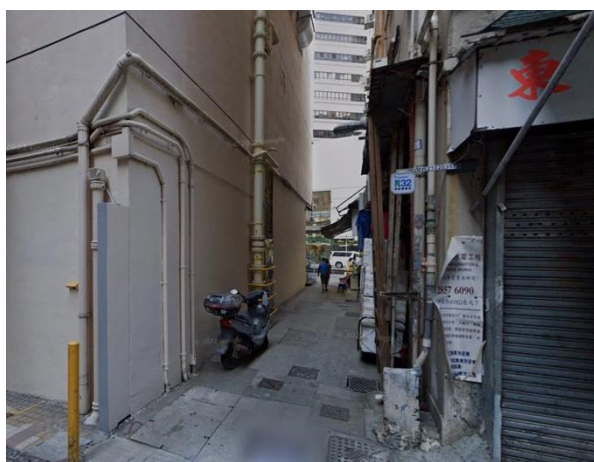


Figure 1 Comparison of discrete choice model structures and the role of the inclusive value (IV) parameter in modeling opt-out behavior

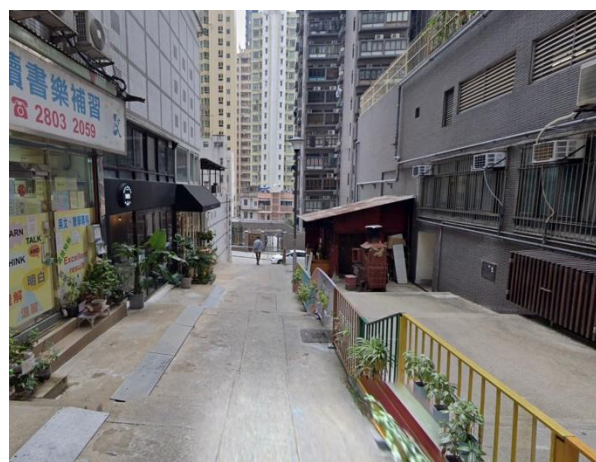
3. Methodology

3.1 Study context

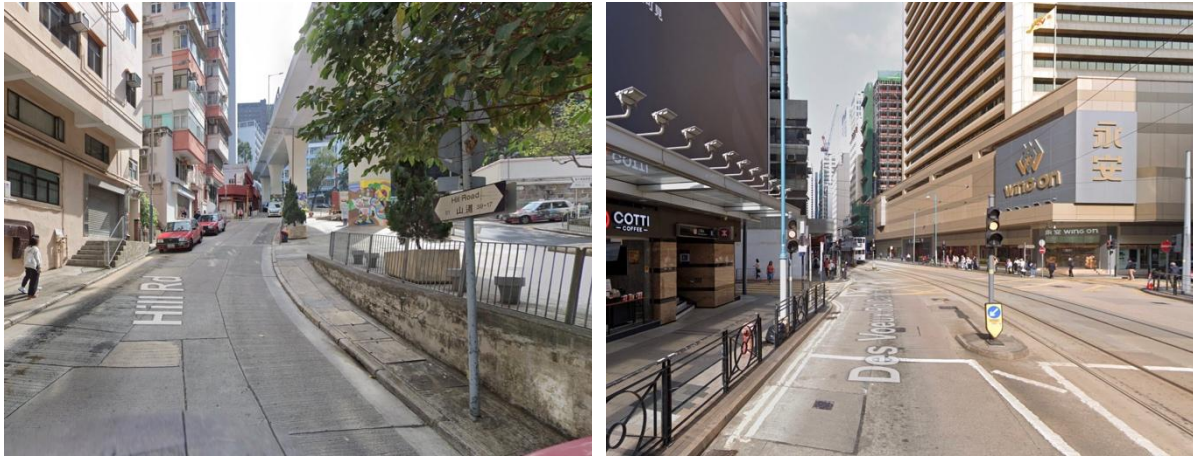
Hong Kong is characterized by its dense urban form and an exceptionally efficient public transport system—including metro, buses, and minibuses—which accounts for over 90% of mechanized travel (HKSARG Transport Department, 2024). Walking also plays a crucial role in daily mobility, particularly for first- and last-mile connections, reinforcing the city’s long-standing focus on vehicle- and transit-oriented development (Xu et al., 2024). Despite a vibrant urban fabric and growing efforts—both grassroots and governmental—to reimagine streets as more than just transport corridors, large-scale transformations in streetscape design remain relatively limited (Chan, 2024; Zhao et al., 2025). This raises important questions about whether existing or proposed interventions genuinely align with public preferences, or whether they are primarily driven by political priorities and top-down agendas (Villani and Talamini, 2023). To highlight the diversity and complexity of Hong Kong’s streetscape (Barber, 2020), **Figure 2** presents representative photos illustrating the city's street hierarchy. This visual guide captures the wide range of street types—from narrow pedestrian alleys to busy arterial roads—underlining the varied conditions under which street design interventions must be applied. These photos are not meant to exhaustively represent all street conditions in Hong Kong, which vary widely due to topography, historical development, and land use, but rather provide a typological framework for the stated preference experiment. By categorizing streets into four types (back alley, pedestrian pavement, minor road, major road), we enable systematic testing of interventions across a range of contexts, with GenAI used to generate photorealistic adaptations that participants imagine in their own neighborhoods. This approach balances generalizability with feasibility, though it may not capture hyper-local nuances such as specific architectural styles or traffic patterns in every sub-region. As Hong Kong continues to balance competing demands between mobility, public engagement, and government-led planning (Chan, 2025a), understanding how people perceive, and value different street environments becomes increasingly vital. Gaining insight into public preferences is essential for shaping inclusive, people-centered, and sustainable urban spaces.



(a) Back alley



(b) Pedestrian pavement



(c) Minor road

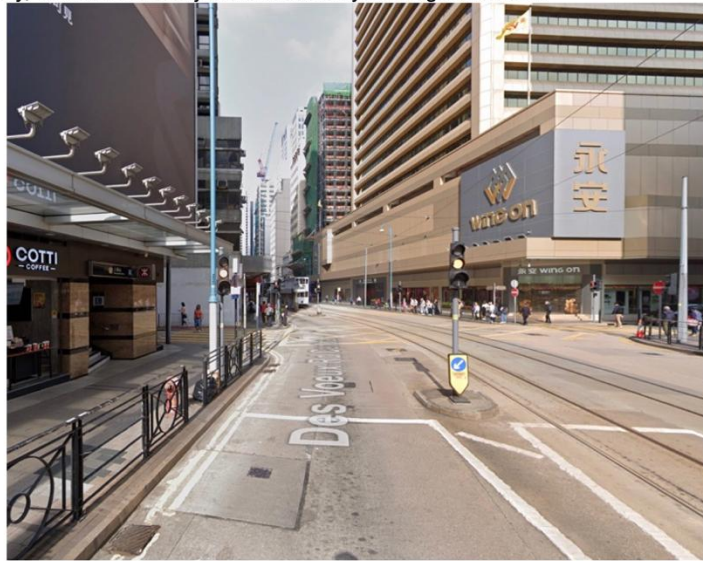
(d) Major road

Figure 2 Street hierarchy in Hong Kong

3.2 Questionnaire design

The questionnaire was structured in three parts to guide participants through both visual evaluation and decision-making tasks related to street design. It began with a brief introduction to typical urban landscapes and examples of street experiments, intended to activate participants' prior experiences and provide context for the upcoming tasks. This framing helped clarify the purpose of the street experiments presented later in the survey. In the first part, participants were asked to assess a series of AI-generated street images based on their visual attractiveness. This photo evaluation helped gauge participants' aesthetic preferences and served as a reference point for later comparisons. The second part involved a stated-choice experiment, where participants evaluated street design scenarios using visual and functional information (**Figure 3**). Participants were asked to imagine a street experiment implemented in their own neighborhood, applied across four different road types (**Figure 2**). This design enables researchers to link participants' responses to specific characteristics of their residential areas—such as land use and population density, based on data from the HKSARG Planning Department (2019). This, in turn, allows for the examination of whether preferences are influenced by the surrounding built environment or regional context. Each choice set included three options: two images depicting different street interventions and a third option labeled “Neither,” allowing participants to opt out if neither design was preferred (Nasar et al., 2015; Patterson et al., 2017; Zhu and Si, 2024). The interventions shown in these images were developed based on a combination of landscape site characteristics and design strategies drawn from previous research on landscape preferences (Cai et al., 2022; Schirpke et al., 2023; Zhu and Si, 2024), as well as a global review of street experiments (Zhao et al., 2024). To account for the functional aspects of street design, travel time was included as a key attribute, reflecting how design changes might affect pedestrian or transit efficiency (Kinigadner et al., 2024; Salazar-Miranda et al., 2025; Smeds and Papa, 2023). Based on the selected landscape and streetscape features, the full set of attributes and their corresponding levels used in the experiment is presented in **Table 1**.

最後，我地來到在你社區嘅一條大馬路。
 Finally, we come to a major traffic road in your neighbourhood.



Road type 地點	Major traffic road 大馬路
Duration 持續時間	1-day 一日
Time slot 時間段	Weekend only 只有假日 (星期六日)

Shared street 共享街道空間	
日常出行時間影響 Impact on daily travel time	+0%
Park and green space 公園和綠地	
	+0%

Figure 3 Example of a choice scenario presented in the questionnaire.

Table 1 Attributes and levels in the discrete choice experiment

Variable	Levels (coding)
Duration	1 day (1)
	1 week (2)
	1 month (3)
	Permanent (4)
Day-of-week	Weekday only (1)
	Weekend only (2)
	All weekdays (3)
Location (Figure 1)	Back alley (1)
	Pedestrian pavement (2)
	Minor traffic road (3)
	Major traffic road (4)
Type of interventions	Outdoor dining and commerce (1)
	Park and greenspace (2)
	Shared street (3)
	Bike accommodation (4)
Travel time impact	0% (1)
	+10% (2)
	+30% (3)

3.3 Survey administration

The online questionnaire survey was conducted between February and April 2024, beginning with a pilot phase designed to test and refine the instrument. The pilot survey yielded 15 valid responses, which were not included in the main survey. These responses provided valuable feedback on several aspects, including the questionnaire’s length, clarity of context, readability of the choice scenarios, and the appropriateness of the selected attributes. Insights from this preliminary round were instrumental in improving the design and finalizing the variable selection for the main study. Following the pilot, the main survey was launched and ran from March to May 2024. A total of 150 valid responses were collected through an online platform, resulting in 1,200 completed choice scenarios (150 respondents × 8 scenarios each).

The sample, summarized in **Table 2**, was recruited through local social media channels that focus on transport updates and innovations in Hong Kong. This approach was chosen for its efficiency and its ability to reach individuals already engaged in urban mobility discussions, ensuring that participants were contextually relevant and likely to provide informed input. The use of a convenience sample is appropriate for this exploratory study (Jager et al., 2017), particularly given its focus on a novel methodology—the use of AI-generated photo visualizations in a stated preference framework. Convenience sampling enables rapid data collection and offers meaningful insights into specific, engaged populations. In this case, targeting transport-aware individuals allowed the study to capture nuanced evaluations of street designs across aesthetic, functional, and socio-cultural dimensions. Moreover, in a city like Hong Kong—where pedestrian activity is intense and social media platforms play an active role in shaping urban discourse—this sampling strategy enhances the relevance and applicability of the findings for informing tactical urbanism and street-level interventions.

Table 2 Social demographics of the convenience sample

Variable	Description	Code	Mean (SD)/Proportion
Gender	Male or female	Male = 1; Female = 0	.620 (.486)
Older	Age	>=40 years old = 1; 15-39 years old = 0	.394 (.291)
Residence	Where do you resident for the recent year?	Hong Kong Island (HK)	.247
		Kowloon (KL)	.289
		New Territories (NT)	.464
ResiDur	How long have you been residing in the mentioned area?	Less than 1 year = 1; 1-3 years = 2; >3 years = 3	2.791 (.502)
Tertiary	Education Level		.873 (.334)
PT pass	Have you possessed a monthly bus/metro pass for the past three months?	Yes = 1; No = 0	.156 (.363)

3.4 Experimental design and attribute

This study employed discrete choice analysis to examine landscape preferences. To construct the choice sets required for this analysis, we adopted an orthogonal experimental design (OED)—a statistical method originally developed by Japanese statistician Genichi Taguchi in

the 1950s. OED enables efficient exploration of relationships among multiple variables at different levels by using orthogonal tables and statistical analysis. It has become widely adopted across various fields including engineering, research, and management due to its ability to identify optimal combinations of factors with a minimal number of experiments (Cai et al., 2022). In a full factorial design, all possible combinations of landscape attributes and expression forms would need to be tested—resulting in 576 combinations in this study. However, such a comprehensive approach is impractical due to the overwhelming workload and time constraints. To overcome this, we used fractional factorial orthogonal design (FFOD)—a commonly applied method in transportation-related discrete choice experiments (Rose and Bliemer, 2009). This allowed us to select a representative subset of combinations that preserve the mathematical orthogonality and balance necessary for valid statistical inference. Using the FFOD approach, we reduced the total number of scenarios to 32 balanced and representative choice sets. These were initially generated using SPSS software (Zhou et al., 2012), which includes built-in modules to create orthogonal arrays based on fractional factorial designs. However, because the experimental attributes had different numbers of levels (e.g., Duration of interventions had four levels, while others had two or three), the software occasionally generated scenarios containing non-existent or illogical levels for attributes with fewer levels. To address this, we manually reviewed and adjusted these cases by replacing invalid levels with valid ones, while preserving the balance and orthogonality of the overall design as much as possible. This design strategy allowed us to retain the essential variability of the full factorial model while focusing on a subset of combinations sufficient to estimate the main effects of each attribute on landscape preferences. The final design reflects a practical balance between statistical rigor and experimental feasibility, supporting robust analysis while minimizing respondent burden (see **Appendix A**).

The experiment used the picture simulation method to display the combination of landscape elements (Cai et al., 2022; Daniel, 2001). This approach leverages DALL-E 2's AI-driven image generation to create speculative urban designs, enabling visualization of diverse urban scenarios based on text prompts and existing photographs. Photos are extracted from Google Street View, and the prompts and tools used to generate images adapted guidelines from Littlefield (2022), which have been adopted in two large-scale studies by Dubey et al. (2024). This method emphasizes iterative design exploration, combining objective urban elements with subjective aesthetic qualities to foster co-creation. This will further be edited to fit into the interventional types of choice scenarios designed by OED. All attribute levels are determined and validated by manual content analysis with >0.9 high intercoder reliability from all authors (**Appendix B**).

3.5 Nested choice model with an opt-out option

To analyze preferences for street experiments while accounting for the real-world tendency to resist change, this study employs a nested logit (NL) model with an opt-out option and compares it with four different models: mixed logit (MXL), multinomial probit (MNP), conditional logit (CL), and Separate Binary Logit (SBL). The nested logit model (Campbell

and Erdem, 2019) is well-suited for capturing hierarchical decision-making processes (**Table 3**), where individuals first decide whether to engage with a street intervention or opt out, and then, if choosing an intervention, select among specific alternatives. The opt-out option reflects the preference for maintaining the status quo, a critical aspect in Hong Kong's mobility-driven context where travel time impacts heavily influence choices.

The nested logit model structures choices into two levels: the upper level (Level 0) represents the decision between selecting any street intervention or opting out, and the lower level (Level 1) includes choices among specific intervention types (e.g., bike, shared space, park, dining). The utility of each choice is modeled based on attributes such as visual score, travel time impact, and socio-demographic factors, as detailed in Table 1. The model accounts for correlations among intervention alternatives within the intervention nest, while the opt-out option is treated as a separate branch to capture distinct behavioral patterns.

The utility for individual n choosing alternative j in nest k (where $k = 1$ for interventions and $k = 0$ for opt-out) is given by:

$$U_{nj} = V_{nj} + \epsilon_{nj} \quad (1)$$

where V_{nj} is the deterministic utility component, and ϵ_{nj} is the random error term assumed to follow a Gumbel distribution. The deterministic utility is expressed as:

$$V_{nj} = \beta' X_{nj} \quad (2)$$

where X_{nj} is a vector of attributes (e.g., travel time impact, visual score, presence of seating) and respondent characteristics (e.g., age, residence duration, characteristics of place of residence (e.g., regions, land use)), and β is a vector of coefficients to be estimated.

The nested logit model assumes that alternatives within the same nest (e.g., intervention types) are more correlated than with the opt-out option. The probability of choosing alternative j in nest k is:

$$P_{nj} = P(j | k) \cdot P(k) \quad (3)$$

where: $P(j|k)$, the conditional probability of choosing alternative j given nest k , is:

$$P(j | k) = \frac{\exp(V_{nj}/\lambda_k)}{\sum_{m \in k} \exp(V_{nm}/\lambda_k)} \quad (4)$$

$P(k)$, the marginal probability of choosing nest k , is:

$$P(k) = \frac{\exp(\lambda_k I_k)}{\sum_l \exp(\lambda_l I_l)} \quad (5)$$

I_k , the inclusive value (logsum) for nest k , is:

$$I_k = \ln \left(\sum_{m \in k} \exp (V_{nm} / \lambda_k) \right) \quad (6)$$

Here, λ_k is the dissimilarity parameter (or IV parameter) for nest k , measuring the degree of correlation among alternatives within the nest ($0 < \lambda_k \leq 1$). $\lambda_k = 1$ indicates no correlation (reducing to a standard logit model), while $\lambda_k < 1$ reflects greater correlation. The dissimilarity parameter confirms significant correlation among intervention alternatives, justifying the nested structure.

For the opt-out option, treated as a single-alternative nest ($k = 0$), the utility includes attributes like travel time impact and demographic factors, reflecting its sensitivity to disruptions and resistance to change. This formulation enables the study to quantify how attributes like travel time impact and visual appeal drive preferences, while the opt-out option captures real-world resistance, particularly among older adults and in scenarios with significant travel disruptions. The nested structure enhances the model's ability to reflect hierarchical decision-making, offering a rigorous framework for designing socially accepted street experiments in Hong Kong.

Table 3 Comparison of choice model specifications for modeling opt-out

Property	Conditional Logit (CL)	Mixed Logit (MXL)	Multinomial Probit (MNP)	Nested Logit (NL)	Separate Binary Logit (SBL)
Model Structure	Single-level model; opt-out treated as one of the alternatives with choice-specific attributes (e.g., cost = 0 for opt-out).	Single-level model; opt-out as an alternative with random coefficients to capture heterogeneity.	Single-level model; opt-out as an alternative, using normal distribution for error terms.	Two-level structure: 1st level (opt-out vs. opt-in), 2nd level (choice 1 vs. choice 2); opt-out in its own nest.	Two separate models: 1st for opt-out vs. opt-in, 2nd for choice 1 vs. choice 2 among opt-in cases.
Opt-Out	Opt-out is modeled as an alternative with fixed attributes (e.g., cost = 0, time = 0).	Opt-out as an alternative; can model heterogeneity in opt-out preferences.	Opt-out as an alternative; similar to logit but with normal errors.	Opt-out in a separate nest, allowing different decision processes for opt-out vs. opt-in.	Opt-out modeled explicitly in a separate binary model, isolating the opt-out decision.
Theoretical Justification	Basic choice models with opt-out as an alternative and homogeneous preferences.	Complex models with heterogeneous preferences and opt-out.	Models needing correlation across alternatives without IIA.	Opt-out as a distinct decision (e.g., change vs. no-change, then streetscape choice).	Simple, separate modeling of opt-out and subsequent choices.
Utility Function	$U_{nij} = \beta' x_{nij} + \epsilon_{nij}$, where x_{nij} are choice-specific attributes (e.g., cost, time) for individual n , alternative j ; ϵ_{nij} is logistic error; opt-out ($j=0$) has fixed attributes (e.g., $x_{n0} = [0,0]$).	$U_{nij} = \beta' x_{nij} + \epsilon_{nij}$, where $\beta_n = \beta + \eta_n$, $\eta_n \sim N(0, \Sigma)$ (random coefficients); x_{nij} are choice-specific attributes; ϵ_{nij} is logistic; opt-out has fixed attributes.	$U_{nij} = \beta' x_{nij} + \epsilon_{nij}$, where $\epsilon_{nij} \sim N(0, \Sigma)$ (multivariate normal); x_{nij} are choice-specific attributes; opt-out has fixed attributes.	$U_{nij} = \beta' x_{nij} + \epsilon_{nij}$, where ϵ_{nij} follows a generalized extreme value distribution; opt-out ($j=0$): $U_{n0} = \beta_0 + \epsilon_{n0}$; opt-in nest includes choices 1 and 2.	1 st model: $U_{n, \text{opt-out}} = \beta' z_n + \epsilon_n$, $U_{n, \text{opt-in}} = 0 + \epsilon_n$ 2 nd model: $U_{n1} = \beta' x_{n1} + \epsilon_{n1}$, $U_{n2} = \beta' x_{n2} + \epsilon_{n2}$ where z_n are individual-specific attributes; x_{nj} are choice-specific attributes; ϵ_n is logistic.
Probability Formula	$P_{nij} = \frac{e^{\beta' x_{nij}}}{\sum_{k=0}^J e^{\beta' x_{nik}}}$ where $j=0$ is opt-out; $j=1, \dots, J$ are alternatives.	$P_{nij} = \int \frac{e^{\beta_n' x_{nij}}}{\sum_{k=0}^J e^{\beta_n' x_{nik}}} f(\beta_n) d\beta_n$ where β_n is random, integrated over distribution $f(\beta_n)$; $j=0$ is opt-out.	$P_{nij} = \int I(\beta' x_{nij} + \epsilon_{nij} > \beta' x_{nik} \forall k \neq j) f(\epsilon_n) d\epsilon_n$ where $\epsilon_n \sim N(0, \Sigma)$; $j=0$ is opt-out; I is an indicator function.	$P_{n0} = \frac{e^{v_{n0}/\lambda_1}}{e^{v_{n0}/\lambda_1} + e^{I_{\text{opt-in}}/\lambda_1}}$ $P_{nj \text{opt-in}} = \frac{e^{\beta' x_{nj}/\lambda_2}}{\sum_{k=1}^2 e^{\beta' x_{nk}/\lambda_2}}$, where $P_{nj} = P_{n, \text{opt-in}} \cdot P_{nj \text{opt-in}}$ $I_{\text{opt-in}} = \lambda_2 \ln \left(\sum_{k=1}^2 e^{\frac{\beta' x_{nk}}{\lambda_2}} \right);$ λ_1, λ_2 are nest scale parameters, $j = 1, 2$ for choices in opt-in nest.	1 st model: $P_{n, \text{opt-out}} = \frac{e^{\beta' z_n}}{1 + e^{\beta' z_n}}$; 2 nd model: $P_{n1 \text{opt-in}} = \frac{e^{\beta' x_{n1}}}{e^{\beta' x_{n1}} + e^{\beta' x_{n2}}}$. Probabilities are computed separately for each model.

Inclusive Value (IV) Range	Fixed at (IV = 1); assumes IIA, no correlation between alternatives (including opt-out).	Not explicitly defined, effectively (IV ≠ 1); random coefficients allow variable correlation.	Not explicitly defined, effectively (IV ≠ 1); correlation via multivariate normal errors.	(0 < IV < 1); indicates correlation within nests.	(IV = 0); separate models imply no correlation or joint estimation.
Preference Heterogeneity	No; assumes homogeneous preferences across individuals.	Yes; allows random coefficients to capture variation in preferences (e.g., different sensitivity to cost).	Yes; captures heterogeneity via multivariate normal errors, but less flexible than mixed logit.	Limited; heterogeneity within nests but assumes similar preferences within each nest.	Limited; heterogeneity modeled separately in each binary model, but no joint estimation.
IIA Property	Yes; assumes Independence of Irrelevant Alternatives, which may bias results if opt-out is correlated with other choices.	No; relaxes IIA through random coefficients, allowing correlation across alternatives.	No; probit does not feature IIA due to normal error structure.	Partially relaxed; IIA holds within nests but not across nests (e.g., opt-out vs. opt-in).	No; separate models avoid IIA by modeling opt-out and choice decisions independently.
Correlation Across Alternatives	No; assumes alternatives (including opt-out) are independent.	Yes; random coefficients allow correlation across alternatives, including opt-out.	Yes; multivariate normal errors allow correlation across alternatives.	Yes; allows correlation within nests (e.g., choice 1 and choice 2 in opt-in nest).	No; separate models treat opt-out and choice decisions independently.
Advantages for Opt-Out	Simple to implement; opt-out treated as another alternative.	Captures heterogeneity in opt-out preferences; flexible for complex choice patterns.	No IIA; captures correlation across alternatives, including opt-out.	Models opt-out as a distinct decision process; relaxes IIA for opt-out vs. opt-in.	Intuitive; separates opt-out decision from choice among alternatives.
Limitations for Opt-Out	IIA may bias results if opt-out is correlated with other choices; no heterogeneity.	Computationally intensive; requires more data for reliable estimation.	Complex estimation; less intuitive for choice-specific attributes.	Requires defining nests correctly; less flexible for heterogeneity.	No joint estimation; may lose information by separating decisions.

4. Results

4.1 Descriptive analysis of rating of AI-generated photos

Krippendorff's Alpha was used to assess inter-rater reliability in the visual perception ratings of AI-generated urban street photos, following the approach of Gu et al. (2025). Ratings were tested using both the original 7-point Likert scale and a simplified 5-point scale, created by collapsing adjacent values—for instance, mapping scores of 5 and 6 into a single category. Results (**Appendix C**) from the 7-point scale showed very low agreement, with Alpha values ranging from -0.0238 to 0.1245 and a median around 0.08. In comparison, the 5-point scale demonstrated a modest improvement, with Alpha values ranging from 0.0492 to 0.2283 and a median of approximately 0.12. Although both scales fall below the generally accepted threshold of 0.2 for minimum reliability, the 5-point scale consistently outperformed the 7-point version. This suggests that reducing the number of response categories mitigates over-differentiation among raters, improving consistency. Supporting this, box plot comparisons (**Appendix D**) showed narrower rating ranges on the 5-point scale—for example, Photo 20 was rated between 1 and 4—whereas the same photo on the 7-point scale ranged from 1 to 6, indicating greater variability.

Further analysis revealed that the presence of specific urban features significantly influenced both rating variability and inter-rater consistency. Among these, seating, vehicle traffic, and bike traffic emerged as the most impactful. For example, the presence of seating significantly affected consistency on the 5-point scale, with both the t-test and Mann-Whitney U test showing results below the 0.01 significance level. A similar, though weaker, effect was observed on the 7-point scale. This suggests that seating evokes subjective interpretations—possibly tied to perceived comfort, attractiveness, or placement—which may increase disagreement among raters. Vehicle traffic also influenced consistency significantly on both scales, likely due to polarized views on its role in urban settings. While some may view cars as necessary components of city life, others may see them as detracting from a street's aesthetic or livability. Bike traffic had a similarly polarizing effect, significantly impacting rating consistency on both scales and increasing rating variability on the 5-point scale. This may reflect divergent perceptions of cycling infrastructure as either a safety issue or a marker of sustainable, people-centered design. In contrast, features such as people, greenery, and bike parking showed no significant effects on inter-rater reliability or rating variability, implying they are either less visually prominent or interpreted more uniformly across participants.

Compared to the findings of Gu et al. (2025), our study reported substantially lower Alpha values, ranging from 0.05 to 0.23 on the 5-point scale. Several methodological differences may explain this discrepancy. First, Gu et al. incorporated rater training to align subjective interpretations and reduce variability, a step our study did not include. The lack of training in our study may have led to greater inconsistency in how participants assessed the images. Second, their image selection process was tightly controlled to ensure uniformity in aspects such as perspective and content, whereas our dataset included photos with considerable variation in content, angle, lighting, and context. Additionally, our images were rated by varying numbers of participants—ranging from 28 to 150—which could have introduced

further noise. Third, while Gu et al. focused on specific attributes like safety, which may have given raters clearer evaluation criteria, our general aesthetic ratings likely left more room for individual interpretation and inconsistency.

A notable difference also emerged in the influence of urban features on rating reliability. While Gu et al. found greenery to significantly improve agreement—likely because it is widely seen as a positive element in urban environments—our study did not observe a similar effect. Greenery had no significant influence on consistency or variability in our data, with a Mann-Whitney U p-value of 0.2366 on the 7-point scale. In contrast, features like seating, vehicle traffic, and bike traffic were far more influential in shaping agreement levels. This suggests that our photo set may have emphasized more dynamic or contested urban features, or that untrained raters were more reactive to immediately visible elements such as movement and street furniture. These findings highlight the importance of context, rater background, and visual focus in shaping the perceived reliability of image-based urban assessments.

4.2 Visual preference of street experiments

As shown in **Table 4**, the nested logit model outperforms the conditional logit, mixed logit, multinomial probit, and separate binary logit models in terms of both AIC/BIC and adjusted rho-squared, indicating the best balance of model fit and parsimony (van der Linden et al., 2025). Additionally, a likelihood ratio test rejects the independence from irrelevant alternatives (IIA) property inherited from the MNL model ($\chi^2 = 32.9864$, $p < 0.001$), further supporting the superiority of the NL model over the standard MNL in capturing the observed choice behavior. The estimated nesting coefficient ($\lambda = 0.285$, $p < 0.001$; $1/\lambda \approx 3.5$) suggests a significant correlation among the opt-in alternatives, validating the use of a nested structure. The empirical analysis that follows is based on the nested logit model (**Table 5**), while a discussion of the comparative model results is presented in the next section.

Table 4 Model fits of the five tested models

Model	Log-Likelihood	AIC	BIC	adj. rho-squared
CL	-1089.864	2231.728	2364.070	0.1733
NL	-1073.3708	2180.742	2267.273	0.1858
MXL	-1072.102	2200.204	2342.726	0.1867
MPL	-1070.2299	2196.46	2338.982	0.1882
SBL				
<i>opt-out/in</i>	-430.58332	887.1666	953.3376	0.1003
<i>opt-in designs</i>	-1354.9868	2719.974	2748.155	0.0567

Across all locations, photo-based attributes significantly drive preferences. The visual score coefficient ($\beta = .419$, $p < 0.01$) indicates that high aesthetic ratings strongly increase experiment preference, crucial in Hong Kong’s visually oriented culture. The presence of people ($\beta = .074$, $p < 0.05$) and seating ($\beta = .069$, $p < 0.1$) further enhance appeal, reflecting demand for vibrant, comfortable spaces (cf. Loo and Fan, 2023). The average time impact coefficient ($\beta = .431$, $p < 0.01$) is positive and significant across all locations, indicating that increased travel time

strongly favors the opt-out. This universal sensitivity underscores the need to minimize disruptions in Hong Kong's fast-paced environment. Bike parking ($\beta = -.070, p < 0.05$) has a statistically significant negative effect on preferences, suggesting visual or spatial concerns (Aldred and Jungnickel, 2013)—particularly in dense urban settings where sidewalk clutter or security issues may deter support (Chan, 2025b; Hurtubia et al., 2021). However, bike traffic and vehicle traffic did not significantly influence preference formation, indicating that the mere presence of movement-related functions is not inherently problematic. This reflects a nuanced distinction in Hong Kong's mobility-driven context, where efficient flow is valued but static, space-consuming infrastructure (such as bike racks) may be perceived as intrusive unless well-integrated. Alleys and pedestrian pavements are ideal for street experiments, particularly with green or social features, as seen in projects like PMQ. Minor and major roads require cautious implementation due to traffic concerns. Aesthetic appeal, social vibrancy, and seating are critical to gaining support, while bike accommodations need compact, safe designs to overcome resistance. Minimizing travel time impacts is essential across all locations to align with Hong Kong's mobility-driven context.



People



Greenery



Seating



Vehicle traffic



Bike parking



Bike traffic

Figure 4 Examples of visual elements in AI-generated photos

4.3 Opt-out preferences

The most significant driver of opt-out preference is average travel time impact ($\beta = 0.431$, $p < 0.01$), indicating that increased travel time strongly increases the likelihood of choosing the opt-out. This reflects Hong Kong's time-sensitive commuter culture, where disruptions to efficiency are a major concern (Chan et al., 2022; Salazar-Miranda et al., 2025). While the choice tasks themselves were presented in a mode-neutral context, this design allows us to observe how people with different travel profiles in different interventional settings respond to the same set of changes. The effect is consistent across all intervention types and locations, with no significant variation by temporality.

Demographic factors also influence opt-out preferences. The coefficient for older participants ($\beta = 0.926$, $p < 0.01$) shows that older adults are more likely to prefer the opt-out, possibly due to accessibility concerns or resistance to change in a city with an aging population. Conversely, participants with tertiary education are significantly less likely to opt out ($\beta = -0.556$, $p < 0.05$). This suggests that higher educational attainment may correlate with greater openness to urban experimentation, possibly due to increased exposure to sustainability narratives, urban design awareness, or familiarity with participatory planning concepts. These individuals may also be more adept at interpreting complex visual stimuli and trade-offs presented in the stated preference tasks, making them more willing to consider novel intervention options. Furthermore, the significance of transport land use ($\beta = -.568$, $p < 0.05$) suggests that respondents in areas with higher public transport supply are more likely to opt for new street designs, likely due to perceived compatibility with transport-friendly infrastructure (e.g., bike lanes or pedestrian zones). Similarly, frequent public transport riders (PTpass, $\beta = .370$, $p < 0.1$) indicates that public transport pass holders are marginally more likely to choose opt-in designs, possibly due to greater reliance on public transport and openness to urban design changes. The coefficient for duration of residence ($\beta = -.298$, $p < 0.05$) suggests that longer-term residents may be less likely to opt out, reflecting familiarity with local needs.

Place of residence also significantly shapes preferences. Living in Kowloon ($\beta = .800, p < 0.01$), when compared to the New Territories, is associated with a higher likelihood of opting out. This may reflect several contextual factors: Kowloon is one of the most densely populated and congested districts in Hong Kong, where residents often experience space constraints, heavy foot traffic, and long-standing commercial and transport patterns that are less amenable to disruptive changes. Residents may also perceive street experiments as encroachments on already limited public space or disruptions to finely tuned daily routines. In contrast, respondents from the New Territories may benefit from more open space, better environmental quality, or recent exposure to urban revitalization projects, fostering a more positive attitude toward spatial experimentation.

Intervention-specific factors further explain opt-out tendencies. For locations of interventions, participants are less likely to opt-out for minor roads ($\beta = -.959, p < 0.001$) for street experiments, likely seeking safer, family-friendly environments. Meanwhile, the strong negative coefficients for pedestrian pavements ($\beta = -1.24, p < 0.01$), and alley ($\beta = -1.31, p < 0.01$) indicate that pedestrian and alley interventions significantly reduce opt-out preference, aligning with Hong Kong's pedestrian-heavy urban fabric. In contrast, the lack of significant effects for permanent and all-day interventions suggests that temporality does not strongly influence opt-out decisions.

Table 5 Coefficient of the five tested models

	NL	MXL	MNP	CL	SBL
Variables	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Intervention					
Visual score	.419 (.092) ***	1.427 (.175) ***	1.196 (.253) ***	.623 (.125) ***	1.608 (.178) ***
Photo Features					
<i>People</i>	.074 (.032) **	.234 (.095) ***	.231 (.081) ***	.234 (.088) ***	.347 (.105) ***
<i>Seating</i>	.069 (.036) *	.171 (.117) *	.179 (.138)	.325 (.115) ***	.128 (.124)
<i>Bike Parking</i>	-.070 (.039) **	-.225 (.111) **	-.209 (.119) *	-.333 (.128) ***	-.240 (.119) **
Opt-out					
Travel time	.431 (.157) ***	.405 (.178) **	1.166 (.442) ***	.886 (.162) ***	.438 (.160) ***
Location of intervention					
<i>Minor roads</i>	-.959 (.233) ***	-.772 (.262) ***	-2.600 (1.224) **	-.898 (.236) ***	-1.047 (.231) ***
<i>Pedestrian pavements</i>	-1.241 (.252) ***	-1.097 (.277) ***	-3.102 (1.755) *	-1.253 (.313) ***	-1.360 (.248) ***
<i>Alley</i>	-1.311 (.255) ***	-1.304 (.283) ***	-3.543 (1.708) **	-1.329 (.270) ***	-1.347 (.255) ***
Socio-demographics					
Older	.926 (.247) ***	.839 (.274) ***	2.517 (1.492) *	.978 (.424) **	.910 (.248) ***
ResiDur	-.298 (.156) **	-.381 (.176) **	-1.336 (1.719)	.181 (.323)	-.325 (.158) **
Tertiary	-.556 (.237) **	-.729 (.268) ***	-1.276 (1.245)	-.276 (.367)	-.528 (.238) **
PTpass	.370 (.229) *	.425 (.252) *	.934 (.848)	.612 (.383)	.373 (.229) *
Location of residence					
<i>HK</i>	.220 (.267)	.116 (.327)	.497 (1.211)	.532 (.517)	.232 (.307)
<i>KL</i>	.800 (.267) ***	.836 (.288) ***	1.955 (1.031) **	1.222 (.472) **	.841 (.270) ***
Ref: NT					
Land use (residence)					
<i>Residential</i>	.726 (.248) ***	.815 (.266) ***	1.614 (1.374)	.899 (.472) **	.726 (.248) ***
<i>Transport</i>	-.568 (.238) **	-.662 (.258) ***	-1.267 (1.488)	-.634 (.472)	-.567 (.239) **
Dissimilarity Parameter					
in tau	.285 (.068) ***	-	-	IV=1	IV=0

Note: *** p < .01; ** p < .05, * p < .1.

5. Discussions

5.1 Implications for experimental adequacy

To ensure realism, our SP design included an opt-out option, allowing respondents to reject both experimental street designs in favor of the status quo. This mirrors actual decision-making in urban experimentations (Bertolini, 2020), where some individuals choose not to adopt proposed changes. To assess whether imbalanced scenarios influenced opt-out behavior, we examined average travel time changes across scenarios and considered including dummy variables indicating whether both alternatives included visual elements (e.g., people, vehicles, bike parking, bike traffic, and seating). Ultimately, we included only travel time to maintain internal validity, as including variables beyond the acceptable scale for IV parameters (0–1) would suggest model misspecification. However, we retained visual design features as alternative-specific attributes. Results showed that visual attributes—particularly the presence of people, bike parking, seats, and the overall visual score—had significant effects on choice, indicating that respondents were sensitive to these elements. This supports the adequacy and variation of the scenarios presented.

Further analysis of the 1,200 choice sets (3,600 observations) revealed that approximately 13% of respondents chose the opt-out. This moderate proportion suggests that the opt-out was a meaningful but not dominant choice, implying that scenario imbalance did not excessively drive opt-out behavior. To explore potential respondent-level biases, we incorporated case-specific socio-demographic and transport-related variables. Significant effects of age, education level, public transport usage, residence location, and transport service availability indicate that these characteristics influenced opt-out decisions. This supports our hypothesis that urban street design in a hyper-mobile city like Hong Kong must account for residents' diverse mobility needs and travel behaviors.

5.2 Behavioral mechanisms behind opt-out choices

Respondents' preference for the status quo in some cases reflects behavioral tendencies such as status quo bias, risk aversion, or dissatisfaction with proposed street designs. To investigate these mechanisms, we compared five models: CL, NL, MXL, MNP, and SBL. The NL model provided the best fit, capturing the two-stage decision-making process: first, whether to opt out or adopt a new design, and second, choosing between Design A or B. This structure reflects real-world thinking and aligns with the significant IV parameter, which shows correlation between the opt-in alternatives. A likelihood ratio test confirmed that the NL model outperforms the MNL model by rejecting the IIA property inherited from the MNL model.

Across most models, results were generally consistent. However, transport-related variables (e.g., frequent public transport use and transport service availability) showed inconsistent significance. In the MXL, NL, and SBL models, these factors significantly influenced opt-out decisions, suggesting that respondents with limited access to public transport or those who regularly use it may exhibit stronger status quo bias or skepticism toward the proposed changes. In contrast, the MNP model provided weaker support for these variables, likely due to its

symmetric correlation structure, which cannot effectively model hierarchical decision processes or individual preference heterogeneity.

Travel time emerged as a statistically significant factor in all models. However, we recognize that travel time is not an entirely objective metric; its perception varies across individuals. To address this, we tested an MXL specification incorporating random coefficients for travel time changes. While this model accounted for heterogeneous sensitivity, it demonstrated significantly poorer fit and was excluded from the analysis. We suggest future research explore this variability using revealed preference data or alternative methods to better capture individual differences in travel time perception.

6. Conclusion

Street experimental interventions offer a dynamic platform for reimagining urban spaces, fostering vibrant and inclusive environments through tactical urbanism. This study contributes to evidence-based urban planning by examining public preferences for such interventions in Hong Kong through a stated preference survey. By analyzing choices between different street experiment scenarios and an opt-out option, the study highlights how travel time impacts, aesthetic preferences, and socio-cultural factors shape urban transformation in a dense, mobility-centric city.

A key insight is the strong preference for pedestrian and alley interventions, which align with Hong Kong's pedestrian-heavy urban fabric and offer promising opportunities to activate underused spaces—particularly in lively districts such as Sham Shui Po (Lai et al., 2023), where projects like PMQ have already thrived. These interventions encourage social interaction and recreation, making them suitable entry points for tactical urbanism. Conversely, the mixed reception to dining, park, and shared street interventions suggests public ambivalence, potentially due to concerns about noise, spatial conflict, or maintenance challenges in compact urban settings. To test these ideas, temporary pilots—such as pop-up dining areas in nightlife zones like Lan Kwai Fong—could be introduced in alignment with initiatives like Night Vibes HK (HKSAR Government, 2024). These can assess public response while minimizing long-term commitments. However, bike-related interventions received the most resistance, reflecting Hong Kong's limited cycling culture, shaped by dense development, pedestrian dominance, and historic perceptions of cycling as purely utilitarian (Tan and Martínez López, 2019). Unlike Western models that prioritize bike infrastructure (e.g., Bertolini, 2020; Smeds and Papa, 2023), Hong Kong requires context-specific strategies, such as compact bike parking in less congested districts like Sha Tin and public awareness campaigns to shift attitudes.

Travel time sensitivity emerges as a critical barrier to intervention acceptance, emphasizing the need for low-disruption strategies. Options such as weekend-only pedestrian zones or well-marked detour signage can help ease concerns, especially in high-traffic areas like Central (Tan and Xue, 2014). Demographic patterns also inform design priorities: families value safe, vibrant spaces with features like play areas or markets, while older adults prefer accessible

infrastructure such as benches and ramps. Opt-out behavior is particularly pronounced among older adults, residents of high-density areas, individuals with lower educational attainment, and frequent public transport users, reflecting heightened time sensitivity, space constraints, and reliance on existing transit networks. Tailored, inclusive approaches that minimize disruption can enhance adoption and reduce opt-out tendencies. The study also underscores the importance of socio-cultural adaptation. Western-centric urban design frameworks may not account for the complexities of high-density Asian cities like Hong Kong (Chan, 2024). Qualitative methods—such as focus groups and ethnographic observations—can complement quantitative findings, helping planners understand deeper cultural drivers behind intervention preferences and resistance to cycling (Chan, 2025b; Ren, 2019; Yu, 1995). Temporary interventions offer a low-risk method to gauge public sentiment, while long-term pilots can evaluate sustained behavioral and social impacts.

To assess intervention preferences, this study employed a nested logit model, which proved especially well-suited to the urban context of Hong Kong. Its hierarchical structure captures how individuals first decide between participating in any intervention or opting out, then choose among specific alternatives. This reflects the reality of Hong Kong residents' decision-making, shaped by time constraints and status quo bias. Compared to flat models like the Random Parameters Logit (Foelske et al., 2019), or models that overlook opt-out options altogether (de Ayala et al., 2015; Häfner et al., 2018; Ng et al., 2023), the nested structure better accounts for the substitution patterns between similar intervention types and provides more interpretable guidance for planners.

Nonetheless, the model has limitations. A key limitation is the sample's potential lack of full representativeness of Hong Kong's demographic distribution, with possible overrepresentation of younger, educated individuals due to online recruitment. While our nested logit model accounts for observed heterogeneity via included socio-demographics, unmeasured factors like professions and income—known to influence travel preferences in transport surveys (e.g., by affecting time valuation and mode choice)—were not captured. Future studies could expand the sample size and incorporate these variables through stratified sampling to enhance generalizability, potentially using interaction terms in models to explore how income moderates aversion to travel time disruptions. In addition, the single opt-out option limits insights into preferences within that category, and overlapping characteristics across interventions may affect result clarity. Additionally, uniform variable application across scenarios may introduce bias, and the model may not always outperform simpler alternatives. Future studies could compare the nested logit model to other frameworks—such as mixed logit or latent class models—and expand the survey to include diverse urban settings. Comparative research involving other dense Asian cities, such as Singapore or Tokyo, would further validate the approach and refine the application of tactical urbanism across different contexts.

One final consideration involves the visual materials used in the survey. While AI-generated street images helped simulate proposed interventions, they may introduce aesthetic or cultural bias by reflecting Western urban ideals rather than the nuanced, lived textures of Hong Kong streets. Elements like signage, human activity, lighting, and environmental wear—crucial for

realistic representation—are often oversimplified. Participants may respond differently to synthetic images than to real-world visuals, which can affect the accuracy of stated preferences. To mitigate this, future research could incorporate a mix of AI-generated images, photorealistic renders, actual site photos, or immersive VR tools to enhance realism and cultural fidelity.

Together, these findings offer a practical framework for advancing tactical urbanism in high-density Asian cities. Hong Kong planners should prioritize low-disruption, inclusive interventions such as pedestrian and alley conversions, designed with local preferences and urban rhythms in mind. Pilot programs for dining or park spaces in vibrant areas like Causeway Bay could serve families and seniors while testing broader concepts. Bike-related projects should be introduced cautiously, supported by public engagement and education. By aligning with initiatives like Night Vibes HK and focusing on cultural adaptation, these strategies can foster both social and economic vibrancy. Ultimately, this study provides a flexible, context-aware roadmap for leveraging tactical urbanism to enhance urban life in dense, dynamic cities.

References

- Aldred, R., Jungnickel, K., 2013. Matter in or out of place? Bicycle parking strategies and their effects on people, practices and places. *Soc. Cult. Geogr.* 14, 604–624. <https://doi.org/10.1080/14649365.2013.790993>
- Anas, A., 1983. Discrete choice theory, information theory and the multinomial logit and gravity models. *Transp. Res. Part B Methodol.* 17, 13–23. [https://doi.org/10.1016/0191-2615\(83\)90023-1](https://doi.org/10.1016/0191-2615(83)90023-1)
- Arriaza, M., Cañas-Ortega, J.F., Cañas-Madueño, J.A., Ruiz-Aviles, P., 2004. Assessing the visual quality of rural landscapes. *Landsc. Urban Plan.* 69, 115–125. <https://doi.org/10.1016/j.landurbplan.2003.10.029>
- Barber, L.B., 2020. Governing uneven mobilities: Walking and hierarchized circulation in Hong Kong. *J. Transp. Geogr.* 82, 102622. <https://doi.org/10.1016/j.jtrangeo.2019.102622>
- Barroso, F.L., Pinto-Correia, T., Ramos, I.L., Surová, D., Menezes, H., 2012. Dealing with landscape fuzziness in user preference studies: Photo-based questionnaires in the Mediterranean context. *Landsc. Urban Plan.* 104, 329–342. <https://doi.org/10.1016/j.landurbplan.2011.11.005>
- Basu, N., Oviedo-Trespalacios, O., King, M., Kamruzzaman, M., Haque, M.M., 2023. What do pedestrians consider when choosing a route? The role of safety, security, and attractiveness perceptions and the built environment during day and night walking. *Cities* 143, 104551. <https://doi.org/10.1016/j.cities.2023.104551>
- Battista, G.A., Manaugh, K., 2019. Generating walkability from pedestrians' perspectives using a qualitative GIS method. *Travel Behav. Soc.* 17, 1–7. <https://doi.org/10.1016/j.tbs.2019.05.009>
- Bertolini, L., 2020. From “streets for traffic” to “streets for people”: can street experiments transform urban mobility? *Transp. Rev.* 40, 734–753. <https://doi.org/10.1080/01441647.2020.1761907>
- Beyazit, E., Waite, I.A., Balik, H., Erturan, A., Keşan, B., 2023. Improving women's accessibility to public transport through participatory street experiments: The case of Maltepe, Istanbul. *J. Urban Mobil.* 4, 100062. <https://doi.org/10.1016/j.urbmob.2023.100062>
- Cai, K., Huang, W., Lin, G., 2022. Bridging landscape preference and landscape design: A study on the preference and optimal combination of landscape elements based on conjoint analysis. *Urban For. Urban Green.* 73, 127615. <https://doi.org/10.1016/j.ufug.2022.127615>
- Campbell, D., Erdem, S., 2019. Including Opt-Out Options in Discrete Choice Experiments: Issues to Consider. *Patient - Patient-Centered Outcomes Res.* 12, 1–14. <https://doi.org/10.1007/s40271-018-0324-6>
- Carlson, J.A., Grimes, A., Green, M., Morefield, T., Steel, C., Reddy, A., Bejarano, C., Shook, R.P., Moore, T., Steele, L., Campbell, K., Rogers, E., 2019. Impacts of temporary pedestrian streetscape improvements on pedestrian and vehicle activity and community perceptions. *J. Transp. Heal.* 15, 100791. <https://doi.org/10.1016/j.jth.2019.100791>
- Casier, C., Verhulst, L., Lanza, G., Solórzano, M.J.Z., Jehle, U., Pucci, P., Büttner, B., Witlox, F., 2025. Identifying optimal locations for street experiments: A digital case study in Bologna. *J. Urban Mobil.* 7, 100131. <https://doi.org/10.1016/j.urbmob.2025.100131>
- Ceccarelli, G., Messa, F., Gorrini, A., Presicce, D., Choubassi, R., 2023. Deep learning video analytics for the assessment of street experiments: The case of Bologna. *J. Urban Mobil.* 4, 100067. <https://doi.org/10.1016/j.urbmob.2023.100067>

- Chan, H.-Y., Mansoor, U., Su, J., Chen, A., 2025a. Walking in the city of footbridges: Sense of community, subjective walkability and walking habits in a layered neighborhood. *Travel Behav. Soc.* 40, 101049. <https://doi.org/10.1016/j.tbs.2025.101049>
- Chan, H.-Y., Tsoi, K.H., Chen, A., 2025b. Social representation, self-identity and anticipated guilt in universal access: A constructivist approach to (non-)visible disabilities. *Urban Stud.* <https://doi.org/10.1177/00420980251342717>
- Chan, H.-Y., Xu, Y., Chen, A., Liu, X., 2022. Impacts of the walking environment on mode and departure time shifts in response to travel time change: Case study in the multi-layered Hong Kong metropolis. *Travel Behav. Soc.* 28, 288–299. <https://doi.org/10.1016/j.tbs.2022.04.010>
- Chan, T.H.-Y., 2025a. Inclusive yet marginalising: Symbolic empowerment through open big data in citizen science for transport planning. *Big Data Soc.* 12. <https://doi.org/10.1177/20539517251325228>
- Chan, T.H.-Y., 2025b. Socio-material perspectives on perceived accessibility of cycling: A sociological inquiry into practices, regulations and informal rules. *Transp. Res. Part A Policy Pract.* 195, 104449. <https://doi.org/10.1016/j.tra.2025.104449>
- Chan, T.H.-Y., 2024. Rethinking urban street experiments through Lefebvre's rhythmanalysis: From vehicles and vibrancy to virtuosos. *Cities* 152, 105175. <https://doi.org/10.1016/j.cities.2024.105175>
- Daniel, T.C., 2001. Whither scenic beauty? Visual landscape quality assessment in the 21st century. *Landsc. Urban Plan.* 54, 267–281. [https://doi.org/10.1016/S0169-2046\(01\)00141-4](https://doi.org/10.1016/S0169-2046(01)00141-4)
- de Ayala, A., Hoyos, D., Mariel, P., 2015. Suitability of discrete choice experiments for landscape management under the European Landscape Convention. *J. For. Econ.* 21, 79–96. <https://doi.org/10.1016/j.jfe.2015.01.002>
- Dickinson, C., Manaugh, K., Pathak, P., Sengupta, R., 2024. Geographic identity and perceptions of walkable space. *Travel Behav. Soc.* 34, 100703. <https://doi.org/10.1016/j.tbs.2023.100703>
- Dramstad, W.E., Tveit, M.S., Fjellstad, W.J., Fry, G.L.A., 2006. Relationships between visual landscape preferences and map-based indicators of landscape structure. *Landsc. Urban Plan.* 78, 465–474. <https://doi.org/10.1016/j.landurbplan.2005.12.006>
- Dubey, R., Hardy, M.D., Griffiths, T.L., Bhui, R., 2024. AI-generated visuals of car-free US cities help improve support for sustainable policies. *Nat. Sustain.* 7, 399–403. <https://doi.org/10.1038/s41893-024-01299-6>
- Fan, Z., Loo, B.P.Y., 2021. Street life and pedestrian activities in smart cities: opportunities and challenges for computational urban science. *Comput. Urban Sci.* 1, 26. <https://doi.org/10.1007/s43762-021-00024-9>
- Fan, Z., Zhang, F., Loo, B.P.Y., Ratti, C., 2023. Urban visual intelligence: Uncovering hidden city profiles with street view images. *Proc. Natl. Acad. Sci.* 120. <https://doi.org/10.1073/pnas.2220417120>
- Figueiredo, M., Eloy, S., Marques, S., 2025. Age-friendly cities and active mobility: A thematic analysis based on immersive 360-degree video elicitation. *Cities* 166, 106260. <https://doi.org/10.1016/j.cities.2025.106260>
- Foelske, L., van Riper, C.J., Stewart, W., Ando, A., Gobster, P., Hunt, L., 2019. Assessing preferences for growth on the rural-urban fringe using a stated choice analysis. *Landsc. Urban Plan.* 189, 396–407. <https://doi.org/10.1016/j.landurbplan.2019.05.016>
- Frank, S., Fürst, C., Koschke, L., Witt, A., Makeschin, F., 2013. Assessment of landscape aesthetics—Validation of a landscape metrics-based assessment by visual estimation of the scenic beauty. *Ecol. Indic.* 32, 222–231. <https://doi.org/10.1016/j.ecolind.2013.03.026>

- Gu, Y., Quintana, M., Liang, X., Ito, K., Yap, W., Biljecki, F., 2025. Designing effective image-based surveys for urban visual perception. *Landsc. Urban Plan.* 260, 105368. <https://doi.org/10.1016/j.landurbplan.2025.105368>
- Häfner, K., Zasada, I., van Zanten, B.T., Ungaro, F., Koetse, M., Piorr, A., 2018. Assessing landscape preferences: a visual choice experiment in the agricultural region of Märkische Schweiz, Germany. *Landsc. Res.* 43, 846–861. <https://doi.org/10.1080/01426397.2017.1386289>
- Harvey, C., Aultman-Hall, L., 2016. Measuring Urban Streetscapes for Livability: A Review of Approaches. *Prof. Geogr.* 68, 149–158. <https://doi.org/10.1080/00330124.2015.1065546>
- Herrmann-Lunecke, M.G., Mora, R., Vejares, P., 2021. Perception of the built environment and walking in pericentral neighbourhoods in Santiago, Chile. *Travel Behav. Soc.* 23, 192–206. <https://doi.org/10.1016/j.tbs.2021.01.002>
- HKSAR Government, 2024. Night Vibes Hong Kong [WWW Document]. GovHK. URL <https://www.nightvibeshk.gov.hk/en/>
- HKSARG Planning Department, 2019. Hong Kong Outline Zoning Plans land use zonings [WWW Document]. Esri China (Hong Kong). URL <https://www.arcgis.com/home/item.html?id=5375a88ec76143ea974d5fb64efbec0d> (accessed 4.2.21).
- HKSARG Transport Department, 2024. Monthly traffic and transport digest.
- Hurtubia, R., Mora, R., Moreno, F., 2021. The role of bike sharing stations in the perception of public spaces: A stated preferences analysis. *Landsc. Urban Plan.* 214, 104174. <https://doi.org/10.1016/j.landurbplan.2021.104174>
- Immerzeel, B., Vermaat, J.E., Juutinen, A., Pouta, E., Artell, J., 2022. Appreciation of Nordic landscapes and how the bioeconomy might change that: Results from a discrete choice experiment. *Land use policy* 113, 105909. <https://doi.org/10.1016/j.landusepol.2021.105909>
- Jager, J., Putnick, D.L., Bornstein, M.H., 2017. More than just convenient: The scientific merits of homogeneous convenience samples. *Monogr. Soc. Res. Child Dev.* 82, 13–30. <https://doi.org/10.1111/mono.12296>
- James, M., Alousi-Jones, M., Soliz, A., El-Geneidy, A., 2025. Getting around on foot: Older adults' walking experiences and perspectives on neighbourhood walkability across Canada. *Travel Behav. Soc.* 41, 101074. <https://doi.org/10.1016/j.tbs.2025.101074>
- Jin, C.-J., Li, J., Wu, C., Xiu, X., Li, D., 2025. Findings in pedestrian route choice experiments: Tradeoff and hypothetical bias. *Travel Behav. Soc.* 40, 101000. <https://doi.org/10.1016/j.tbs.2025.101000>
- Kinigadner, J., Büttner, B., Rivas de Gante, A., Aumann, S., 2024. How to transform urban spaces and mobility: a framework for analysing street experiments. *J. Urban Des.* 1–21. <https://doi.org/10.1080/13574809.2024.2320918>
- Lai, T.C., Gerlofs, B.A., Wang, H., 2023. Timing is everything: Territorial stigmatization, immobility policy, and the COVID-boom in Hong Kong's Sham Shui Po. *J. Urban Aff.* 1–22. <https://doi.org/10.1080/07352166.2023.2254870>
- Lesan, M., Gjerde, M., 2020. A mixed methods approach to understanding streetscape preferences in a multicultural setting. *Methodol. Innov.* 13. <https://doi.org/10.1177/2059799120937233>
- Littlefield, J., 2022. Re-imagining Urban Spaces with Dall-E 2 AI.
- Loo, B.P., Fan, Z., 2023. Social interaction in public space: Spatial edges, moveable furniture, and visual landmarks. *Environ. Plan. B Urban Anal. City Sci.* 239980832311605. <https://doi.org/10.1177/23998083231160549>
- Loo, B.P.Y., 2021. Walking towards a happy city. *J. Transp. Geogr.* 93, 103078.

- <https://doi.org/10.1016/j.jtrangeo.2021.103078>
- Loo, B.P.Y., Zhang, F., 2024. Design of public open space: Site features, playing, and physical activity. *Health Place* 85, 103149.
<https://doi.org/10.1016/j.healthplace.2023.103149>
- Marcheschi, E., Vogel, N., Larsson, A., Perander, S., Koglin, T., 2022. Residents' acceptance towards car-free street experiments: Focus on perceived quality of life and neighborhood attachment. *Transp. Res. Interdiscip. Perspect.* 14, 100585.
<https://doi.org/10.1016/j.trip.2022.100585>
- Nasar, J.L., Holloman, C., Abdulkarim, D., 2015. Street characteristics to encourage children to walk. *Transp. Res. Part A Policy Pract.* 72, 62–70.
<https://doi.org/10.1016/j.tra.2014.12.004>
- Nazemi, M., Rababah, B., Ramos, D., Zhao, T., Farooq, B., 2025. Decoding pedestrian stress on urban streets using electrodermal activity monitoring in virtual immersive reality. *Transp. Res. Part C Emerg. Technol.* 171, 104952.
<https://doi.org/10.1016/j.trc.2024.104952>
- Ng, X., Lu, H., Heidenreich, S., Tervonen, T., 2023. Literature Review on the Use of Opt-out in Discrete Choice Experiments. *Value Heal.* 26, S330–S331.
<https://doi.org/10.1016/j.jval.2023.03.1881>
- Patterson, Z., Darbani, J.M., Rezaei, A., Zacharias, J., Yazdizadeh, A., 2017. Comparing text-only and virtual reality discrete choice experiments of neighbourhood choice. *Landsc. Urban Plan.* 157, 63–74. <https://doi.org/10.1016/j.landurbplan.2016.05.024>
- Ren, X., 2019. Consensus in factors affecting landscape preference: A case study based on a cross-cultural comparison. *J. Environ. Manage.* 252, 109622.
<https://doi.org/10.1016/j.jenvman.2019.109622>
- Rose, J.M., Bliemer, M.C.J., 2009. Constructing efficient stated choice experimental designs. *Transp. Rev.* 29, 587–617. <https://doi.org/10.1080/01441640902827623>
- Salazar-Miranda, A., Fan, Z., Baick, M., Hampton, K., Duarte, F., Loo, B.P.Y., Glaeser, E., Ratti, C., 2024. Shifting Patterns of Social Interaction: Exploring the Social Life of Urban Spaces Through A.I. Cambridge, MA. <https://doi.org/10.3386/w33185>
- Salazar-Miranda, A., Fan, Z., Baick, M., Hampton, K.N., Duarte, F., Loo, B.P.Y., Glaeser, E., Ratti, C., 2025. Exploring the social life of urban spaces through AI. *Proc. Natl. Acad. Sci.* 122. <https://doi.org/10.1073/pnas.2424662122>
- Savela, N., Latikka, R., Lahtinen, J., Oksanen, A., 2024. Robots are coming to town: A visual experiment on urban belonging and anxiety. *Cities* 144, 104640.
<https://doi.org/10.1016/j.cities.2023.104640>
- Scerri, K., Attard, M., 2023. People as planners: Stakeholder participation in the street experimentation process using a virtual urban living lab. *J. Urban Mobil.* 4, 100063.
<https://doi.org/10.1016/j.urbmob.2023.100063>
- Schirpke, U., Mölk, F., Feilhauer, E., Tappeiner, U., Tappeiner, G., 2023. How suitable are discrete choice experiments based on landscape indicators for estimating landscape preferences? *Landsc. Urban Plan.* 237, 104813.
<https://doi.org/10.1016/j.landurbplan.2023.104813>
- Schirpke, U., Tappeiner, G., Tasser, E., Tappeiner, U., 2019. Using conjoint analysis to gain deeper insights into aesthetic landscape preferences. *Ecol. Indic.* 96, 202–212.
<https://doi.org/10.1016/j.ecolind.2018.09.001>
- Smeds, E., Papa, E., 2023. The value of street experiments for mobility and public life: Citizens' perspectives from three European cities. *J. Urban Mobil.* 4, 100055.
<https://doi.org/10.1016/j.urbmob.2023.100055>
- Swetnam, R.D., Korenko, J., 2019. Can computer game landscapes target new audiences for landscape quality assessment? *Appl. Geogr.* 113, 102102.

- <https://doi.org/10.1016/j.apgeog.2019.102102>
- Talen, E., Choe, K.W., Akcelik, G.N., Berman, M.G., Meidenbauer, K.L., 2023. Street design preference: an on-line survey. *J. Urban Des.* 28, 1–24. <https://doi.org/10.1080/13574809.2022.2066512>
- Tan, H., Martínez López, M.A., 2019. Has urban cycling improved in Hong Kong? A sociopolitical analysis of cycling advocacy activists' contributions and dilemmas, in: Yip, N.M., Martinez Lopez, A.Mi., Sun, X. (Eds.), *The Contemporary City*. Palgrave MacMillan, pp. 123–146. https://doi.org/10.1007/978-981-13-1730-9_6
- Tan, Z., Xue, Q.L.C., 2014. Walking as a planned activity: Elevated pedestrian network and urban design regulation in Hong Kong. *J. Urban Des.* 19, 722–744. <https://doi.org/10.1080/13574809.2014.946895>
- Valença, G., Azevedo, C., Moura, F., Morais de Sá, A., 2025. Creating visualizations using generative AI to guide decision-making in street designs: A viewpoint. *J. Urban Mobil.* 7, 100104. <https://doi.org/10.1016/j.urbmob.2025.100104>
- Van Cauwenberg, J., De Bourdeaudhuij, I., Clarys, P., Nasar, J., Salmon, J., Goubert, L., Deforche, B., 2016. Street characteristics preferred for transportation walking among older adults: a choice-based conjoint analysis with manipulated photographs. *Int. J. Behav. Nutr. Phys. Act.* 13, 6. <https://doi.org/10.1186/s12966-016-0331-8>
- van der Linden, H., Correia, G., van Oort, N., Koster, S., Legêne, M., Kroesen, M., 2025. Driving factors behind station-based car sharing adoption: Discovering distinct user profiles through a latent class cluster analysis. *Transp. Policy* 162, 232–241. <https://doi.org/10.1016/j.tranpol.2024.12.001>
- van Zanten, B.T., Verburg, P.H., Scholte, S.S.K., Tieskens, K.F., 2016. Using choice modeling to map aesthetic values at a landscape scale: Lessons from a Dutch case study. *Ecol. Econ.* 130, 221–231. <https://doi.org/10.1016/j.ecolecon.2016.07.008>
- VanHoose, K., Bertolini, L., 2023. The role of municipalities and their impact on the transitional capacity of city street experiments: Lessons from Ghent. *Cities* 140, 104402. <https://doi.org/10.1016/j.cities.2023.104402>
- VanHoose, K., de Gante, A.R., Bertolini, L., Kinigadner, J., Büttner, B., 2022. From temporary arrangements to permanent change: Assessing the transitional capacity of city street experiments. *J. Urban Mobil.* 2, 100015. <https://doi.org/10.1016/j.urbmob.2022.100015>
- Vasilev, M., Pritchard, R., Jonsson, T., 2022. Mixed-methods approach to studying multiuser perceptions of an interim Complete Streets project in Norway. *Travel Behav. Soc.* 29, 12–21. <https://doi.org/10.1016/j.tbs.2022.05.002>
- Verhulst, L., Casier, C., Witlox, F., 2023. Street Experiments and COVID-19: Challenges, Responses and Systemic Change. *Tijdschr. voor Econ. en Soc. Geogr.* 114, 43–57. <https://doi.org/10.1111/tesg.12542>
- Verlinghieri, E., Vitale Brovarone, E., Staricco, L., 2023. The conflictual governance of street experiments, between austerity and post-politics. *Urban Stud.* <https://doi.org/10.1177/00420980231193860>
- Villani, C., Talamini, G., 2023. Failed pedestrian street experiments in high-density urban Asia: A matter of policies? *J. Urban Mobil.* 4, 100069. <https://doi.org/10.1016/j.urbmob.2023.100069>
- Xu, Y., Chan, H.-Y., Chen, A., Chim, T.-Y., Liu, X., 2024. Aged and wheeled mobility in transit-oriented development: The capabilities approach. *Transp. Res. Part D Transp. Environ.* 127, 104058. <https://doi.org/10.1016/j.trd.2024.104058>
- Yu, K., 1995. Cultural variations in landscape preference: comparisons among Chinese sub-groups and Western design experts. *Landsc. Urban Plan.* 32, 107–126. [https://doi.org/10.1016/0169-2046\(94\)00188-9](https://doi.org/10.1016/0169-2046(94)00188-9)

- Zhao, J., Sun, G., Webster, C., 2024. Global Street Experiment: A Geospatial Database of Pandemic-induced Street Transitions. *Landsc. Urban Plan.* 242, 104931.
<https://doi.org/10.1016/j.landurbplan.2023.104931>
- Zhao, K.J., Chang, R.A., Sun, G., 2025. Experiment unlearned: Unpacking leadership and learning of key actors in a Hong Kong street experiment. *J. Urban Mobil.* 7, 100091.
<https://doi.org/10.1016/j.urbmob.2024.100091>
- Zhou, J., An, R., Zhang, H., Liu, Y., 2012. Orthogonal Design of Pharmaceutical Experiment Based on SPSS, in: *Information Computing and Applications*. pp. 552–560.
https://doi.org/10.1007/978-3-642-34041-3_77
- Zhu, W., Si, W., 2024. Predicting choices of street-view images: A comparison between discrete choice models and machine learning models. *J. Choice Model.* 50, 100470.
<https://doi.org/10.1016/j.jocm.2024.100470>