

---

Diverse Places,  
Diverse Signage

**INTERDISCIPLINARY  
JOURNAL OF SIGNAGE  
AND WAYFINDING**

Vol. 7 / No. 1

**Copyright © 2023 by the Interdisciplinary Journal of Signage and Wayfinding.  
All rights reserved.**

**ISSN 2470-9670**

**Published by Academic Advisory Council for Signage Research and Education (AACRSRE)**

**EDITORS**

Pat Crawford, Ph.D.  
School of Design, South Dakota State University

**ASSOCIATE EDITORS**

Robert Dalton, Ph.D.  
School of Design, South Dakota State University  
Marisa Ten Brink, M.F.A.  
School of Design, South Dakota State University

**EDITORIAL BOARD**

**John D. Bullough, Ph.D.**, Rensselaer Polytechnic Institute  
**Dawn Jourdan, Ph.D.**, University of Maryland  
**James Kellaris, Ph.D.**, University of Cincinnati  
**Steven W. Kopp, Ph.D.**, University of Arkansas  
**Bryce C. Lowery, Ph.D.**, University of Oklahoma  
**Robert W. Oast, Jr, J.D.**, Ohio State University  
**Charles R. Taylor, Ph.D.**, Villanova University

The Interdisciplinary Journal of Signage and Wayfinding is the official publication of the Academic Advisory Council for Signage Research and Education (AACRSRE). AACRSRE's membership is comprised of faculty at institutions of higher education throughout the United States representing the wide variety of academic disciplines concerned with signage and wayfinding research. AACRSRE seeks to provide a forum for academic literature of an interdisciplinary nature that may not meet the disciplinary strictures of other academic journals, so current signage and wayfinding research can be made accessible to academics and practitioners alike. The IJSW is a peer-reviewed, interdisciplinary journal that disseminates current and ongoing research in the fields of signage and wayfinding. Works published in IJSW further current knowledge and practice across disciplines concerned about the influences of signage and wayfinding on viewer behavior, and impacts on and perceptions of the built environment. The IJSW is committed to the sharing and dissemination of signage and wayfinding research, such that all issues are available digitally without charge at <https://journals.shareok.org/ijsw>.

The Interdisciplinary Journal of Signage and Wayfinding (ISSN 2470-9670) is published biannually in the Spring and Fall. The IJSW has been published digitally since 2016 by the University of Oklahoma Libraries, and is indexed by ROAD, MIRABEL, DOAJ, and CROSSREF.

**COPYRIGHT PERMISSION:**

Works published in the Interdisciplinary Journal of Signage and Wayfinding will be distributed under a Creative Commons Attribution-Noncommercial License (CC BY-NC) unless otherwise noted on individual manuscript pages. For more information on permissions associated with CC BY-NC attribution, please visit [Journals.shareok.org/ijsw/information/authors](https://journals.shareok.org/ijsw/information/authors)

# table of contents

IJSW  
Vol. 7, No. 1 (2023)

- |                |  |
|----------------|--|
| <b>3 – 4</b>   | Editors' Introduction<br><b>Pat Crawford, Robert Dalton and Marisa Ten Brink</b>   |
| <b>5 – 20</b>  | Bilingual Signs: How Language Influences Shoppers<br><b>Susan Powell Mantel and James J. Kellaris</b>  |
| <b>21 – 36</b> | Visual Mixed Messaging: The Role of Signage in Public and Private Governance of New York City Interior Privately Owned Public Spaces<br><b>Alex Donahue, Madlen Simon and Madeline Brown</b> |
| <b>37 – 52</b> | On-Premise Signage and Placemaking: Aiding Lively Streetscapes to Maintain Signage Visibility<br><b>Robert Dalton, Sahand Abbasi, Seojoo Han</b>   |
| <b>53 – 54</b> | Book Review: <i>Public Space: Notes on Why it Matters, What We Should Know, and How to Realize its Potential</i> by Vikas Mehta<br><b>Pat Crawford</b>                                       |







# Editor's Introduction

## Pat Crawford

Director  
School of Design  
South Dakota State University

pat.crawford@sdstate.edu

## Robert Dalton

Assistant Professor  
School of Design  
South Dakota State University

## Marisa Ten Brink

Assistant Professor  
School of Design  
South Dakota State University

---

This issue of the Interdisciplinary Journal of Signage and Wayfinding highlights the importance of respecting diversity in signage. As our world becomes ever more connected, signage can influence groups previously not engaged in a location. Such people may speak a different language, have different values, or simply may be visiting for the first time. Our collective knowledge in signage research allows us to be flexible and adaptable, meeting the needs of diverse audiences in diverse places.

In the first article, "Bilingual Signs: How Language Influences Shoppers" written by Susan Powell Mantel and James J. Kellaris, uses a mixed-method approach to highlight the effects of bilingual signs for possible customers. In the United States context, a sign with one language may be authentic to a specific group and create a sense of sophistication or authenticity, such signs may cause potential customers who do not speak the language to disengage. Bilingual signs, specifically in English and Spanish, Mantel and Kellaris find, provide for more diverse audiences as both language groups feel included. Both English and Spanish speaking people found the signs to demonstrate a cultural competency to deliver quality products for the customer. Bilingual signs provide heuristic triggers (non-conscious) for the customers, an ever "moving target" in our changing world.

In "Visual Mixed Messaging: the Role of Signage in Public and Private Governance of New York City Interior Privately Owned Public Spaces" by Alex Donahue, Madlen Simon, and Madeline Brown, examine the signs, and specific words utilized, of both private and public entities in privately owned public spaces. These privately owned public spaces are made more complicated in the cosmopolitan center of New York City as they are a distinctive part of the private complex and also open to the public. People desire safe places and how signage is presented and worded may influence the actions of people in the public spaces. While public (or city) signs in these spaces highlight words such as "public," "open," and "plaza," the private sector businesses operating in these

interior spaces highlight the site's amenities and regulated behaviors, such as gambling, sleeping, or smoking. While the authors do not condone or condemn any sign, they do suggest that the degree of regulation can exclude visitors from these public spaces.

The third article, "On-Premise Signage and Placemaking: Aiding Lively Streetscapes to Maintain Signage Visibility" by Robert Dalton, Sahand Abbasi, and Seojoo Han, discuss signage visibility in public streetscapes. The authors discuss placemaking, a means of designing streetscapes with the intention of engaging current and new people in a community. This includes physical, streetscape elements, such as signs, furniture (benches, lighting), street trees, and other people. The researchers statistically analyzed photos that are coded to varied streetscape elements. With the 3M's VAS software, the team knew the percent likelihood of person finding a sign in the street during pre-attentive processing – that is, before cognition could influence the eye. Once placemaking is established on a street, and thus brings more people and potential customers in an area, pre-attentive signage visibility decreases. However, as streetscapes become more complex with additional elements, signage visibility does not statistically change. The authors provide suggestions for balancing the design of these streetscape elements to increase the population in these public spaces while ensuring sign visibility.

Lastly, the journal concludes with a book review by Pat Crawford for Vikas Mehta's 2023 book, *Public Space: Why it Matters, What We Should Know, How to Realize its Potential*. The manuscript uses a combination of text, typography, sketches and diagrams to engage readers in thinking about public space from multiple perspectives and disciplines. Mehta draws on his deep disciplinary experience in architecture, planning and urban design to challenge assumptions and explore possibilities about public space.

No matter the language we speak, the specific words we employ, or the built environment around us, signs can inform and influence behaviors. As our population continues to grow globally and travel opportunities expand, the importance of signage systems and visual communications will grow. Signs provide guidance for opportunities, such as patronizing a business or understanding expected behaviors in a space. We hope you enjoy these articles and considering adding to the conversation with your own research work to expand our understanding of signage and wayfinding.

# Bilingual Signs: How Language Influences Shoppers

**Susan Powell Mantel\***

Professor of Marketing  
Lindner College of Business  
University of Cincinnati

\*Corresponding Author  
mantelsp@ucmail.uc.edu

**James J. Kellaris**

James S. Womack / Gemini Chair of Signage and  
Visual Marketing  
Professor of Marketing,  
Lindner College of Business  
University of Cincinnati

## INTRODUCTION

Bilingual signs—those that feature two written languages—have long been a common feature of the linguistic landscape in places frequently visited by travelers (e.g., international airports, cultural and touristic sites), and where mandated by law to serve a bilingual population (e.g., Eastern Canada). There are many possible benefits of bilingual signage beyond the practical utility of facilitating communication. As examples, bilingual signs have the potential to contribute positively to the bottom line of a business by broadening the accessibility of messages to include wider audiences. Bilingual signs can foster feelings of inclusion (de Villiers et al., 2022). The implicit effort underlying bilingual communication may cue inferences about product quality and the service one might expect from a business represented by such signs. Moreover, they may lend interest to a retail environment, imply cosmopolitan sophistication, and contribute to the richness of the linguistic landscape. Ample merits notwithstanding, there may be some looming hazards to using bilingual signage. For example, bilingual signs may risk triggering negative sentiments among individuals who view multilingualism as an ideological threat to American-English dominance or as symbolic of a failure to assimilate immigrant groups into the mainstream.

Foreign language signs—those featuring only a language other than the dominant language—are often found in ethnic enclaves (e.g., Chinatown, Little Italy, French Quarter). Such signs may be intended to signal selected population segments (e.g., Hebrew signage on a synagogue, Greek signage on an Eastern Orthodox church). In the case of businesses, we speculate that foreign language signs may convey impressions of authenticity (e.g., Spanish signage identifying a taquería “taco restaurant”). Nevertheless, they may also risk being off-putting to some members of the dominant culture, specifically those of an ethnocentric

## Abstract

A growing use of bilingual signage among retailers in the United States begs the question, How do shoppers react to bilingual signs? How is such signage processed by consumers, what does it signal, and to what effect? Drawing from a national panel of American consumers, we exposed participants to examples of English, bilingual, or Spanish signage in a program of experiments that measured behavioral intentions, attitudes toward the stores and signs, and various expectations, perceptions, and impressions. Results show a direct effect of the language of the sign on shoppers' behavioral intentions to engage with and buy from a store. Evidence shows that evaluations of signs shape evaluations of the stores they represent. Additionally, the language used on signs shapes shoppers' expectations of service quality, with bilingual signs engendering favorable impressions of authenticity, inclusiveness, and interestingness. Signs using only a foreign language, by contrast, tend to lower expectations of service, communication, and inclusiveness.

## Keywords

On-premises signs, Bilingual communication, Signage information processing, Inclusive signage

bent (Liu et al., 2006) who characteristically embrace monolingualism as a linguistic ideology (Leeman, 2018) but also to majorities that may resent an implied exclusion.

Based on casual observation, bilingual signage is becoming more commonplace beyond its customary use in international, touristic contexts. The widespread use of bilingual in-store signs by large U.S. retailers such as Walmart, Home Depot, Kroger grocery stores, among others have expanded from areas with large immigrant populations (Coomer, 2012) to more widespread use (A. Colón, personal communication, September 13, 2022). Despite the proliferation of such signs, scant evidence documents how majority customers perceive bilingual signs and their effect(s) on customer behavior.

Given the expansive breadth of the topic, we narrowed this initial investigation to the following research questions: Generally, what are the benefits and hazards of bilingual and foreign language signs? How do consumers process information communicated by bilingual or foreign language signs (as compared to the dominant, majority language)? What impressions do bilingual and foreign language signs provoke? Do they foster perceptions of inclusion and authenticity, as we speculated? Do they add an element of interest to a retail environment? Do they cue expectations about the quality of products and customer service? What influence does the language of signs have on prospective customers' behavioral intentions vis-à-vis a business? Although this research is preliminary and exploratory, the goal is to develop evidence-based, practical guidelines concerning the commercial use of bilingual signs.

## CONCEPTUAL BACKGROUND

### *Two Paths to Persuasion*

According to Kellaris and Machleit (2016), viewers can process signage information via two paths, one being essentially an automatic, nonconscious route (heuristic processing), the other being an actively evaluative, effortful processing route (systematic processing). Communication can take place successfully via either path if the information is designed to facilitate both.

Which process viewers use depends on the traits of the individual and the circumstances surrounding the exposure to the sign. For example, when conditions trigger thoughtful processing of sign information, viewers form affective evaluations of the sign and its message, which leads to consistent evaluations of the business the sign represents, with downstream consequences for behavioral responses (Kellaris et al., 2020). However, this is not always the case. Individuals characterized by a low need for cognition (i.e., those who do not particularly enjoy the process of effortful thinking; Cacioppo et al., 1983), should be more prone to heuristic processing, wherein they rely on heuristic shortcuts to form quick impressions. Similarly, when people are in a hurry, they may have a high need for closure (Webster & Kruglanski, 1994), wherein they do not take the time



to process information critically. Events such as seeing something interesting, exceptional, or unexpected can trigger more mindful processing (Kruglanski & Webster, 1996).

According to Schwarz (2004), people often use positive or negative metacognitive experiences as a basis for forming judgments. Such judgments occur automatically, without effortful evaluation. For example, the ease or difficulty with which information is processed (fluency) can serve as an implicit heuristic cue to inform judgments of objects or messages encountered. In the case of signage information, if it is easy (vs. difficult) to process, the experience of fluency (disfluency) will be positive (negative), and this valence (+/-) will color perceptions of the sign message. Hence, signs in one's native language or those that facilitate ease of processing via bilingualism should be more fluently processed and thus generate a positive metacognitive experience. When the experience is positive, the information source is assumed to be positive, good, likeable, believable. The reverse is also true. Signs experienced disfluently, such as a monolingual English speaker encountering a Spanish sign that is difficult or impossible to decode, lead to a negative metacognitive experience such that the source is assumed to be negative, bad, disliked, or distrusted.

#### *The Role of Ethnocentrism*

When a viewer is exposed to bilingual or foreign language information, reactions could be shaped by the individual's level of ethnocentrism. Ethnocentrism is a type of cultural bias wherein one views other cultures, nationalities, or ethnic groups, through the lens of one's own culture (Shimp & Sharma, 1987). A highly ethnocentric individual believes his or her own culture, nationality, or ethnic group is more important or superior to those of others. Individuals can be characterized in terms of differences in their degree of ethnocentrism, a trait correlated with political ideologies, with right-leaning individuals tending to hold more ethnocentric views.

Given its biasing potential, we expect consumer ethnocentrism to play a role in shaping reactions to bilingual and foreign language signs. Specifically, more ethnocentric individuals (because they are more locally focused) are more likely to experience bilingual, or foreign language signs as disfluent (vs. those in English). This disfluency may contribute to less positive behavioral intentions.

#### *Overview of Studies*

We explore consumers' reactions to bilingual signs in a program of experimental studies. In each study, participants are exposed to a mock-up of signage for a retail shop in English only, both English and Spanish (bilingual), or Spanish only, and asked questions regarding their behavioral intentions toward the store, their evaluations of the store and the signage, expectations regarding product and service quality, and other perceptions hypothesized to be antecedents of behavioral responses (authenticity, inclusiveness, relevance, interestingness). We selected Spanish as the second language because it is the second most widely

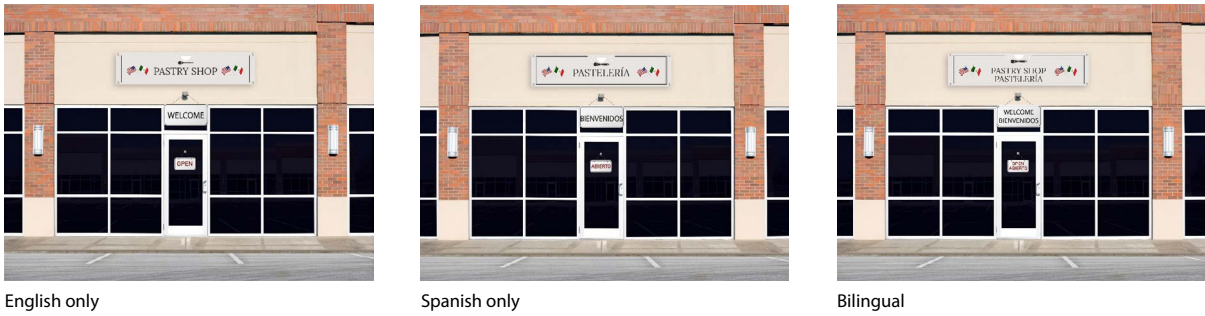


Figure 1 /

Study 1 Stimuli – Bakery Signage

spoken language in the United States after English. Indeed, famously, more Spanish speakers are in the United States than in Spain (Dynamic Language, 2022), estimated to be over 50 million (World Population Review, 2022).

### Study 1

Study 1 investigates how the language of retail signage (English, Bilingual, Spanish) influences shoppers' behavioral intentions toward a store and the paths by which signs shape those behavioral intentions, including conscious (evaluative) and nonconscious (automatic) processes. Additionally, this study explores how the language of signs shapes shoppers' expectations of a business's product and service quality.

#### *Participants and Design*

We recruited a national sample of 240 adult consumers (57.9% female; median age 35; age range 18–79) from the Prolific™ consumer panel in exchange for a nominal fee. For the most part, the participants learned English as their first language (99.6%). However, 23% report the ability to read or speak Spanish, and another 59% report familiarity with some Spanish phrases, leaving 18% reporting complete unfamiliarity with Spanish. We told participants that the purpose of the study is to “Investigate consumers' feelings, opinions and attitudes regarding some pieces of information.” An additional 17 participants started the study but did not pass standard attention checks and were excluded from analysis.

All participants were required to view the survey on a larger screen device and were rejected if they attempted to participate from a mobile phone. After reading and agreeing to the informed consent document, participants were asked to remove headphones to reduce distractions. Next, participants were told, “You will see a picture of a business store front. Please imagine that this business is in a local strip commercial center somewhere near you.” The participants were also told that they should review the information for as long as they need and really think about all aspects of this business because they will not be able to go back to the photo after they are done viewing it. The stimuli were randomly assigned so that one-third of the participants viewed a storefront with signage printed in English only, one-third viewed a storefront with bilingual signage in both English and Spanish, and one-third viewed a storefront with signage printed in Spanish only in a between-subjects design (see Figure 1). The English-only condition served as a control group for comparisons with reactions to bilingual and Spanish signs.

After reviewing the stimuli, participants were asked to respond to questions about their perceptions of the business they just saw. First, they were asked to report their behavioral intentions toward the store, then their attitude toward the store, their attitude toward the sign, their perception of ease of processing the sign information (“fluency”), and finally, they reported their ethnocentrism and demographics.

### Measures

We measured Behavioral Intent using a seven-point, two-item likelihood scale (1 = extremely unlikely, 7 = extremely likely). The items were “How likely is that you would interact with the business (e.g., stop in, patronize)?” and “How likely would you be to make a purchase at the business that you just viewed?” Alpha reliability was high ( $\alpha = 0.93$ ), so we summed and averaged the responses to the two items to form a composite scale of behavioral intent (BI).

Attitude-toward-the-store was adapted from (Goldsmith et al., 2000) and measured using a seven-point, four-item, bipolar scale. The items were “Inviting/Uninviting, Authentic/Inauthentic, Welcoming/Unwelcoming, Inclusive/Not Inclusive, reverse coded such that higher numbers indicate more positive attitudes. This measure was reliable ( $\alpha = 0.85$ ) and thus summed and averaged to form a composite measure ( $A_{\text{Store}}$ ).

Attitude-toward-the-sign was adapted from (Goldsmith et al., 2000) and measured using a seven-point, 4-item bipolar scale (Good/Bad, Favorable/Unfavorable, Pleasant/Unpleasant, Well designed/Poorly Designed. These were reverse coded such that higher values indicate more positive attitudes). This measure was reliable ( $\alpha = 0.95$ ) and thus summed and averaged to form a composite measure ( $A_{\text{Sign}}$ ).

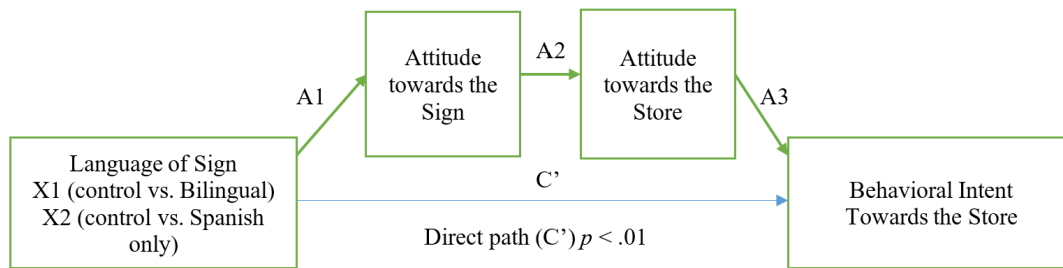
Fluency was adapted from (Kostyk et al., 2021) to measure perceptions of how easy the sign information was to process. The measure consisted of four, seven-point agreement items (agree = 7, disagree = 1) preceded by the prompt “The sign was ...” The items were “Difficult to process. Difficult to read. Takes a long time to process. Difficult to understand.” The scale was reverse coded to produce a scale with a high number representing ease of processing. The resulting (reverse coded scale) was reliable ( $\alpha = 0.96$ ) and thus summed and averaged to form a composite measure.

We measured ethnocentrism using a seven-point, 8-item agreement scale (e.g., “Most other countries are backward in comparison with the United States”; Neuliep & McCroskey, 1997). Low levels of agreement on the Ethnocentrism items indicate a more global outlook; higher levels of agreement indicate a more local (U.S.-centric) outlook. The ethnocentrism scale is reliable ( $\alpha = 0.94$ ) and thus summed and measured to form a composite scale.

### Results

First, we evaluated the data using a one-way ANOVA with behavioral intent as a function of sign type. Results show a main effect of sign type on behavioral intent ( $F_{(2,239)} = 3.395, p = .04, \eta^2 = .03$ ) such that the bilingual sign engenders more positive intentions toward the store ( $M = 4.8$ ) as compared to the Spanish only sign ( $M = 4.1, p = .01$ ). The English sign engendered more positive behavioral intention than the Spanish sign, less positive than the bilingual sign but not statistically different from either ( $M = 4.5$ ).

To test the hypothesis that the language of a sign will produce systematic differences in attitudes toward the sign and the store it represents, we conducted a mediation analysis using PROCESS version 4.0, model 6 (Hayes, 2021). We evaluated the independent variable (language of the sign) with the English-only sign as the control compared to the bilingual and Spanish-only signs as the two test conditions.



Serial mediation (A1, A2, A3)  
 X1 (Effect = 0.39, LLCI = 0.2122, ULCI = 0.6299)  
 X2 (Effect = 0.16, LLCI = -0.0119, ULCI = 0.3435, *ns*)

The model included language of the sign as the independent variable, Attitude-to-the-sign and attitude-to-the-store as mediators, and behavioral intent as the dependent variable (see Figure 2). Results show partial mediation with a significant path from Sign through Attitude-toward-the-sign and Attitude-toward-the-store to behavioral intent ( $p < .01$ ). This serial mediation is particularly driven by the positive impact of the bilingual sign compared to the English-only control (Effect = .39,  $p < .01$ , LLCI = .212; ULCI = .629); however, the direct path from sign type to behavioral intent remains significant for the bilingual sign (Effect = -.40,  $p = .03$ ) and the Spanish only sign (Effect = -.54,  $p < .01$ ) compared to the control (Omnibus test of direct effects of X on Y,  $F_{(2, 235)} = 4.70$ ,  $p < .01$ ).

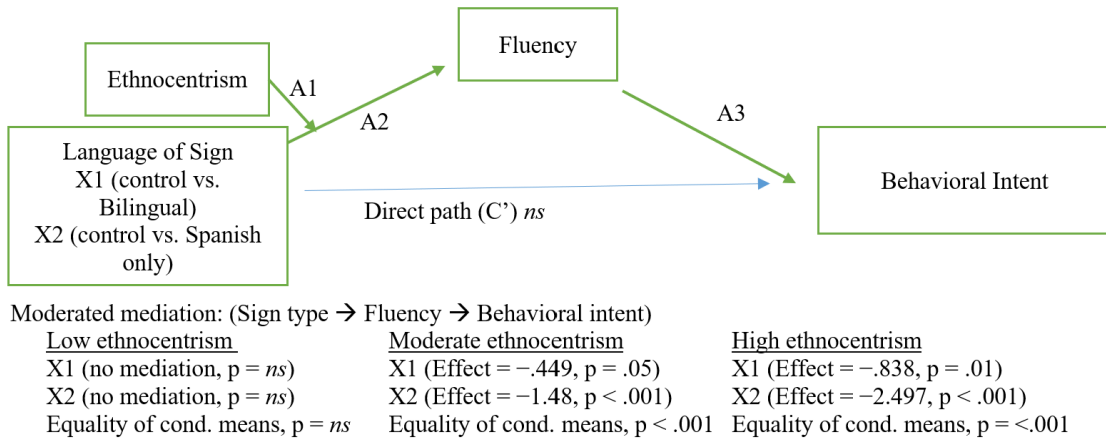
Next, we investigated the hypothesis that fluency (ease of processing sign information) will mediate the impact of a sign's language on behavioral intent, contingent upon the viewer's level of ethnocentricity. Specifically, individuals who hold a more local (U.S.-centric) view should perceive a sign using Spanish (bilingual or Spanish only) as less fluent (more difficult to process) than an English-only sign. To test this hypothesis, we investigated moderated mediation using the PROCESS version 4.0, model 7 (Hayes, 2021). Language of the sign remains the independent variable, Ethnocentrism is included as the moderator, Fluency is included as the mediator, and Behavioral Intent is included as the dependent variable. Results show a significant moderated mediation (Index = -0.2206, LLCI = -0.4135, ULCI = -0.0709), such that at low levels of ethnocentrism (Global focus) there is no mediation through fluency; however, at moderate and high levels of ethnocentrism (relatively more United States focused) there is a mediation through fluency (see Figure 3).

Consistent with our expectations, ethnocentrism and fluency combine to explain the influence of a sign's language on behavioral intent. Specifically, an individual's level of ethnocentrism amplifies the perceived ease of processing sign information in English but significantly decreases the perceived ease of processing bilingual and Spanish information. Among individuals characterized by higher levels of ethnocentrism, the perceived fluency of bilingual (mean = 5.5)

**Figure 2**

Study 1: How the Language of a Sign Shapes Behavioral Intentions Toward the Store It Represent





and Spanish (3.9) signs is lower than that of English (6.4) signs. That perceived fluency level shapes behavioral intentions but only among individuals characterized by moderate to high ethnocentrism.

*Bilingual Signs Cue Expectations*

Taylor et al. (2005) described the practical wisdom of the sign industry, which suggests that on-premises signs are analogous to a salesperson's handshake, (i.e., a first impression, conveying the personality of the business they represent). Survey evidence showed that a large majority of shoppers claim that they can infer the quality of a business from its signage (Kellaris, 2010). Kellaris and Machleit (2016) formalized this idea by proposing that viewers may use signs as "inferential cues" to formulate impressions. In this vein, we explored how the language of signs may shape shoppers' expectations of product and service quality, as well as perceptions of authenticity, inclusiveness, personal relevancy, and interestingness. Table 1 shows average ratings across language conditions.

**Table 1** / Mean Expectations Across Language Conditions (Study 1)

Expectations of...	English only (control)	Bilingual	Spanish only
Product quality	3.48	3.65	3.43
Service quality			
• Warmth	3.36	3.74*	3.32 <sup>1</sup>
• Competency	3.70	3.85	3.66
• Ease of communication	4.01	4.01	3.38 <sup>1,2</sup>
Authenticity	4.45	5.06**	4.73
Inclusiveness	4.40	5.01**	4.331
Personal relevancy	3.96	4.01	3.63
Interestingness of store	3.97	4.55*	4.24

Note. Cell entries are means on seven-point scales.

\*  $p < .05$  compared to control; \*\*  $p < .01$  compared to control.

<sup>1</sup>  $p < .05$  compared to Bilingual condition; <sup>2</sup>  $p < .05$  compared to control.

**Figure 3**

Study 1: The Role of Fluency as a Mediator of the Impact of a Sign's Language on Behavioral Intentions Toward the Store It Represents, Contingent Upon Shopper Ethnocentrism

## Discussion

In summation of Study 1 findings, the language of a sign has a direct influence on behavioral intentions toward the store represented by the sign, with bilingual signs having the most positive effect. One process by which this influence takes place is an evaluative process whereby the language of a sign leads to shoppers forming attitudes toward the sign itself, which in turn shapes attitudes toward the store the sign represents. More positive attitudes lead to more positive intentions to patronize a store (see Figure 2). However, this is not the whole story. The path from signs to intentions is only partially mediated by attitudes (affective evaluations of the sign and store). This suggests that there is another process by which this influence may take place.

Hence, we investigated the possibility of a second, nonconscious process by which fluency—the ease of processing sign information—may shape behavioral intentions in conjunction with ethnocentrism (see Figure 3). Evidence shows that ethnocentrism interacts with fluency such that when ethnocentrism is moderate or high, English signs are perceived as easier to process, and bilingual or Spanish signs are perceived as disfluent. Generally, more fluent sign information tends to engender more positive intentions toward a store ( $r = .288, p < .001$ ). But this effect is not statistically significant when ethnocentrism is low.

The evidence suggests that the language of the signs shapes expectations. Specifically, bilingual signage enhances perceptions of warmth, authenticity, and inclusiveness, and makes a store seem more interesting, as compared to English-only signage (see Table 1). Additionally, only a marginal uptick occurs in average product quality expectations when signs are bilingual, albeit no statistical difference as compared to single-language signs. What is the root source of these apparent advantages of bilingual signs? One respect in which such signs differ from single-language signs is the amount of text used to convey information in two languages. Thus, the mere amount of text poses an alternative explanation to the effects attributed to a sign being bilingual. We speculate that increasing the amount of text on a sign (within a reasonable limit) may trigger a mindless “more is better” heuristic (Cialdini, 2009), with attendant halo effects. Study 2 will explore this issue.

Whereas mean ratings represent “the average consumer” in our sample, we explored contingencies that might underlie the documented advantages of bilingual signage, reasoning that individuals characterized by different levels of ethnocentrism, differing political ideologies, foreign language facility, and demographics (gender, age, education) could react differently to the same sign message (Kellaris & Machleit, 2016). For the most part, the pattern evident in Table 1 persisted across participants characterized by these individual differences. We did, however, discover a correlation between political ideology and personal relevancy of the store, such that the more conservative an individual, the less relevant a store seems when it is represented by bilingual signage ( $r = -.225, N = 84, p < .04$  two-tailed). Additionally, we find that men and women, young and old, with varying levels of education, language facility, ethnocentrism, and political ideologies generally tend to respond similarly to bilingual signage.

## Study 2

Study 2 is a conceptual replication and extension of Study 1. Using different signs for different retail store types to assess the generality of the prior findings, we also sought to test an alternative explanation for the effects attributed to bilingual signage. Specifically, we created an additional “English + English” experimental condition in which the total amount of textual information was similar to that of the bilingual condition. As an added extension, we added a thought-elicitation task to gather qualitative evidence regarding impressions of the signs.

### *Participants and Design*

We recruited a national sample of 236 adult consumers (49.6% female; median age 35; age range 19–93) from the Prolific™ consumer panel in exchange for a nominal fee. As in study 1, these participants learned English as their first language (98.3%) and report similar levels of familiarity with the Spanish language (19% report the ability to read or speak Spanish; another 66% report familiarity with some Spanish phrases; and only 15% reporting complete unfamiliarity with Spanish). Participants were told that the purpose of the study is to “Investigate consumers’ feelings, opinions and attitudes regarding some pieces of information.” An additional 15 participants started the study but did not pass attention checks and were excluded from the analysis.

The procedure and measures were identical to those used in Study 1, with the following exceptions: (1) We changed the store signs to represent a candy shop; (2) we added a thought-elicitation task to gather additional insights; and (3) we added a fourth “English plus more English” condition that parallels the amount of text on the bilingual sign (see Figure 4). The intent of this condition is to determine if the apparent advantage of bilingual signs might stem partly from the greater amount of text such signs contain.

### Measures

In addition to the measures used in Study 1, Study 2 included a thought-elicitation task to capture affective evaluations of the sign. Participants were instructed to report retrospectively on “What thoughts passed through your mind as you viewed the sign? Please list any thoughts you can recall, briefly, including thoughts about the sign, the store, this research study, or any unrelated, random thoughts.” We provided ten spaces with instructions to “PLEASE LIST ONE COMPLETE THOUGHT PER BOX BELOW (words, phrases, or incomplete sentences are fine).” Across participants, the average number of thoughts listed was 5 (median = 6.1). After completing that task, participants were asked to code the affective valence of each thought they listed as being either positive, negative, or neutral. We averaged to form a measure we label valence of thoughts generated by the signs (Thought Valence). Finally, we used participant location data to create a geo-demographic variable (Geo) that classified each participant as residing in an area with relatively low, moderate, or high proportions of Spanish speakers relative to the general population (World Population Review, 2022).

### Qualitative Results

Write-in comments from the thought-elicitation task revealed interesting similarities and differences between reactions to otherwise identical store signs in English, bilingual, or Spanish-only. In terms of similarities, there were many comments across signage groups regarding nonsign features of the storefront, such as the dark windows and parking. Additionally, the size of the sign, the font, and other common features were noted consistently across groups.



Bilingual



English only



English + English



Spanish only

### Figure 4

Study 2 Stimuli—Candy Shop Signage

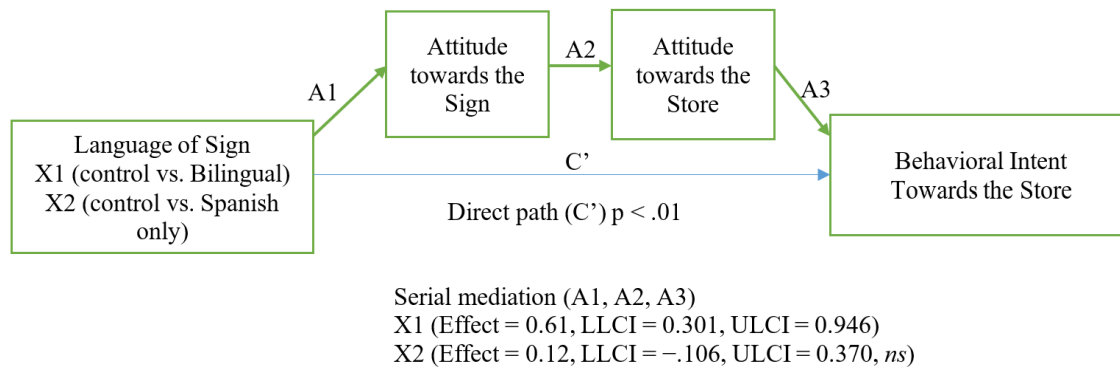


Figure 5

Study 2: Replication—How the Language of a Sign Shapes Behavioral Intentions Toward the Store It Represents

The English version of the sign was perceived as plain, simple, minimalist, somewhat dull, not particularly interesting, but clean and perfectly clear in its purpose: it was unambiguously a candy shop, which evoked disparate sentiments ranging from warm nostalgia to cold horror at the sugar and calories. Participants exposed to the sign in English did not appear to spontaneously generate thoughts regarding inclusiveness until they were asked about it later in the survey.

Exposure to a bilingual (English + Spanish) version of the sign provoked, in many cases, notably different perceptions. Not only was the sign perceived to be more interesting and inclusive, it was also characterized as cute, colorful, fun, and welcoming. Only a few participants misidentified the second language as something other than Spanish (One elderly participant commented cheerfully that “France is known for its excellent candy!”). Those that correctly identified the second language as Spanish inferred store location in a culturally diverse area with Hispanic customers or ownership.

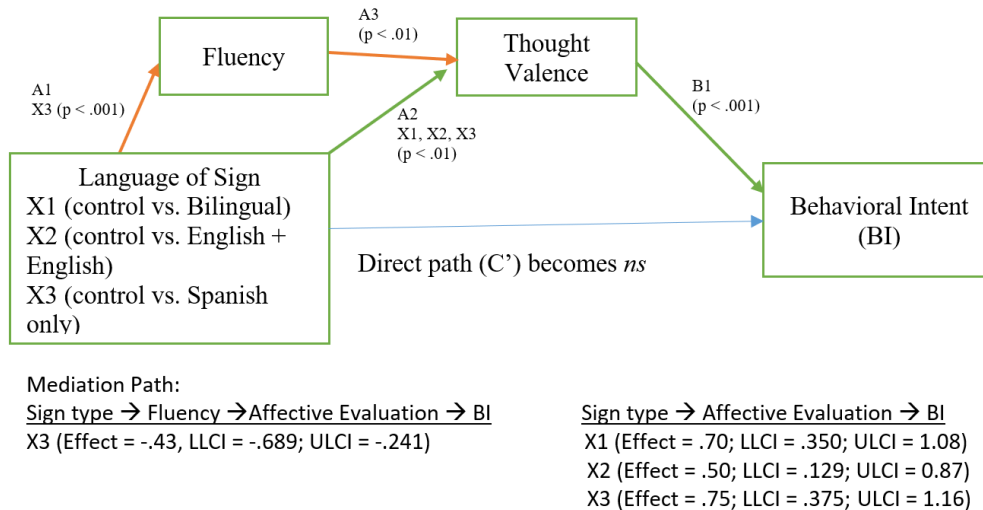
Exposure to a Spanish-only version of the sign leads to misunderstandings regarding the nature of the store and what it sells, with some guessing it is a dairy shop, bakery, pastry shop, or something other than a candy store. It was the only condition that provoked responses in the form of questions (e.g., “What kind of business?” “Why is the sign in Spanish?” “What do they sell?” and “Is this (storefront)

a church?”). Additionally, many participants expressed a reluctance to explore the shop, anticipating communication problems or simply inferring personal irrelevance.

#### Statistical Results

The statistical analysis began with a replication of Study 1 using data from Study 2. To test the hypothesis that the language of a sign will produce systematic differences in attitudes toward the sign and the store it represents, we conducted a mediation analysis using PROCESS version 4.0, model 6 (Hayes, 2021). As in the prior study, we evaluated the independent variable (language of the sign) with the English-only sign as the control compared to the bilingual and Spanish-only signs as the two test conditions. The model included language of the sign as the independent variable, Attitude-to-the-sign and Attitude-to-the-store as mediators, and behavioral intent as the dependent variable (see Figure 5). Results show partial mediation with a significant path from Sign through Attitude-toward-the-sign and Attitude-toward-the-store to behavioral intent ( $p < .01$ ). This mediation is particularly driven by the positive impact of the bilingual sign compared to the English-only control (Effect = .61,  $p < .01$ , LLCI = .301; ULCI = .946), however the direct path from sign type to behavioral intent remains significant for the Spanish only sign (Effect = -.75,  $p < .01$ ) compared to the control (Omnibus test of direct effects of X on Y,  $F(2, 168) = 4.72, p = .01$ ). In summation, results from





Study 1 were conceptually replicated using different stimuli and a different sample of consumers, which affirms the generality of the process by which the language of signs influence behavioral intentions toward the stores they represent.

Next, we investigated the possibility that fluency (ease of processing sign information) and the valence of thoughts generated by signs might mediate the impact of a sign's language on shoppers' behavioral intentions. Our conjecture is that fluency will be an important mediator for the Spanish language sign, but valence of thoughts will be more important for processing bilingual signage. To test this, we conducted a sequential mediation analysis using PROCESS version 4.0, model 6 (Hayes, 2021). Language of the sign is the independent variable, Fluency and Thought Valence are included as mediators, and Behavioral Intent as the dependent variable.

Results show a significant ( $p < .01$ ) serial mediation through Thought Valence for all the sign conditions (bilingual, English + English, and Spanish). Moreover, for the Spanish language sign, there is an additional, significant ( $p < .001$ ) serial mediation through Fluency to Thought Valence to Behavioral Intent. When the mediators are included in the model, the direct effect of a sign's language on behavioral intentions becomes nonsignificant, indicating a full mediation. (see Figure 6).

To further explore the role of fluency as a mediator, we introduced a geo-demographic variable as a moderator of language's influence on the experience of (dis)fluency. This variable (Geo) divided participants into areas characterized as low, moderate, or high in terms of proportion of Spanish speakers in the population. For example, whereas California (26.16%) and Texas (25.60%) have relatively high proportions, Vermont (1.05%) and Maine (0.86%) have relatively low proportions (World Population Review, 2022). Not surprisingly, we find a significant

**Figure 6**

Study 2: The Role of Fluency and Affective Evaluation of the Sign as Mediators of the Impact of a Sign's Language on Behavioral Intentions Toward the Store It Represents

interaction ( $p < .01$ ) between language of sign and Geo, with Geo moderating the influence of language on perceptions of fluency. People living in areas with low or moderate numbers of Spanish speakers find signs in Spanish more disfluent than do people living in areas with a high proportion of Spanish speakers. For example, whereas the English sign averaged 5.8 in fluency among people living in locales with a small Hispanic population, Spanish signs averaged 2.8 in fluency (vs. 4.4 among those living in areas with a large Hispanic population).

Finally, we replicated the analysis shown in Table 1 of Study 1, which examined how the language of a sign shapes consumers' expectations of the store it represents. The results of Study 2 replicated those of Study 1 using different stimuli and participants (see Table 2), affirming certain advantages of bilingual signs.

**Table 2 / Mean Expectations Across Language Conditions (Study 2)**

Expectations of...	English only (control)	Bilingual	English + English	Spanish only
Product quality	3.08	3.68 <sup>1</sup>	3.38	3.31
Service quality				
• Warmth	3.02	3.77 <sup>1</sup>	3.70 <sup>1</sup>	3.31
• Competency	3.27	3.82 <sup>1</sup>	3.70 <sup>2</sup>	3.47
• Ease of communication	3.54	3.93 <sup>2</sup>	3.87	2.85 <sup>1</sup>
Authenticity	3.53	4.72 <sup>1</sup>	4.53 <sup>1</sup>	4.76 <sup>1</sup>
Inclusiveness	3.68	5.12 <sup>1</sup>	4.60 <sup>1</sup>	3.61
Personal relevancy	3.48	4.11 <sup>2</sup>	3.87	2.81 <sup>2</sup>
Interestingness of store	2.98	4.42 <sup>1</sup>	3.75 <sup>2</sup>	3.86 <sup>2</sup>

Note. Cell entries are means on seven-point scales.

<sup>1</sup> Significantly different from control  $p < .01$ .

<sup>2</sup> Significantly different from control  $p < .05$ .

### Discussion

Again, the evidence from Study 2 shows that the language of a sign has a direct influence on behavioral intentions toward the store represented by the sign, with bilingual signs having the most positive effect. One process by which this takes place is through attitude formation wherein a sign that engenders positive evaluations of the sign tends to foster similar attitudes toward the store it represents, with positive attitudes encouraging positive behavioral intentions.

Study 2 provides additional evidence that the ease with which sign information is processed (fluency) plays a mediational role in shaping a sign's influence on prospective shoppers' behavioral intentions. This is most evident in the case of Spanish signage, which is processed with less ease, particularly in areas with relatively small Spanish-speaking populations, where Spanish signage is presumably less common. Disfluency colors the thoughts generated during the viewing of a sign, with negative thoughts reducing intentions to engage with a business.

Bilingual signage has advantages over English-only signage in terms of product and service quality expectations, perceived authenticity, inclusiveness, and interestingness of the store. Additionally, whereas increasing the amount

of English text to mirror the amount of text on a bilingual sign (English + English condition) appears to operate similarly on many categories of expectations, suggesting that some of the advantages of bilingual signs may stem from an implicit “more is better” heuristic. Moreover, whereas Spanish-only signage scored well in terms of authenticity and interestingness, these advantages are offset by disadvantages in terms of ease of communication and personal relevancy to majority consumers.

## GENERAL DISCUSSION/CONCLUSION

This study is an initial, exploratory investigation of shopper reactions to bilingual signage. Evidence from two experimental studies indicates that bilingual signs may have a number of advantages beyond the mere facilitation of communication across language groups. In general, bilingual signs, as compared to single-language signs, foster more positive perceptions of authenticity, inclusiveness, warmth, and add an element of interestingness to the stores they represent. Foreign language signs (Spanish-only in the present case), by contrast, appear to cue expectations among some English-speaking majorities of less positive service experiences in terms of friendliness and ease of communication and seem less welcoming (inclusive) as compared with bilingual signs.

There appear to be multiple processes by which bilingual signs influence prospective shoppers’ intentions to patronize a store. One path by which the language of a sign shapes behavioral outcomes is by engendering attitudes toward the sign itself, which foster similar attitudes toward the store it represents. Positive regard (“I like this sign, therefore I like this store”) naturally leads to approach behaviors, such as the intent to shop.

This, however, does not fully explain how the language of the signs shapes behavioral intent in all cases, under all circumstances. A second path by which the language of a sign shapes behavioral outcomes is by the ease with which the sign information can be processed (“fluency”), which in turn is contingent upon the level of an individual’s ethnocentrism (Study 1) and can operate through the valence of thoughts it generates (Study 2). Moreover, whereas study participants reacted similarly to bilingual signs and English signs with texts of similar length (“English

+ English” condition, Study 2), some apparent advantages of bilingual signs may stem from a “more is better” heuristic. Collectively these paths may account for the majority of influence a sign’s language exerts on viewers’ intentions, but other process mechanisms may await discovery.

## Practical Implications

Although we consider the present findings to be preliminary, they suggest intriguing communication effects with potential to guide real-world applications in the realm of on-premises signage. Primarily, even if bilingual signage is not needed to facilitate basic communication, such as in an area with recent immigrants, it may be advantageous to use in terms of fostering generally positive perceptions and outcomes among majority consumers. Bilingual signage has the potential for making stores seem more interesting by adding a dash of international flavor and more inclusive by appearing welcoming to a broader range of shoppers.

This, however, comes with a caveat. According to Angel Colón (personal communication, September 13, 2022), Senior Director of Diversity at The Kroger Company, target markets are moving targets, so responses to bilingual signs are not static over time. He recounted examples of the market’s dynamic nature from Kroger grocery stores’ experience with bilingual signage. Originally, it was intended to facilitate basic communication with the growing Hispanic segment, primarily “Mexican moms.” Older Hispanic customers and recent immigrants appreciated the courtesy of easily understandable bilingual signage in both English and Spanish, which facilitated shopping and conferred the residual benefit of helping them learn English. Children of the next generation, however, grew to resent bilingual signage, as implied that they did not understand English adequately. It singled them out as “different.” However, over time, as Latino Pride emerged as a cultural phenomenon, bilingual signage became a source of pride in heritage and in the impact of Latinos on the culture. It signaled that Spanish was “mainstream.” (A. Colón, personal communication, September 13, 2022). From this perspective, we can say that bilingual signage tended to be viewed positively by majorities and minorities alike *at this moment in time*. How this might change in the future is a topic ripe for speculation and investigation and a caution flag for the sign industry.

The generality and practical value of the present findings are subject to verification in future research. Nevertheless, we hope that this article will spark further investigations into the effects of bilingual signs. Among the topics that could be explored are a deeper dive into nonconscious processes through which types of signs influence desired behavioral outcomes. It would be interesting to investigate personal characteristics (need for closure or need for cognition) and heuristics (e.g., “more is better”) as possible moderators of mediators of the process. For example, in addition to evoking a “more is better” heuristic, perhaps bilingual signs foster an illusion of being able to read in two languages. If so, we speculate that a resulting uplift to ego (e.g., “I am smart, because I can read a second language”) may be generalized as a positive metacognitive experience attributed to or otherwise associated with the sign and the business it represents, with downstream consequences for shopper behavior.

Another direction for future research could be to examine reactions to bilingual signs in other contexts, such as wayfinding signs at international tourist sites or aspects of the signage design. Bilingual signs at tourist locations may seem natural and imply that visitors come from far and wide. The design of the sign could vary the order of languages presented (e.g., English/Spanish vs. Spanish/English) as well as the relative size of the text (e.g., equal sizes vs. larger English/smaller Spanish), which may signal implied importance and cue inferences of who the intended audience is, or respect for different segments.

Finally, we believe it could be interesting for future investigations to dive deeper into geo-demographic factors, such as the proportion of a local population that is Hispanic, Spanish-speaking, or highly ethnocentric. We found that ethnocentrism moderates the influence of the language of the sign on fluency, but it would be interesting for future research to investigate why individuals characterized by high ethnocentrism perceive bilingual and foreign language signs as more disfluent. Is it because they are more likely to be monolingual or is it driven by a lack of comprehension or some other demographic or cognitive difference? We speculate that bilingual signs could seem more/less normal, welcoming, or threatening, depending upon geo-demographics, but commend the investigation of these questions to future research.

### *Conclusions*

At the outset, a number of research questions guided this investigation. To conclude our report, we will briefly recap the research questions and the answers provided by the evidence.

What are the benefits and hazards of bilingual and foreign language signs? The benefits of bilingual signs include their positive effect on behavioral intentions toward the businesses they represent as well as fostering positive perceptions of service quality, authenticity, inclusiveness, and interestingness. A hazard of bilingual signs is their potential to be off-putting to some shopper segments (e.g., highly ethnocentric customers, second-generation immigrants that are fully fluent in English). Benefits of foreign language signage include their “audience



sorting” potential to target a specific segment as well as fostering perceptions of authenticity. Hazards of foreign language signs include their potential to be off-putting to some majority consumers and their cueing expectations of communication difficulty, a dimension of service quality.

How do consumers process information communicated by bilingual or foreign language signs (as compared to the dominant, majority language)? Evidence shows that sign information can be processed via a conscious, evaluative process (see Figures 2 & 5) or by nonconscious, automatic processes, such as inferring from the ease of processing sign information that the store it represents is good or bad.

What impressions do bilingual and foreign language signs provoke? Do they foster perceptions of inclusion and authenticity, as we speculated? Do they add an element of interest to a retail environment? The short answer is yes. Across studies, bilingual signs consistently provoked impressions of warm, cordial service, authenticity, inclusion, and interestingness, more so than English or Spanish signs. Foreign language signs provoked the impression that communication might be difficult.

Do signs cue expectations about the quality of products and customer service? Again, the short answer is yes. Bilingual signs enhanced expectations of service (Studies 1 & 2) and product (Study 2) quality. Foreign language signs, by contrast, tended to cue expectations of nominally but not statistically lower quality. The main problem issue was cueing expectations of communication challenges with majority language customers.

What influence does the language of signs have on prospective customers’ behavioral intentions vis-à-vis a business? Evidence from two experiments shows wide variation in behavioral intentions toward stores, depending upon the language of signage. Bilingual signage has a general advantage over English and Spanish signs. This advantage stems from encouraging positive attitudes, positive metacognitive experiences (fluency), and priming positive expectations. Whereas bilingual signs use more text than monolingual signs, repeating information in two languages, such signs may benefit from triggering a “more is better” heuristic below the threshold of conscious perception.

## REFERENCES

- Cacioppo, J. T., Petty, R. E., & Morris, K. J. (1983). Effects of need for cognition on message evaluation, recall, and persuasion. *Journal of Personality and Social Psychology*, 45(4), 805–818. <http://dx.doi.org/10.1037/0022-3514.45.4.805>.
- Cialdini, R. B. (2009). *Influence: Science and practice* (5th ed.). Pearson Education.
- Coomer, B. (2012, October). Tour the new “party” Kroger. *Houston Chronicle* <https://www.chron.com/news/houston-texas/slideshow/Tour-the-new-party-Kroger-51316.php>
- de Villiers, G., Costandius, E., Brazier, K., & Perold-Bull, K. (2022). Towards linguistic inclusivity: An exploration of the wayfinding system at Stellenbosch University, South Africa. *Interdisciplinary Journal of Signage and Wayfinding*, 6(2), 31–42. <http://dx.doi.org/10.15763/issn.2470-9670.2022.v6.i2.a119>.
- Dynamic Language. (2022). *A demographic look at Spanish speakers in the U.S.* Retrieved December 2, 2022, from <https://www.dynamiclanguage.com/a-demographic-look-at-spanish-speakers-in-the-u-s/>.
- Goldsmith, R. E., Lafferty, B. A., & Newell, S. J. (2000). The impact of corporate credibility and celebrity credibility on consumer reaction to advertisements and brands. *Journal of Advertising*, 29(3), 43–54. <http://dx.doi.org/10.1080/00913367.2000.10673616>.
- Hayes, A. F. (2021). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press.
- Kellaris, J. J. (2010). Marketing student’s attitudes towards and beliefs about commercial signage. In M. K. Brady, & M. D. Hartline (Eds.), *Marketing theory and applications: 2010 AMA winter educators’ conference* (pp. 224–225)
- Kellaris, J. J., & Machleit, K. A. (2016). Signage as marketing communication. *Interdisciplinary Journal of Signage and Wayfinding*, 1(1), 1–17. <http://dx.doi.org/10.15763/issn.2470-9670.2016.v1.i1.a4>.
- Kellaris, J. J., Machleit, K., & Gaffney, D. R. (2020). Sign evaluation and compliance under mortality salience. *Interdisciplinary Journal of Signage and Wayfinding*, 4(2), 51–66. <http://dx.doi.org/10.15763/issn.2470-9670.2020.v4.i2.a65>.
- Kostyk, A., Leonhardt, J. M., & Niculescu, M. (2021). Processing fluency scale development for consumer research. *International Journal of Market Research*, 63(3), 353–367. <http://dx.doi.org/10.1177/1470785319877137>.
- Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: “Seizing” and “freezing.” *Psychological Review*, 103(2), 263–283. <http://dx.doi.org/10.1037/0033-295x.103.2.263>.
- Leeman, J. (2018). It’s all about English: The interplay of monolingual ideologies, language policies, and the U.S. Census Bureau’s statistics on multilingualism. *International Journal of the Sociology of Language*, 2018(252), 21–43. <http://dx.doi.org/10.1515/ijsl-2018-0013>.
- Liu, F., Murphy, J., Li, J., & Liu, X. (2006). English and Chinese? The role of consumer ethnocentrism and country of origin in Chinese attitudes towards store signs. *Australasian Marketing Journal*, 14(2), 5–16. [http://dx.doi.org/10.1016/s1441-3582\(06\)70057-x](http://dx.doi.org/10.1016/s1441-3582(06)70057-x).
- Neuliep, J. W., & McCroskey, J. C. (1997). The development of a U.S. and generalized ethnocentrism scale. *Communication Research Reports*, 14(4), 385–398. <http://dx.doi.org/10.1080/08824099709388682.2>
- Schwarz, N. (2004). Metacognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, 14(4), 332–348. [http://dx.doi.org/10.1207/s15327663jcp1404\\_2](http://dx.doi.org/10.1207/s15327663jcp1404_2).
- Shimp, T. A., & Sharma, S. (1987). Consumer ethnocentrism—Construction and validation of the CETSCALE. *Journal of Marketing Research*, 24(3), 280–289. <http://dx.doi.org/10.1177/002224378702400304>.
- Taylor, C. R., Claus, T. A., & Claus, S. L. (2005). *On-premise signs as storefront marketing devices and systems* (1st ed.). U.S. Small Business Administration.
- Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology*, 67(6), 1049–1062. <http://dx.doi.org/10.1037/0022-3514.67.6.1049>.
- World Population Review. (2022). Spanish Speaking States [Updated January 2023]. Retrieved December 2, 2022, from <https://worldpopulationreview.com/state-rankings/spanish-speaking-states>

# Visual Mixed Messaging: The Role of Signage in Public and Private Governance of New York City Interior Privately Owned Public Spaces

**Alex Donahue**

Ph.D. Candidate,  
School of Architecture,  
Planning and Preservation,  
University of Maryland, USA

**Madlen Simon\***

Professor,  
School of Architecture,  
Planning and Preservation,  
University of Maryland, USA  
3835 Campus Drive,  
College Park, Maryland 20742, USA.

\*Corresponding author  
mgsimon@umd.edu

**Madeline Brown**

Assistant Professor,  
Anthropology Department,  
University of Maryland, USA

## INTRODUCTION

Signage is the technology by which the use of New York City's interior privately owned public spaces (IPOPS) are regulated by public and private entities. This category of urban place presents barriers to entry, visible in the form of building facades and doors of the host buildings whose architecture typically signals corporate exclusivity rather than a general welcome to the public. Signage is how New York City (NYC) welcomes the public into these places that might be mistaken for office buildings open only to authorized visitors. Given that these signs are the primary signals to potential space users about which activities, behaviors, and objects are allowed in these areas, understanding their messaging is an integral part of interpreting the governance of these publicly owned private spaces. Moreover, while the city mandates some signs, others are idiosyncratic and posted by owners in an unstandardized fashion. Such owner signs offer additional governance of these spaces beyond the regulations and accessibility required by the city. We examine the signage found upon entry to IPOPS, including signs mandated by New York City regulations (city signs) and signs provided by private owners at their discretion (owner signs). To what extent does signage convey the public nature of these places? A related question is, does owner signage constrain the definition of the term "public" that is a feature of city signage? Our findings show that city signage conveys welcome to the public, informs about opening hours, and lists amenities for visitors to enjoy. Owner signage, on the other hand, regulates the use of the spaces by enumerating prohibited activities, behaviors, attributes, and items and by signaling enforcement mechanisms.

In IPOPS, signage makes visible the separation of responsibility between two authorities, public and private entities, governing these spaces. The city invites

## Abstract

New York City's Interior Privately Owned Public Spaces (IPOPS) provides developers with bonus floor area in exchange for the urban amenity of publicly accessible space. Many issues can arise in jurisdictional overlap when city authorities and private owners govern space. Upon entering the front door of an IPOPS, one may encounter signage placed by private owners stating explicit rules discouraging specific uses, while city-mandated signage must state that the space is "open to the public." Given recent efforts to replace publicly regulated POPS signage, this study provides a timely assessment. The research question is: Do private owners' signs communicate in a manner that narrows the definition of "public"? Our research method includes transcribing all externally visible signage, including city-regulated signage and owner signage and performing a text analysis with R to discover the prevalence of language inviting use and regulating behavior. We analyze the data to discover how in contrast to city-mandated signage, owner signage tends to narrow the definition of "public." We explore the implications for the governance and administration of public space.

## Keywords:

signage, interior privately owned public space, urban space, linguistic landscape, language processing

the public into the space; the building owner provides security. We consider how deontic status and stance in signage confer authority upon private entities to enforce an enhanced security atmosphere in nominally public places where people should enjoy all the freedoms of public space. Valverde (2011) asserted that dynamic analyses of security projects should consider logic, scope, and techniques. The scope of our research is a set of nineteen IPOPS in New York City, but it is critical to acknowledge that each IPOPS is a microcosm of jurisdiction with its model of private urban governance existing behind the street wall that typically denotes the membrane between public and private regulation. Kempa et al. (1999) outlined five aspects of the logic of private governance in these spaces that Caldeira (1996) termed “fortified fragments.” Four of these strategies are evident in IPOPS: (a) A sorting process separates “desirables” from “undesirables”; (b) Orderly behavior is rewarded with participation while disorderly conduct is threatened with expulsion; (c) Control strategies are embedded in the design; (d) Order is instrumental, seeking to prevent infringement rather than punish wrongdoing. This work seeks to discover the logic of security in these environments by interrogating the signage technique.

In this research, we examine the language of city signs to determine how inclusive the public welcome is and the language of owner signs to determine whether their prohibitions constrain uses legally permitted in public places. The follow-up question is, do these restrictions target particular groups of people in ways that implicitly exclude them from enjoying the benefits of IPOPS? This question refers to Valverde’s (2011) distinction between *sûreté* and *securité*; we question whether some will read the signs as a signal that the private authorities threaten their presence while others will feel they are being protected. This study is a timely assessment, given that in 2017 all publicly regulated POPS signage was replaced following a publicly engaged design process and has yet to be evaluated. While this research focuses on IPOPS in NYC, the results have broader significance, as POPS have proliferated beyond NYC, and have become prevalent in many cities and countries worldwide (D. Lee, 2022; Németh, 2008).

POPS was created in NYC in the 1960s as a new development incentive permitting developers to build bigger buildings in return for publicly accessible space on privately

owned property. The broad question about POPS is, does this zoning regulation offer a fair trade-off, or does it favor private developers’ interests over the public good?

Our research focuses on the role of signage in messaging about the public character of these spaces or who is and who is not welcome in these public urban places located within the walls of private buildings. The study’s methodology is a pioneering application of natural language processing (NLP) to the signage of IPOPS, enabling a comparison of texts of city signage with texts of owner signage to gain insight into the extent to which the intention of public access is or is not supported by these messaging systems. This text-mining process enables us to identify and examine messages about attributes, behaviors, and belongings that may function as proxies for particular social groups. In this article, we provide background information on IPOPS signage, briefly outline the theoretical framework of this study, and discuss the methodology for data collection and analysis. We present and discuss the findings from our analysis, offering conclusions, acknowledging our study’s limitations, suggesting future research directions, and raising implications for public policy.

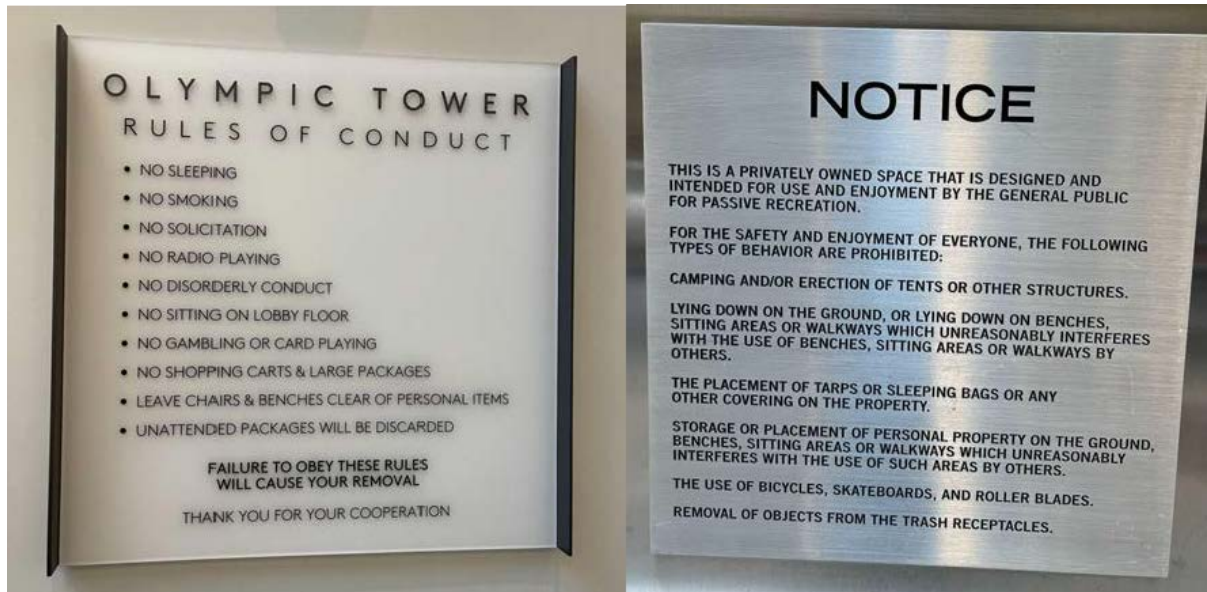
### **City Signage**

In most cases, IPOPS signage is rarely a “sign system,” but rather a combination of city signs and owner signs. While the initial zoning resolution establishing POPS did not mention the requirement of entry signage, the 1969 Zoning Resolution mandated the inclusion of entry plaque signs at each street frontage or entry point (Section 82-00[a]). The resolution also called for the inclusion of the tree logo signifying public space, the international symbol of access for people with health conditions or impairments, and a title stating that the space is open to the public (Kayden, 2000).

In 2017, the New York City Council adopted local law 116 and subsequent local law 250, requiring signage at all new and existing POPS. The city’s “signage system” presently comprises two components: the “entry plaque” identifying the space as public and the “informational plaque” communicating the amenities provided (Kallós et al, 2017).

Specific information must be included on these signs, including hours of operation, contact information, and a statement on accessibility, including the international





symbol of access. Not required, however, are other accessibility provisions such as braille, additional icons, or languages other than English.

### **Owner Signage**

NYC law neither requires nor restricts owner provision of signage. As observed in this study, many owners have added their own discretionary signage intended to regulate the behavior, attributes, and belongings of users of the space. Signs may announce that the space is intended for “passive recreation.” Certain behaviors, such as loitering, are typically noted negatively, following the word “no” or called out as prohibited. Personal attributes, notably odor, may be prohibited. Certain items, such as shopping carts, large packages, and tents, are prohibited. Signs may include information about the consequences of noncompliance with these regulations, such as “failure to obey these rules will cause your removal.” Figure 1 displays two examples of owner-provided signage within NYC IPOPS.

## **THEORETICAL FRAMEWORK**

This study addresses a gap in existing POPS research. While others (Huang & Franck, 2018; Kayden, 2000; D. Lee, 2022; Mitrasinovic, 2016; Németh, 2012; Smithsimon, 2011; Whyte, 1980) examined the extent to which POPS are publicly accessible places, we focus on the mechanisms by which signage, provided by city mandate and private owner discretion, promotes or denies public access in IPOPS. We examine how signage technology establishes a system of private urban governance by the owners of private real estate enclosing these public urban places.

*Figure 1 /*

Examples of Owner Signage, Displaying Rules of Conduct Within an IPOPS

Through this literature review, we identified three main lenses that we later used to analyze our findings: (a) IPOPS governance, (b) conscribed sense of public in IPOPS, (c) implicit exclusion in the linguistic landscape.

### 1. Visualizing the Invisible: IPOPS Governance

The ascendance of POPS has paralleled a more significant trend toward government deregulation and public-private partnerships, which Brenner and Theodore (2002) called the “rolling out” of urban neoliberalization. The neoliberal trend occurring in the past half-century has fueled increased construction of such hybrid spaces as the shopping mall (Sorkin, 1992), the Business Improvement District (Lippert & Sleiman, 2012), and the urban condominium (Lippert & Steckle, 2016). Like these urban typologies, POPS operates in physical space and through an invented legal relationship with a complicated inner-governance structure motivated by profit. The blurred public-private distinction makes POPS unique due to a direct and continued legal commitment to public access (Kayden, 2000). The unclear nature of POPS can lead to misunderstanding by the public about the kind of space a POPS fundamentally is (D. Lee, 2022). Crang and Graham (2007) asserted that visible governance technology has saturated our urban environment, with little thought given to how the public perceives the visibility of such elements.

Other aspects of governance that could be more readily apparent when entering a space are issues of broad overlapping governing jurisdiction, including local, state, and federal laws, along with rules and regulations of a private entity (Valverde, 2011). We argue that signs make the invisible concept of jurisdictional governance visible.

### 2. Conscripted Public Use in IPOPS

*The right to the city* is the notion, introduced by Henri Lefebvre, that the public is embedded in the rights to the city discourse:

“The right to the city manifests itself as a superior form of rights: right to freedom, to individualization in socialization, to habitat and to inhabit. The right to the oeuvre, to participation and appropriation (clearly distinct from the right to property), is implied in the right to the city” (1996, pp. 173–174)



Figure 2

No Loitering Sign Found in NYC POPS

Mitchell (2003) agreed with Lefebvre (1996), focusing on the exclusion of unhoused people from public spaces, a denial of the right to inhabit the city and, hence, to participate in the oeuvre, or work of the city. Mitchell wrote about the importance of the way the public is imaged, citing Crilley’s (1993, pp. 153–154) observation that “corporate producers of space tend to define the public as passive.” Mitchell (2003, pp. 202–203) noted the difference and correlation between status (e.g., homelessness and behavior, like sleeping in public).

To discern the extent private urban governance imposes extralegal restrictions on users of IPOPS, it is critical to understand what behavior is regulated by law. New York State Penal Code Article 240 enumerates offenses against public order, public health, and morals. Two relevant offenses are loitering and disorderly conduct. Figure 2 displays a typical loitering sign within a NYC POPS space.

While the commonly used definition of loitering is synonymous with hanging out, the legal definition in New York is constrained to loitering with specific purposes (gambling with cards, dice, or other gambling paraphernalia; using or possessing controlled substances; or engaging in prostitution offenses) or attributes (being masked).

Whyte (1980, p. 65) asserted that the private owner of a public space “has not been given the right to allow only those public activities he happens to approve of,” narrowing the definition of accessibility and not complying with the spirit of the agreement with the city for which the owner has been “specifically, and richly, rewarded.”

**Figure 3**

On the Left, the Original Rules of Conduct Sign for Zuccotti Park. On the Right: Post-Occupation Rules for Zuccotti Park



Mitchell (2003, pp. 1–9) evaluated NYC after the turn of the millennium following the attacks of September 11th, 2001, and found an increase in “environment change, behavior modification, and stringent policing” resulting from a “fear of inappropriate users,” such as the “homeless, drug dealers, loitering youth-and not inconsequentially, political activists protesting in squares.” Grounding his argument in the right to the city discourse, Mitchell called for “a different kind of order; one built not on the fears of the bourgeoisie but on the needs of the poorest and most marginalized residents” (Mitchell, 2003, p.9). Douglas Woodward contextualized the impact of private urban governance during the “Occupy” era, recounting the significance of owner signage before and after the internationally famed occupation of Zuccotti Park, which sparked the Occupy movement. The preoccupation signs displayed fewer rules and regulations. In contrast, the post-occupancy sign added terms such as “passive recreation” and further rules banning items such as tents and “other structures,” placement of tarps, and prohibiting actions such as lying down on benches. “Despite all the rulemaking, there is still no clear guide as to what constitutes proper behavior in a POPS, or exactly what kind of activities property owners can control” (Woodward, 2012). Woodward references the changes to Zuccotti Park’s rule signs. We visited this site and photo-documented the same findings. Figure 3 below displays the initial rules sign at Zuccotti Park (left) and a newer sign with additional rules (right).

### 3. *Implicit Exclusion in the Linguistic Landscape*

Németh and Schmidt (2011, p.5) stated, “Privately owned public spaces are frequently criticized for diminishing the publicness of public space by restricting social interaction, constraining individual liberties, and excluding undesirable populations.” Marginalization and exclusion can take many forms, as prohibiting specific actions can be a proxy for excluding certain groups, effectively limiting the definition of the public. The United States has a long history of exclusion in public space by gender (Day, 1999) and race. One example of how signage excludes can be found in “Black codes,” a colloquial term for Jim Crow-era loitering

laws that gave police broad license to persecute Black people in public spaces. Loitering laws still oppress people of color, particularly youth and transwomen (A. Lee, 2022).

While Landry and Bourhis (1997), originators of the term linguistic landscape (LL) were primarily concerned with languages spoken by members of communities in particular geographic areas, the meaning of the term linguistic landscape has broadened. The editors of *Linguistic Landscape* (2015, as cited by Gorter, 2018, p.2) identified that LL attempts to explore “attempts to understand the motives, uses, ideologies, language varieties and contestations of multiple forms of ‘languages’ as they are displayed in public spaces.”

### ***Deontic Status and Stance in Signage***

Svennevig (2021, p.165) noted that signs are “power indices of norms of propriety and social order.” Svennevig discussed the author’s claim to authority in regulating the actions of others and how compliance is enforced. This level of authority is known as deontic status. Stevanovic and Peräkylä (2014, p.190) distinguished between deontic status and deontic stance as follows: deontic stance, “refers to the position that a participant has in a certain domain of action, relative to his/her co-participant(s)”, whereas deontic status is “the speakers’ public ways of displaying how powerful they are.” Gorter (2006) designated “top-down signage” as “official signs placed by a government or institution,” while “bottom-up signage” is considered “nonofficial signs put there by commercial enterprises or by private institutions or persons.” Kallen (2009, p. 273) argued that while it is useful to categorize, the binary distinction is too simplistic, stating that “Any act of signage could be simultaneously top down, bottom up, horizontal, or otherwise oriented depending on the speaker’s intent.”

Trinch and Snajdr (2020, p. 235) asserted that signs regulate “social interaction, users, and usages of space,” noting instances where “privilege is exercised through public texts as forms and models of communication.” Signs can exclude the absence or marginalization of languages. An obvious example is using only one language in a community where a high percentage of the population speaks a primary language other than that displayed on the sign.

## **METHODOLOGY**

### ***Data Collection***

Between October 14–16, 2022, we documented 35 signs at 19 IPOPS in NYC and divided them into two groups based on deontic status and stance (i.e., city signs in one group and owner signs in the other). The criterion used for selecting IPOPS to study is that the space must be climate-controlled with a clear threshold between indoors and outdoors. The researchers utilized the Advocates for Privately Owned Public Space (APOPS) database to filter climate-controlled spaces only.

We then transcribed text from the documented signs and entered it into an Excel spreadsheet. The spreadsheet includes additional identifying characteristics: sign address, sign type, city sign or owner sign, presence of braille, and languages included on the sign. We cataloged specific rules and prohibitions on owner signs. This task was performed by a single researcher, ensuring consistency in the process to prevent bias.

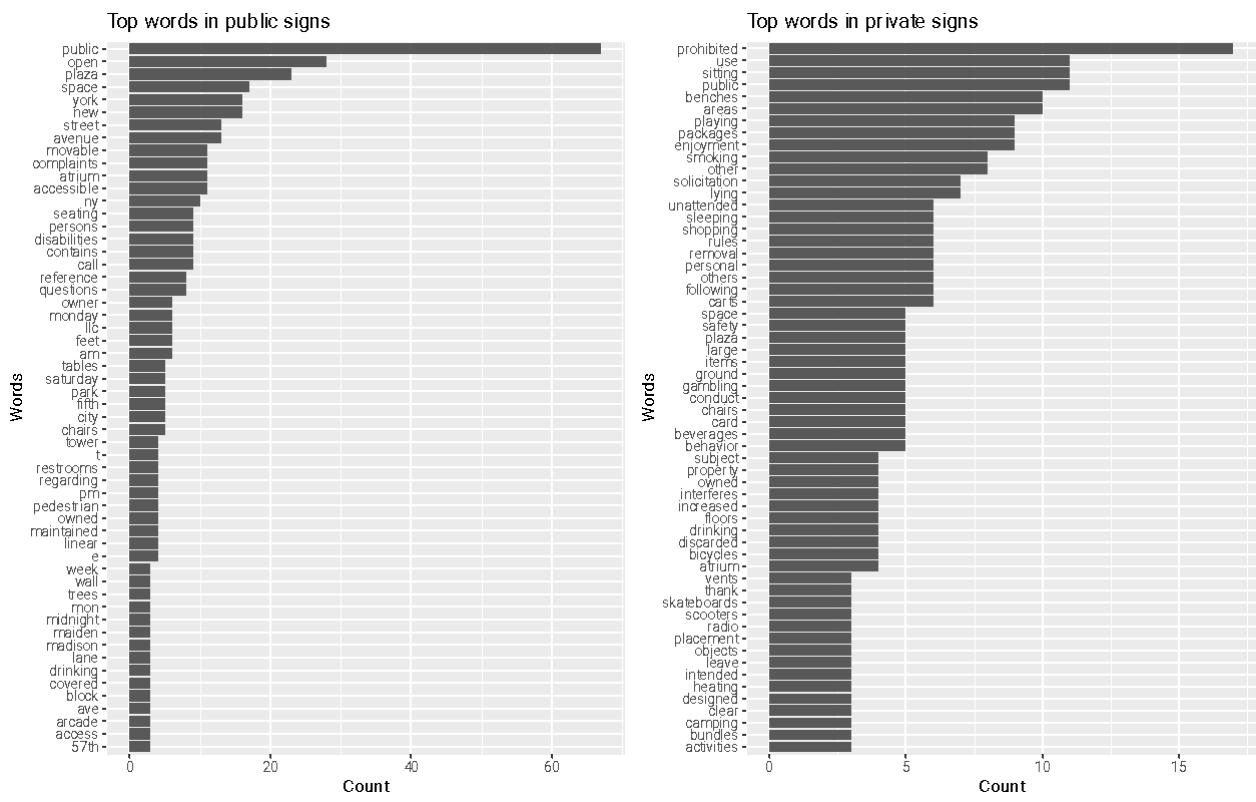
## **Data Analysis**

We analyzed sign text qualitatively and quantitatively to examine common and distinctive themes. Here, we use methods from Natural Language Processing (NLP) and general text analysis to understand the patterns in sign messaging (Silge & Robinson, 2017). We conducted data cleaning, analysis, and visualization using R (R Core Team, 2022). First, we cleaned (e.g., removed punctuation and standardized capitalization) and tokenized the sign text data using the tidytext R package (Silge & Robinson, 2016). Next, we removed stopwords using a process further detailed below. Burns describes stopwords as “lexical ‘noise’ that prevents ‘signal’—semantically or thematically significant content—from being accurately discriminated” (Burns, 2018, p. 4). Using the cleaned data, we compared word frequency and sentiments across the city-mandated and owner discretionary signs. Sentiment analysis is a popular approach for analyzing emotions and perceptions embedded in texts (S. M. Mohammad, 2021; Silge & Robinson, 2017). Some sentiment taggers, such as Bing or AFINN, classify terms into “positive” and “negative” categories (Hu & Liu, 2004; Nielsen, 2011). Others, such as NRC, classify terms into multiple categories, including emotions (e.g., joy, sadness, and anger; S. Mohammad & Turney, 2013). Finally, we analyzed the types of amenities provided in and behaviors or objects prohibited from IPOPS.

## **Approaching Public Signs as Text**

Working with unstructured text data collected from the built environment is not always straightforward. Signs often include information beyond the text itself, which may be encoded in font size, formatting (e.g., bold or italics), and capitalization, in addition to the importance of text placement, iconography and overall sign design. In addition, sign transcriptions may include descriptive text segments such as address numbers or hours of operation, which may be difficult to interpret as text without the broader context of the sign. Another challenge we encountered in applying text analysis approaches to sign text is the way these texts are structured. For example, a sign might begin a section with the phrase: “The following are prohibited”: followed by a bullet list of particular behaviors or objects. From a natural language processing perspective, although we can easily define where the list of prohibitions begins, it may be difficult to identify where it ends. This may require sign text data to undergo an additional reorganization phase or data structuring after transcription.

Removing stopwords from a text is a common practice for removing unnecessary common words from an analysis (Burns, 2018; Silge & Robinson, 2017). However, when applying standard stopword libraries included in tidytext (Silge & Robinson, 2016) to the POPS sign text, we found that these lists also removed words of interest in this particular context. For example, the words “open,” “welcome,” “everyone” and “others” are considered stopwords in these libraries but may be of analytic interest in understanding signage, suggesting that the development of stopword lists specifically for the domain of public signs would be beneficial for increasing the ease of application of text mining approaches to these signs. By constructing custom stoplists, it may be possible to reduce barriers to incorporating text mining into planners, landscape architects, and graphic designers’ analysis of public signage. For this paper, we first used a parts-of-speech tagger and then filtered the terms to include only those tagged as nouns, verbs, and adjectives. We did not change plurality, tenses, or forms of particular words.



## FINDINGS

### Word Prevalence

After cleaning the transcripts of the sign text, we documented 195 unique words on the owner signs and 184 on the city signs. The texts were somewhat less equal in length, with a total of 493 words on the owner signs and 614 words on the city signs. We compared the most frequent individual words appearing on the city signs and owner signs. The most frequently occurring word on the city signs is “public,” appearing 67 times, followed by “open” ( $n = 28$ ) and “plaza” ( $n = 23$ ), both occurring at a much less frequent rate. Figure 4 conveys the top 50 words occurring on public signs, from which several themes emerged. First, many of the frequent terms describe the place and the amenities one might find there (e.g., “seating,” “chairs,” “contains,” and “restroom”). In addition, some terms reference accessibility and ADA compliance (e.g., “accessible” and “disabilities”), while others refer to contact information (e.g., “call,” “questions,” “regarding”).

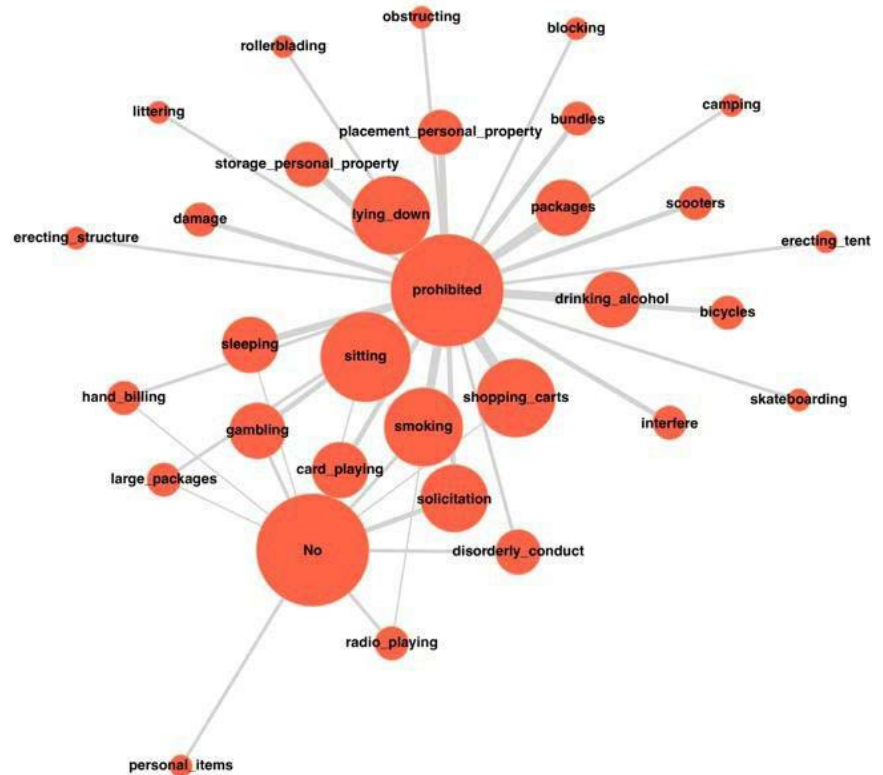
By contrast, the word appearing most frequently on the owner signs is “prohibited” ( $n = 17$ ), followed by “use,” “sitting,” and “public” (each  $n = 11$ ). Similar to the city signs, the owner signs contain some descriptions of amenities (e.g., “benches” and “heating”). However, most terms refer to actions and activities (e.g., “playing,” “sleeping,” “gambling,” “smoking,” and “solicitation”) or are descriptive adjectives that might be used to clarify certain conditions (e.g., “personal,” “safety,” and

Figure 4  
Word Prevalence Graphs



**Figure 5**

Restrictions in Owner Signs, Word Network Diagram of Terms and Phrases Associated with the Words “No” and “Prohibited”



“unattended”). Finally, many of the frequent words on these signs refer to objects: personal belongings and features of the space (e.g., “carts,” “property,” “floors,” and “vents”).

### Word Associations

In addition to examining frequent words, we analyzed words and phrases associated with key terms. For the city signs, we examined which amenities were listed as provided in each space, while for the owner signs, we analyzed terms associated with the words “prohibited” and “no.” Further data processing was required to analyze the concepts most associated with these terms. Because many prohibited activities and objects are outlined on signs in a list format, they could not be easily incorporated into a text analysis workflow. Instead, we manually created a word cooccurrence dataset for “prohibited” and “no.” In several cases, we removed prepositions or changed the plurality or form of a word to connect concepts that refer to the same action. Otherwise, these categories were kept consistent with the wording on the signs, meaning some prohibited actions may appear in multiple similar variations

(e.g., rollerblading and rollerblades are treated as distinct items). We found no restrictions on city signs, so the analysis focuses on the 153 references to actions/objects banned in IPOPS according to owner signs at 8 locations. In these references to restrictions on owner signs, 15% use the word “no” ( $n = 23$ ), while the overwhelming majority (85%) use the word “prohibited” ( $n = 130$ ). In total, 69 different restrictions were recorded from owner signs.

Words associated with the terms “prohibited” and “no” can be described as objects and behaviors. The most frequent restriction is “sitting” ( $n = 8$ ) followed by a tie between “lying down,” “shopping carts,” and “smoking,” which occur seven times. Figure 5 illustrates the co-occurrence network of restrictions linked to the terms “prohibited” and “no.” In this figure, nodes are relatively sized based on degree centrality (with some adjustment for “no” and “prohibition,” which are highly connected), with edge widths adjusted for the number of times the two terms are connected. For plotting clarity, terms that appear less than twice are excluded from the graph.

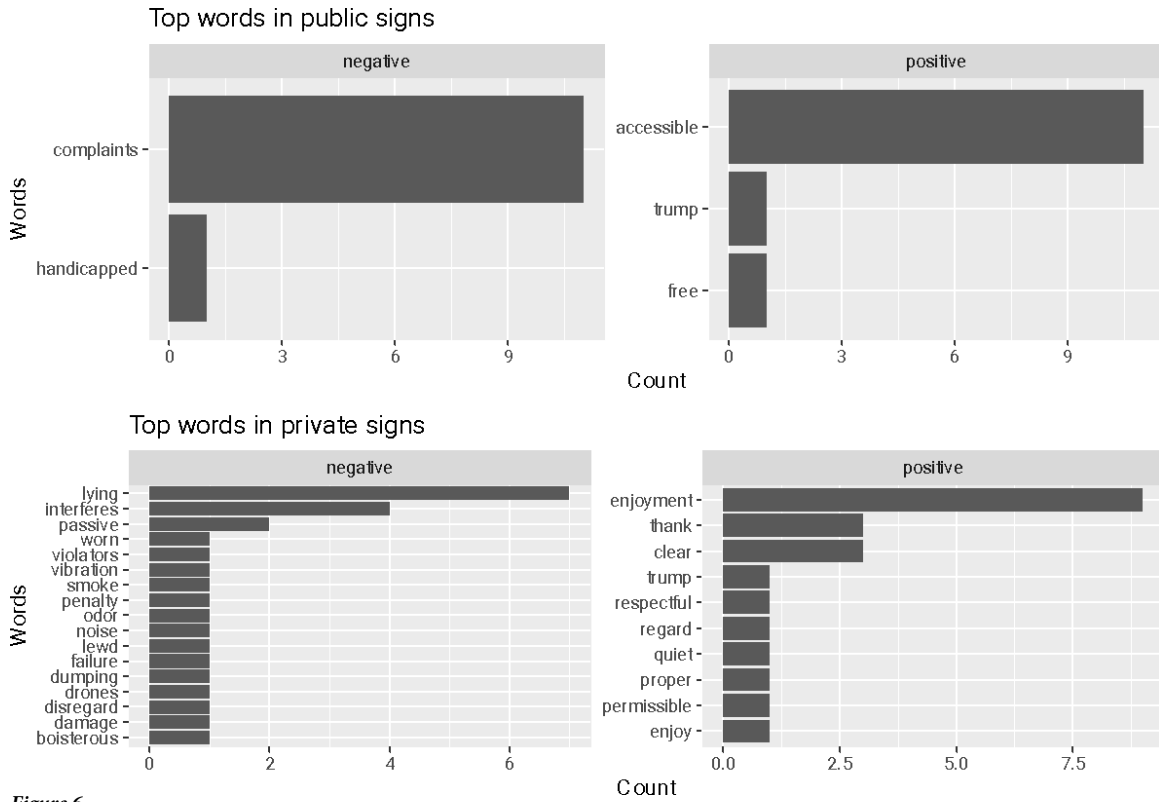


Figure 6

Sentiment Analysis of Top Words in City Signs (Above) and Owner Signs (Below)

The Fruchterman-Reingold layout algorithm is included in the igraph R package (Csardi, 2006) and draws on graphical adjustments detailed by Ognyanova (2021). From this figure, the top terms associated with restrictions on owner signs include objects (e.g., bundles, scooters, and bicycles) and behaviors (e.g., disorderly conduct, gambling, and solicitation). Some signs offered more detailed explanations, such as references to restrictions on storage or placement of personal property on benches, the ground, sitting areas, and walkways. Other objects-related restrictions include restrictions on sleeping bags, tarps, and coverings. Here we focus on analyzing the sign text, but future research might work to categorize further and group these restrictions along common themes. For example, many restrictions refer to certain attributes of behaviors and persons, such as “disruption,” “damage,” “interfere,” “disorderly,” “obstructing,” and “blocking.”

Examining the standard amenities mentioned on signs identified features primarily associated with seating, plants, and restrooms. Many signs specified that the IPOPS included movable seating or tables. Other amenities

included water features, Wi-Fi, art features, and drinking fountains. Still, other amenities mentioned refer to entertainment, food, charging stations, and telephones.

### Sentiment Analysis

We analyzed sentiment in IPOPS signage using the Bing sentiment lexicon, which classifies terms into “positive” and “negative” sentiments (Hu & Liu, 2004), as included in tidytext (Silge & Robinson, 2016). Among the city-mandated signs, only five words were included in the tagging lexicon.

Notably, “handicapped” and “complaints” appear as negative words, while “accessible,” “trump,” and “free” appear as positive terms, suggesting that the sentiment tagging may not capture the meaning of these terms in the specific context of urban signage. We interpret the general lack of polarizing terms as potentially being either related to the relative neutrality of terms appearing in city-mandated signs or to a gap in the types of words included in sentiment tagging lexicons. By contrast, the owner signs featured words coded as positive or negative (Figure 6). The most frequently occurring negative terms include “lying,”

“interferes,” and “passive,” followed by numerous terms that occurred once and are generally associated with actions, objects, and characteristics. Terms tagged with a positive sentiment include “enjoyment,” “thank,” and “clear,” followed by several words appearing once that emphasize quiet, respectful compliance in the spaces.

## DISCUSSION

### *Explanations and Restrictions in Public Signage*

Our primary finding from the sentiment analysis is that city signage tends to be excluded from the results of the sentiment tagger, (i.e., the language is neutral rather than flagged as either positive or negative). In contrast, the owner signage tends to emphasize negative sentiment.

Comparing word frequencies reveals clear differences between the city signs and owner signs. While the city signs focus on descriptions of available amenities, owner signs instead delineate the rules about behaviors discouraged in these spaces. One trend is the prevalence of the term “prohibited” on owner signs, while the city signs lack this term entirely. The language in owner signs intends to control and regulate behavior. We conclude that signage technology is deployed to render visible a private governing order in IPOPS. Following Valverde’s (2011) analytical model, we consider the scope of the security project, its scale, and jurisdiction limited to each IPOPS, for each is governed by a property owner that sets forth its version of urban order. However, the text analysis methodology we employed in this research reveals a similarity of logic that permits us to consider the entire set of IPOPS we studied to constitute a system of private urban governance. Utilizing Kempa et al.’s (1999) model to interrogate the logic of signage across the nineteen study sites reveals how the nineteen individual systems may be viewed as a unified security project to create an idealized vision of urban order for public space occurring within the walls of high-end New York City real estate. As Blomley (2004, p. 89) noted, “Real property has long had a special significance in governmental discourse, given its supposed value in the formation of desirable social and political entities.”

Given the notable differences in signage messaging between city signs and owner signs, what factors might

account for this variance? Though a full understanding of building owner motivations, connected to Valverde’s (2011) discussion of “telos,” or discourse and ethical justification, for posting particular signage is outside the scope of the present paper, we offer several suggestions based on the text differences alone, noting that these might be explored in further studies. Establishing that city signs tend to describe operating hours and amenities, it is unsurprising that these features are not replicated on owner signs. Instead, we posit that the owner signs add additional messaging that may be missing or inadequately communicated on city signage. For example, many owner signs contain specific information about restricted behaviors and activities that may be engaged in within the IPOPS. This information is not provided in city signage, meaning there could be miscommunication or conflicts about how these spaces are meant to be used. Notably, the owner signs are the only places that construct the notion that quiet, passive recreation is the ideal norm for IPOPS use. There is no legal requirement for the passive use of IPOPS. There is no universally accepted definition of passive use. For example, some definitions consider camping passive recreation, whereas camping or its attributes appear prohibited in numerous signs. Owner signage is the medium by which the instrumental nature of private governance is conveyed; lists of prohibitions, along with the encouragement of passive use seek to prevent infringement rather than punish transgression. Indeed, the question of punishment for engaging in prohibited but legally permitted activities is fraught; However, expulsion is threatened as a recourse for noncompliance, it would likely be an illegal action itself. Therefore, owner signage is designed to establish the deontic status and legitimacy of the real property owner to establish a private order within a nominally public space.

Certain prohibitions restate New York State Penal Code offenses against public health and morals (gambling and solicitation) or against public order (unreasonable noise and obstructing pedestrian traffic). Other prohibitions, however, such as sitting on floors, placing personal property on chairs, having large packages, card playing, and sleeping, are not illegal in public places in New York. The owner signage serves to set a higher bar for behavior in public spaces within private buildings than is standard

in urban public spaces such as the sidewalk outside the IPOPS, rewarding compliance with the opportunity to enjoy participation and threatening expulsion as punishment for non-compliance (Kempa et al., 1999).

We sought to determine whether the signage texts convey information about who IPOPS are intended to serve and who they are not. City signs refer to the public. We discovered that many of the most frequently occurring terms in owner signs refer to actions or conditions that might serve to exclude or deter certain populations from using the spaces. In particular, some terms are correlated with the language used to discuss unhoused or activist populations (e.g., terms like “sleeping” and “carts”), while others might refer to items that might be associated with youth, (e.g. “skateboards”), and the term “loitering” (found only infrequently) has a history in Jim Crow laws (A. Lee, 2022). The prohibition of radio playing is akin to noise ordinances, which subjectively “target classes of people as unworthy of being in public” (Staehele, 2010, p. 72, as cited in Ramirez, 2020) and often carry forth norms that are deeply racialized (Ramirez, 2020, p. 158).

Here, it is helpful to refer to Mitchell’s (2003) distinction and correlation between status and behavior. The owner signage does not ban unhoused individuals, public protesters, youth, or people of color, but they do prohibit behaviors and items associated with these groups. This is the mechanism for the “sorting process” that Kempa et al. (1999) identified as a strategy of private governance.

While our analysis has focused on the text of signage, another form of exclusion stems from what must be included on signs. We discovered that most signage texts were written solely in English, whereas nearly half (49.1%) of New Yorkers speak a language other than English at home (NYC, 2015). This suggests that non-English speakers are not welcomed by the city or the owners of IPOPS signage. We observed that, while a wheelchair icon was present, braille was missing from most signs, conveying a welcome and signifying accessibility to people with mobility disorders but not to people with low vision and blindness.

### ***Future Pathways for NLP in Signage Analysis***

Several important considerations exist considering the broader applications of text analysis to the study of

public signage. In general, existing text analysis tools need to apply better to public signs.

First, words used in public signage may sometimes have different context-specific meanings than when used in other contexts. This requires careful attention to word use, particularly for terms that may be coded language referring to certain socioeconomic or racial/ethnic groups. This reflects a recognized challenge related to applying general-purpose sentiment lexicons: although many words are used similarly across texts, sometimes there are domain-specific meanings of particular words and phrases (Codon et al., 2005; Hamilton et al., 2016). This has led to the development of domain-specific sentiment lexicons in fields such as medicine and crisis management that can improve the accuracy of extracting useful information from texts, as well as of querying social media or other big data sources for relevant text data (Codon et al., 2005; Olteanu et al., 2014). To our knowledge, no sentiment tagging lexicons are publicly available for landscape architects and urban planners, and none are available for interpreting public signage. This challenge might be addressed by creating domain-specific lexicons for interpreting and tagging public signage.

Second, the format of sign text only sometimes lends itself to easy integration into text mining workflows. For example, a sign may include lists of prohibited behaviors or objects, not all of which directly include the word “no” or “prohibited” near the restricted behavior/object. This requires additional text processing to interpret and organize these restrictions into a data format that can be further analyzed quantitatively.

Finally, general-purpose stop word lists are not necessarily well suited to analyzing sign text. Many terms that may offer little insight in other contexts can be critical to understanding the framing of public signs. This suggests that custom stoplists may be beneficial to furthering quantitative natural language processing approaches to signage. Developing such open-access tools and datasets might foster new forms of interpretation of the textual messages in public signage. With the development of open-source tools, custom stoplists, and domain-specific sentiment lexicons, there will be greater potential to reduce the barriers for NLP and big data approaches to be leveraged for urban planners and allied fields to discover critical social

and political insights related to textual messaging in public spaces such as who might feel welcome or excluded in particular types of places.

## CONCLUSIONS

The primary research question was, Do private owners' signs communicate in a manner that narrows the definition of "public"? We applied the three lenses developed in the literature review to our analysis, resulting in three main conclusions: (a) Signage reveals the dual nature of IPOPS governance, with owner signs containing text that aims to control and regulate behavior, while city signs extend welcome and list amenities provided in the space; (b) Owner signs suggest a conscribed form of public use should be the norm within each space, constraining behavior found in fully public spaces; (c) Owner signs could implicitly exclude unhoused individuals, public protesters, youth, or people of color, by language prohibiting behaviors, attributes, and items associated with those groups. Owner signs could exclude people with visual disabilities and non-English speakers because of the lack of English literacy by people in those groups.

### ***1. Signage Reveals the Dual Governance of IPOPS: Owner Signs Regulate while City Signs Welcome***

Key differences are present in style and substance between the city signage representing public governance of IPOPS and the owner signage representing private governance of these spaces. First, the two types of signage differ in the tones with which they communicate. City signs are straightforward without affect (sentiment does not show up in the analysis), whereas owner signs tend toward negative messaging and sentiment. City signs proclaim the public character of the spaces, offer amenities, and extend welcome, while owner signs restrict use and prohibit behaviors, activities, attributes, and belongings.

### ***2. Owner Signs Conscribe Public Use and Constrain Behavior***

Some of these restrictions go beyond what is legally proscribed in public places, establishing an extralegal order that constrains the publicness of the places. Some of the prohibitions are couched in language shown to correlate

with references to particular socioeconomic groups and political gatherings, suggesting an intent to exclude particular demographic groups using coded messaging. These differences point to distinctions between city visions for public spaces and the concerns of property owners who manage these spaces privately. By passively allowing private owners to create their regulatory frameworks, the city permits the publicness of IPOPS to be diminished.

### ***3. The Language of Signs Could Lead to Implicit Exclusion***

Our analysis of the texts—and missing texts—of signage mandated by the City of New York and provided at the discretion of owners of real property that forms the site of IPOPS makes visible a form of private urban governance existing in these nominally public spaces shielded from scrutiny by the reflective glass of their office building facades and by the failure of the city to exercise oversight and accountability for signage. A close reading of the signage texts reveals a shared intention among real property owners to constrain activity within each IPOPS, which could lead to the implicit exclusion of different groups of people. It appears these owners of commercial real estate are seeking to shape the profile of IPOPS users to match the profile of office workers and business patrons who make it past the security guards to gain admission to the private areas of their buildings. This finding suggests a policy recommendation for the City of New York to establish guidelines restricting the ability of private owners of IPOPS to deploy signage to establish exclusionary systems of urban governance in spaces they dedicate to the public good as compensation for the financial gain they receive in the form of floor area bonuses. Both city and owner signage implicitly excludes non-English speakers because communication is restricted to the English language in a city characterized by linguistic diversity among residents and visitors. Likewise, people with visual disabilities are implicitly excluded because the signage is inaccessible.

### ***Policy Recommendations***

The following recommendations stem from the research conducted in this article; the authors note that their implementation would require greater collaboration between POPS owners and New York City.

1. The NYC planning department should consider approaches to better coordinate city and owner signs within the space. The disconnect between owner and city signs reflects competing interests and could make the space less legible to those who inhabit it. A potential solution is to approach signage holistically within each POPS. The city-mandated “welcome” and “amenity” sign review process could expand to encompass a city-reviewed POPS sign system package. A full review of a comprehensive sign package could create greater visual and text consistency between signs within the POPS boundaries, such as bathroom signs and rules signs. Collaborative creation and review of a complete sign package could allow for enhanced partnership between building owners and NYC, making the nature of POPS less ambiguous and potentially more inviting for all people.

2. If the spirit of the arrangement between developers and NYC is to allow bonus revenue-generating space in exchange for public space, NYC should provide oversight of messaging about activities, attributes, and items prohibited within the space through a sign system approval process. The city should develop inclusive standards for owners to follow. The city should carefully review all text to ensure the owner establishes reasonable rules fitting the spirit of public space.

3. To provide more inclusive and accessible messaging, the NYC Department of Planning and allied agencies should develop a “language access plan” for all POPS. The 2015 plan enacted by NYC Parks could be a helpful starting point. Signs should communicate in multiple languages that reflect the community. Signs should be made more accessible through the use of braille. The DCP and allied agencies should dedicate resources to record-keeping and evaluation and create feedback channels for the DCP and building owners. One addition could be implementing QR codes on city and owner signs to provide additional information and space to provide feedback.

### ***Policy Implications***

Signs have power, especially in public spaces. Planners have a special responsibility to ensure that sound policies can guide thoughtful, more inclusive solutions regarding signs in the public realm. While specific prohibitions or word choices can seem benign to some, to many, such

as unhoused populations, youth, people of color, people with visual impairment, or people who are not familiar with the language on the sign, words have the potential to signal that they are not welcome in a space. A participatory design process encompassing the diversity of potential users of IPOPS could give the public input into the development of inclusive signage standards for both public and owner signage.

### ***Research Recommendations***

We recommend further research to (a) discover further linkages between the wording of signage texts and particular socioeconomic groups by performing textual analysis on other sources, such as newspaper articles; (b) study who uses IPOPS and who feels welcome there; (c) observe what behaviors and activities users are engaged in; (d) understand the rationale, objectives, and ethical justifications of building owners in the messaging they put forth in their signage; (e) observe mechanisms for enforcement of owner prohibitions; and (f) discover whether there are spaces where conflicts or friction arise from the discrepancies between public and private governance in IPOPS.

### ***Methodology Recommendations***

Examining the text of signs is beneficial. Still, many of the existing general-purpose tools only sometimes yield clear results because public signs use words in domain-specific ways. Urban planning is not yet represented in the disciplines that have developed domain-specific tools. This is a promising avenue for future inquiry and development of tools to be used by advocacy groups, urban planners, and graphic designers interested in signage and how it functions in the governance of public spaces.



## REFERENCES

- Blomley, N. (2004). *Unsettling the city: Urban land and the politics of property*. Routledge.
- Brenner, N., & Theodore, N. (2002). Cities and the geographies of “actually existing neoliberalism.” *Antipode*, 34(3) 349–379. <http://dx.doi.org/10.1111/1467-8330.00246>
- Burns, P. J. (2018). Constructing stoplists for historical languages. *Digital Classics Online*: 4–20. <https://doi.org/10.11588/dco.2018.2.52124>
- Caldeira, T. (1996). Fortified Enclaves: The New Urban Segregation. *Public Culture*, 8, 303-328. <http://dx.doi.org/10.1215/08992363-8-2-303>
- Coden, A, Pakhomov, S., Ando, R., Duffy, P., Chute, C. (2005). Domain-specific language models and lexicons for tagging. *Journal of Biomedical Informatics*, 38(6), 422–430. <http://dx.doi.org/10.1016/j.jbi.2005.02.009>
- Crang, M., & Graham, S. (2007). Sentient cities ambient intelligence and the politics of urban space. *Information, Communication & Society*, 10(6), 789–817. <http://dx.doi.org/10.1080/13691180701750991>
- Crilly, D. (1993). Megastructures and urban change; Aesthetics, ideology, and design. In P. Knox (Ed.), *The restless urban landscape*, 126–164. Prentice Hall.
- Csardi G, Nepusz T (2006). “The igraph software package for complex network research.” *InterJournal, Complex Systems*, 1695,1-9 <https://igraph.org>.
- Day, K. (1999). Introducing gender to the critique of privatized public space. *Journal of Urban Design*, 4(2), 155–178. <http://dx.doi.org/10.1080/13574809908724444>
- Gorter, D. (2006). *Linguistic landscape: New approach to multilingualism*. Clevedon: Multilingual Matter.
- Gorter, D. (2018). Methods and techniques for linguistic landscape research: About definitions, core issues, and technological innovations. In M. Pütz & N. Mundt (Eds.), *Expanding the linguistic landscape: Linguistic diversity, multimodality and the use of space as a semiotic resource*, 38–57. Multilingual Matters. <http://dx.doi.org/10.21832/9781788922166-005>
- Hamilton, W. L., Clark, K., Leskovec, J., and Jurafsky, D. (2016). Inducing domain-specific sentiment lexicons from unlabeled corpora. In Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing. Association for Computational Linguistics, Austin, Texas, pp. 595–605. <http://dx.doi.org/10.18653/v1/d16-1057>
- Hamilton, W. L., Clark, K., Leskovec, J., and Jurafsky, D. (n.d.). SocialSent: domain-specific sentiment lexicons for computational social science. <https://nlp.stanford.edu/projects/socialsent/> <http://dx.doi.org/10.18653/v1/d16-1057>
- Huang, T., & Franck, K. (2018). Let’s meet at Citicorp: Can privately owned public spaces be inclusive? *Journal of Urban Design*, 23(2), 499–517. <http://dx.doi.org/10.1080/13574809.2018.1429214>
- Hu, M., & Liu, B. (2004). Mining and summarizing customer reviews. In *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD-2004)*, Seattle, Washington, USA, 22–25 August 2004. <http://dx.doi.org/10.1145/1014052.1014073>
- Kallen, J. (2009). Tourism and representation in the Irish linguistic landscape. In E. Shohamy & D. Gorter (Eds.), *Linguistic landscape: Expanding the scenery*, 270–283. Routledge. <http://dx.doi.org/10.4324/9780203930960>
- Kallos, B., Greenfield, D., Espinal, R. (2017). Local Laws of The City of New York for the Year 2017 No. 250, 1-3. <https://www.nyc.gov/site/buildings/codes/local-laws.page>
- Kayden, J. (2000). *Privately owned public space: The New York City experience*. John Wiley & Sons.
- Kayden, J., & Woodward, D. (n.d.). *Privately owned public space in New York City: Find a POPS*. Advocates for Privately Owned Public Space. Available at: <https://apops.mas.org/find-a-pops/> (accessed 8 November 2022). <http://dx.doi.org/10.2991/iccahe-16.2016.100>
- Kempa, M., Carrier, R, Wood, J, Shearing, C, (1999). Reflections of the evolving concept of “private policing.” *European Journal on Criminal Policy and Research*, 7(2), 197–223. <http://dx.doi.org/10.1023/a:1008705411061>
- Landry, R., & Bourhis, R. (1997). Linguistic landscape and ethnolinguistic vitality: An empirical study.

- Journal of Language and Social Psychology*, 16(1), 23–49. <http://dx.doi.org/10.1177/0261927x970161002>
- Lee, A. (2022). The Jim Crow roots of loitering laws. *Anti-racism daily*. Retrieved November 8, 2022, from <https://the-ard.com/2022/05/31/the-jim-crow-roots-of-loitering-laws/> <http://dx.doi.org/10.5040/9798400674358.ch-001>
- Lee, D. (2020). Whose space is privately owned public space? Exclusion, underuse, and the lack of knowledge and awareness. *Urban Research & Practice*, 15(3), 366–380. <http://dx.doi.org/10.1080/17535069.2020.1815828>
- Lefebvre, H. (1996). The right to the city. E. Kofman & E. Lebas (Eds.) *Writings on cities* (pp. 173–174). Blackwell.
- Lippert, R., & Sleiman, M. (2012). Ambassadors, business improvement district governance, and knowledge of the urban. *Urban Studies*, 49(1), 61–76. <http://dx.doi.org/10.1177/0042098010396235>
- Lippert, R., & Steckle, R. (2016). Conquering condos from within: Condo-isation as urban governance and knowledge. *Urban Studies*, 53(1), 132–148. <http://dx.doi.org/10.1177/0042098014562332>
- Mitchell, D. (2003). *The right to the city: Social justice and the fight for public space*. Guilford Press.
- Mohammad, S., & Turney, P. (2013). Crowdsourcing a word-emotion association lexicon. *Computational Intelligence*, 29(3), 436–465. <http://dx.doi.org/10.1111/j.1467-8640.2012.00460.x>
- Mohammad, S. M. (2021). Sentiment analysis: Automatically detecting valence, emotions, and other affectual states from text. In: *Emotion measurement*, 323–379. Woodhead Publishing.
- Németh, J., & Schmidt, S. (2011). The Privatization of Public Space: Modeling and Measuring Publicness. *Environment and Planning B: Planning and Design*, 38(1), 5–23. <http://dx.doi.org/10.1068/b36057>
- New York City Planning Commission/Department of City Planning (1961). *Zoning Handbook: A Guide to the Zoning Resolution of the City of New York*. December 1961, and subsequent editions. <http://dx.doi.org/10.4324/9781003419006-4>
- New York State Senate. (n.d.). *Legislation, Article 240, Offenses Against Public Order*. Retrieved November 3, 2022, from <https://www.nysenate.gov/legislation/laws/PEN/P3TNA240>
- Nielsen, F. Å. (2011). A new ANEW: Evaluation of a word list for sentiment analysis in microblogs. *arXiv preprint arXiv:1103.2903*.
- Ognyanova, K. (2021). *Network visualization with R*. Retrieved November 7, 2022, from [www.kateto.net/network-visualization](http://www.kateto.net/network-visualization)
- Olteanu, A., Castillo, C., Diaz, F., Vieweg, S. (2014). Crisislex: A lexicon for collecting and filtering microblogged communications in crises. In *Eighth International AAAI Conference on Weblogs and Social Media*. <http://dx.doi.org/10.1609/icwsm.v8i1.14538>
- R Core Team. (2022). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved November 8, 2022, from <https://www.R-project.org/>
- Ramirez, M. (2020). City as borderland: Gentrification and the policing of Black and Latinx geographies in Oakland. *Society and Space*, 38(1), 147–166. <http://dx.doi.org/10.1177/0263775819843924>
- Shohamy, E., & Gorter, D. (2009). *Linguistic landscape: Expanding the scenery*. Routledge. <http://dx.doi.org/10.4324/9780203930960>
- Silge J. and Robinson D., (2016), tidytext: Text Mining and Analysis Using Tidy Data Principles in R, *Journal of Open Source Software*, 1(3), 37, <http://dx.doi.org/10.21105/joss.00037>
- Silge, J., & Robinson, D. (2017). *Text mining with R: A tidy approach*. O'Reilly Media Inc.
- Sorkin, M. (1992). *Variations on a theme park: The new American city and the end of public space*. Hill and Wang.
- Staehele, L. A. (2010). Political geography: Democracy and the disorderly public. *Progress in Human Geography*, 34(1): 67–78. <http://dx.doi.org/10.1177/0309132509105006>
- Stevanovic, M., & Peräkylä, A. (2014). Three orders in the organization of human action: On the interface between knowledge, power, and emotion in interaction and social relations. *Language in Society*, 43(2), 185–207. <http://dx.doi.org/10.1017/s0047404514000037>
- Stringer, S. (2017). *Office of the New York City Comptroller audit report on the city's oversight over privately owned public spaces*. Retrieved November 4, 2022, from [nyc.gov/reports/audit-report-on-the-on-the-city-oversight-over-privately-owned-public-spaces/](https://nyc.gov/reports/audit-report-on-the-on-the-city-oversight-over-privately-owned-public-spaces/). <http://dx.doi.org/10.26417/ejis.v3i1.p7-14>
- Svennevig, J. (2021). How to do things with signs. The formulation of directives on signs in public spaces. *Journal of Pragmatics*, 165, 165–183. <http://dx.doi.org/10.1016/j.pragma.2021.01.016>
- Trinch, S., & Snajdr, E. (2020). *What the signs say: Language, gentrification, and place-making in Brooklyn*. Vanderbilt UP. <http://dx.doi.org/10.2307/j.ctv160btqs>
- Valverde, M. (2011). Questions of security: A framework for research. *Theoretical Criminology*, 15(1), 3–22.
- Whyte, W. H. (1980). *The social life of small urban spaces*. New York City: Project for Public City
- Woodward, D. (2012). Rules of Conduct. *Urban Omnibus*. Retrieved November 8, 2022, from [urbanomnibus.net/2012/05/rules-of-conduct/](http://urbanomnibus.net/2012/05/rules-of-conduct/)

# On-Premise Signage and Placemaking: Aiding Lively Streetscapes to Maintain Signage Visibility

**Robert Dalton\***

Assistant Professor  
School of Design  
South Dakota State University

\*Corresponding author  
robert.dalton@sdstate.edu

**Sahand Abbasi**

Assistant Professor  
School of Design  
South Dakota State University

**Seojoo Han**

Assistant Professor  
School of Design  
South Dakota State University

---

## INTRODUCTION

### *Placemaking*

The Project for Public Spaces (PPS; 2022) coined *placemaking* in the 1990s and acknowledges it is not a process they invented. Since the first cities in our archaeological record, humans have sought ways to attract and retain people with a system of diverse business owners and trades, shared language, organized bureaucracy, and the arts (Childe, 1950). Globally, urban movements sought social and economic improvement through Victorian-era reforms to improve housing and schools (Crook, 2019), the City Beautiful movement in North America to promote aesthetic redevelopments (Hess, 2006), and the modernist, New Town movement for planned communities like Letchworth, England or Brasilia, Brazil in the 1950s (Holston, 1989; Merlin, 1980). Other reforms include Urban Renewal—the intentional tearing down of low-income housing—building new housing for rapidly growing populations, and the construction of the urban freeway (Thomas and Dillard, 1997). These movements designed cities from the top down. These methods can be without identity; without the human element, they are placeless (Relph, 1976).

Placemaking differentiates from these past concepts by placing individuals at the local level as the purpose for changes in the built environment (PPS, 2022). The people's needs vary from clean air and water, social and economic opportunities, and the simple enjoyment of leisure in the area. The grassroots level is more in tune with its own needs and culture than a top-down, single-voiced authority (Alexander et al., 1977; Jacobs 1961). Fundamental authors such as Lynch and his web of nodes and paths (Lynch, 1960) and Alexander's (2015) multiple points of interest depict an integrated system of urban activity and life. The people

---

### *Abstract*

Placemaking is an initiative with roots in the 1960s and 70s to enhance public life in the urban setting. This complex notion requires multiple disciplines, flexibility, and a human-centric approach toward development. While developing new streets and enhancing the existing, built environment, professionals, community residents, and business owners must consider multiple elements to bring people to the street: furniture, vegetation, walkability, art, and culture. With this sidewalk interaction comes the opportunity for economic development. When the people are drawn in, signage can inform the pedestrian. This study builds a collection of 200 photos, representing four levels of placemaking intensities. Each photo is coded into 600 cells to count the quantity of placemaking elements. Visual attentive software (VAS) is then used to measure the sign effectiveness to visually stand out. Placemaking initially impacts preattentive visibility, while the building façade, road surface, tree canopy, landscaping, and the sky each play a role. Planners, designers, and business owners can use these findings to better inform the impact and interaction of streetscape and business.

### *Keywords:*

placemaking, visibility, design, on-premise signage

may unite for social bonding at any intersection within this web and support local businesses along the pathways. The people, seeking to improve their neighborhood, may positively impact the city community across geographic and temporal scales (Cabannes et al., 2018).

A breadth of built environment professionals, business owners, residents, and community leaders use placemaking to foster community quality. The broad scope of voices is necessary in the process because the aim is to cast a wide net to attract and retain people in the community to live, work, play, and learn (Wyckoff, 2014). Wyckoff identified three methods, in addition to what he designated as standard placemaking, that a community may identify for their process: (a) strategic placemaking focusing on a specific goal, (b) creative placemaking to highlight the arts and culture, and (c) placemaking as short and long-term built projects often for testing, learning, and improving. Forsyth (2015) suggested a simplification of placemaking's variety into three clusters of purposes to implement placemaking: means (Do the planners intend to develop a goal, such as walkability?); outcomes (Is this to improve public life?); or multidimensional (Are planners seeking to develop vitality?). No matter the varied methods or goals for placemaking, a street has the opportunity to host placemaking elements as a streetscape.

### ***Streetscapes and Placemaking Elements***

Placemaking requires such a breadth of professionals and strategies because it varies from large-scale complexity to detail-oriented solutions (Cabannes et al., 2018). Community empowerment and development may include the use of art, economics, connectivity, and housing policy (PPS, 2022). The street is one element of the urban fabric providing a space for the intersection of these elements. An engaging sidewalk near the street makes for places that attract people (Jacobs, 1961). As exciting and engaging downtowns attract more people, so too the streets will grow in ever-increasing design and visual complexity. Gibson and Shaw (1977) first created the affordance theory, in that the physical elements of the surroundings can impact behaviors. This may include an affordance of a feeling of danger, encouraging people to avoid an area or a beautiful setting, encouraging people to access and utilize a streetscape.

A photo analysis of streetscapes acknowledges the many components of a streetscape, including the building façade, sky, road, sidewalk, and vegetation (Chen et al., 2022). The building itself is one important component of a streetscape, providing an edge between internal and external spaces, a location of safety for businesses and residents, and a means to frame views. Though the sky is static in a photograph, it remains an opportunity for light to permeate the streetscape for a possible increase in visibility, while moving shadows highlight different components of the street. The quantity of sidewalk space provides more room for quality site amenities and pedestrians, developing greater opportunities for placemaking to occur. Such placemaking elements include concentrations of *art, vegetation, people, and furniture*.

One placemaking method is the development of new art in the urban environment, ranging from ad hoc graffiti, temporary performance art or ad hoc citizen built decorations, and commissioned murals and statues (Billings et al., 2022). As art is viewed differently by each viewer, so too different forms of art have different impacts on the community (Frederick & Clarke, 2014). Commissioned, public art can build a sense of community ownership of the streetscape, reducing the potential for crime and vandalism. This is due to art's ability to activate underutilized areas, building new and desirable pathways to established areas of activity (Matthews & Gadaloff, 2022) and connecting primary pathways to each other in the urban fabric (Billings et al., 2022). While the positive effects of art on the streetscape may dissipate (Zebracki et al., 2010) a lighter-quicker-cheaper mentality (PPS, 2022) suggests these spaces can be reactivated with art repeatedly over time.

From the Hanging Gardens of Babylon to Singapore's Tree Towers in the Gardens by the Bay, humans can enjoy vegetated spaces in the urban environment. Much of modernist, urban tree research considers this respect for nature in studying the preservation, the ecological effects, and the changes to the microclimate (Li, 1969; Simon et al., 2018; Smith, 1977). Nature is entwined with humanity and thus plays a key role in placemaking (Cilliers et al., 2015). "Green placemaking" has developed as a recent strategy to reactivate street life and placemaking (Gulsrud et al., 2018). Similar to art, residents believe it is the government's responsibility to provide and care for street trees (Moskell

& Allred, 2018). Nevertheless, street trees can provide a calming, safe environment, promote social ties (Kuo et al., 1998), and support a microclimate for pedestrians to enjoy a space (Y. Wang & Akbari, 2016).

Gathered people are core to placemaking because more people will gather when a comfortable group is established (Whyte, 1980). People attract more people and self-manage the crowds to a comfortable capacity. People stay in functional and beautiful places (Wey & Wei, 2016). A concentration of people may provide a greater economic opportunity for business and could require more complex streetscapes. To pause in a space and view opportunities of social and economic participation in the streetscape, pedestrians require furniture. Customizable furniture unique to each streetscape provides opportunities for shade, social interaction (van Ameijde et al., 2022), and technology to recharge or digitally interact with the streetscape (Chew et al., 2021). Well-designed lighting plans highlight key elements in the streetscape, provide safety, and allow gatherings into the evenings, particularly in areas of shorter daylight.

### ***Placemaking and Signage***

Signage has long played a key role in placemaking. Ancient Romans crafted signboards with modest materials such as wood, stone, and terracotta to promote commercial and social activities for businesses and on public ground (Beard, 2017). Europe's rapid trade expeditions in the 11th and 12th centuries supplied a rich ground for more sophisticated on-premise signage for wealthy merchants and renowned craftsmen (Mircea, 2019). As Europe's commerce continuously expanded, so did the sign industry and signage's appearance in the everyday. It was emblematic that Charles II ordered no outdoor sign to hang across streets or pedestrian walkways due to public safety concerns relating to the fall of signs (Mircea, 2019). Signage quickly became more than just mere promotional tools for commerce but also a subject of legal consideration and city planning elements which entered deep into the consciousness of early urbanites' lives.

A series of important human inventions shape the function, design, and even the meaning of on-premise signage. Remarkable manmade inventions such as the gas light (1840), the incandescent light bulb (1880), neon

(1910), and plastic (1907) have followed a lineage through the Industrial Revolution to today for evolving signage opportunities in the streetscape. In the North American context, the popularity and dominance of the automobile affected the design of signages, as "street signs should be designed for maximum legibility in the conditions under which they are most frequently seen—in this country, from a moving car" (Ewald, 1971, p. 6). Automobiles not only affected the formal quality of signage but its social function beyond immediate advertising media. Signs function like cement that holds American society together in the midst of a vast continent connected with highway systems (Jackle & Sculle, 2004).

In addition to its technological and functional adaptations, signage in urban streetscapes needs to be understood as an integral part of a larger urban communication system. Jackle and Sculle (2004) recognized signage as more than mere technological and utilitarian terms but as fundamental instruments that impact the social behavior of people. "Signs, as they implicate in human symbolic interaction, are fundamental instruments of social construction" (Jackle & Sculle, 2004, p. 167). The broader social aspects of signs and their role in shaping the culture of neighborhoods were discussed recently through the lens of sociolinguistics and anthropology (Trinch & Snajdr, 2020). *What the Signs Say* details the relationship between Brooklyn, NY retail signs' linguistic elements and gentrification. Here, the authors recognized the cultural significance of storefront signs beyond their intended functions and expectations, affirming their role as an important register of placemaking (Trinch & Snajdr, 2020). In their design project of capturing unique visual characteristics of neighborhoods in Cincinnati, Ohio, Mehta and Rahman (2017) demonstrated how urban typography, including retail signages of local businesses, has contributed to the identity of the neighborhood. These two studies explain with vivid examples how on-premise signage is thoroughly involved in the varying aspects of placemaking.

### ***Summary***

Many have experienced placelessness. It varies by the individual. For some, it is walking into Times Square and being surrounded by such visual diversity that it becomes a blur instead of unique. For others, it is the view from a

highway exit ramp with simplistic signs on tall, widely-spaced posts, each competing with the next for visual dominance. Placemaking seeks to balance this dichotomy of abundance and emptiness by remaining flexible for day-to-day activities, adaptable to different audiences and over time inviting authentic experiences (Ellin, 2006).

Placemaking and signage are linked through urban planners' and designers' work in form-based code (Crawford et al., 2015); pedestrians look for just the right business for shopping and visitors or new residents use wayfinding for the right landmark or node to begin their adventure. Signage has the potential to inform the community through writing of the historical and cultural importance of an area, while placemaking can help the people feel the excitement and local culture. While trees may provide placemaking opportunities, many business owners have long felt hesitant to a full streetscape development, as it may detract from or block their storefront or their on-premise signage (Dumpelmann, 2019; Wolf, 2004). How may planners and designers establish the heart of placemaking in the streetscape, while maintaining universal, visual access to on-premise signage? What aspects of placemaking may damage signage visibility? Using 3M's VAS software and a variety of placemaking images, this study explores each placemaking element's impact on sign visibility.

## METHODS

### *A Definition of This Study's Terms*

---

**placemaking elements:** visible parts of the streetscape, including the street furniture, trees, and on-premise signage. These elements are found in the placemaking library (see below).

---

**placemaking intensity:** a ranked set of images with increasing levels of placemaking from original images without placemaking (26 images) to increasingly more complex images at levels 1, 2, and 3. Level 1 features images from the placemaking library while level 3 features more images from the library.

---

**placemaking library:** a collection of digital, placemaking elements placed on top of the original street image

---

**VAS output:** a variable using the VAS software that predicts preattentive visibility of the primary sign

### *Image Development*

The research team created a catalog of 26 original photographs of a midsize, Midwestern American downtown street. Photographs are a common method to study a streetscape (Chen et al., 2022; M. Wang et al., 2015). A Midwestern, American downtown allows for a broad sample with building densities and populations related to many other communities. These photographs show few placemaking elements, as they are streets rather than streetscapes. They include the primary building and its signage and often lack art, vegetation, furniture, and are without people. This was intentional to help develop three additional levels of placemaking intensity within the photographs. The team also built a placemaking library of streetscape



elements, including furniture (metal and wooden benches, lighting from posts to bollards and sconces), art (murals, sculptures, seasonal decor), vegetation (trees, ground-level shrubs, lawn/turf). Each element was its own layer in Photoshop, allowing for each one to be moved on its own.

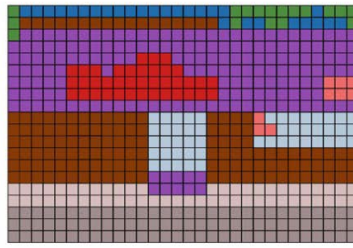
Each of the 26 original images was opened in Photoshop where the study's method integrated placemaking elements from the placemaking library. As an example, a researcher could pull a streetlamp from the library and put it directly on top of the original image in the appropriate location and scale on the street (see Figure 1). Using Photoshop, the team created three levels of placemaking intensity on top of the original, continually adding more placemaking elements from the placemaking library. These additions provide a placemaking intensity of levels 1, 2, and 3. In this manner, the team assembled 200 images for examination. Some of the original photographs were used as a base to build upon multiple times.

### **Coding**

Using methods from M. Wang et al. (2015), the team placed a 5" x 7" grid over the 5" x 7" images, with each cell in the grid measuring ¼" x ¼". This created 600 cells for each of the 200 images. The researchers color coded each cell to a streetscape element (see Figure 1). A cell filled with at least 51% of a placemaking element was coded to that one element. The cell colors were used solely to aid in counting the individual cells. From this, the researchers gathered a count of cells for each streetscape element. The researchers met after working independently on the first four images (an original, and its intensity levels 1–3) to ensure reliability. We selected fifteen elements to represent the future coded work:

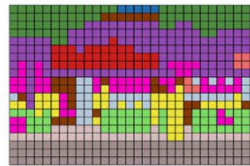
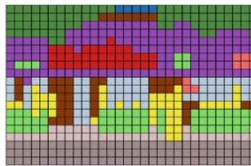
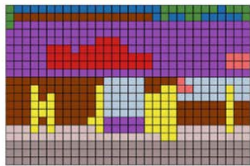
- Primary business sign of the photograph (coded: red)
- Secondary signage (wayfinding, street signs about sales in the store; pink)
- Building façade, including windows on the second story and above (brown)
- First-floor transparency (windows, often display windows for store; light blue)
- People (yellow)
- Furniture (benches, lights, street tables and umbrellas, awnings, fountains; purple)
- Art (murals, sculptures, seasonal décor; magenta)
- Tree canopy (all areas above the tree trunk; dark green)
- Other landscaping (thin tree trunk, window boxes, visible green roofs; green)
- Turf (usually grass in a right of way; light green)
- Sidewalk surface (light gray)
- Road surface (dark gray)
- Cars (any motorized, street vehicle; beige)
- Sky (blue)
- Other (fire hydrant, utility box; black)

An example of this coding process can be found in Figure 1. As placemaking elements from the placemaking library become more abundant in the image (Placemaking intensity increasing) image color (or coding) becomes more diverse. In Figure 1, the red coding represents the business's primary signage, purple represents the awning (furniture), pink represents the secondary signage found in the windows, blue represents the large windows, decorative planter box benches coded to furniture (purple), and the sidewalk and road coded light and dark gray respectively. Yellow cells represent people, which first appear in intensity



**Figure 1 /**

The Original Image and Its Streetscape Element Coding (Top Row), With Increasing Streetscape Intensities and Their Coded Cells for Level 1, Level 2, and Level 3



level 1. The trees placed in intensity level 2 have trees coded to dark green across the top of the images, breaking up some of the awning (purple). Art appears in the windows on level 3 and is coded to magenta. Note that coded images, in a raster format, do not perfectly depict all the contents of an image. For example, the small plants in the planter boxes (original photograph) represented the smallest portion of these cells, which were coded to first floor transparency and furniture; the planter boxes do not appear in coding.

**Visual Attentive Processing (VAS) and Statistical Analysis**

3M’s visual attention software (VAS; 3M-VAS, 2022) tracks what the eye is likely to see before cognitive function begins. This precognitive phase is referred to as preattentive processing and refers to the first 3–5 seconds while viewing a scene. This software employs brain and eye science to remove the influences of “gender, age, and culture” (3M-VAS, 2022) that could affect visual attention. VAS assesses a photograph by combining the number of edges within the image, the photograph’s intensity, red-green contrast, blue-yellow contrast, and faces. Each of these elements are the “building blocks” that can attract the eye before cognition begins.

We analyzed the 200 streetscape images with VAS to understand the percent likelihood of discovering the on-premise signage in a precognition phase. As shown in this VAS-produced image (Figure 2), the likelihood of success, according to the software, of on-premise signage visibility for the original image was 79%. The likelihood of a person seeing the planter boxes in yellow and purple is 98%, while a person has a 73% of seeing the sky and tree above the awning



**Figure 2 /**

Visual Attentive Processing Results for the Original Image in Figure 1

in preattentive processing. This 79% chance of seeing the sign in preattentive processing creates an additional variable for data analysis, later referred to as the VAS output.

In this study, we used SPSS to test changes and influences of three sets of variables: placemaking intensity (original, levels 1–3), placemaking elements (primary sign, secondary sign, furniture), and VAS output (the percent likelihood of finding a sign in preattentive processing). The team first compared through ANOVA the placemaking intensities (independent) and their statistical influence on the VAS Output (dependent). We used a Tukey post hoc test to compare individual levels of placemaking intensity within the dependent variable (compare the original to level 1, compare level 2 to level 3, etc.).

To understand if placemaking elements could impact VAS output, we performed linear regressions at each level of placemaking intensity. We identified the placemaking elements as the independent variables while the VAS output served as the dependent variable. Does the quantity of cells coded to “people” significantly alter the VAS output in the original image, level 1, level 2, and level 3? After understanding which variables have a significant influence over the VAS output, we placed such variables into a multilinear regression to measure if these can be stronger predictors when analyzed together.

## RESULTS

### *Overall Analysis—All 200 Images Studied*

The 200 images are comprised of 26 original photographs, and 58 Photo-shop-built images at levels 1–3 placemaking intensity. The mean VAS output decreases from 70.23% in the original images to 56.28% at level 3 intensity. With 0.05 P value as the determinant for statistical significance in this study, the VAS output significantly decreases once placemaking was established at a level 1

intensity streetscape (59.93% mean VAS output). We found no other significant changes in the VAS output once placemaking elements populated the streetscape images (see Tables 1–2).

**Table 1 / VAS Output and Sample Size by Placemaking Intensity Levels**

Placemaking intensity	Mean VAS output	N	Std. dev.
Original	70.23%	26	15.09
Level 1	59.93%	58	13.67
Level 2	57.72%	58	13.86
Level 3	56.28%	58	13.61
Total	59.57%	200	14.47

**Table 2 / ANOVA and Tukey Results (Overall ANOVA Model Results  $P = .001, F = 6.538$ , Asterisk denotes significant differences found in all ANOVA tables)**

Comparison level	Significance	Std. error
Original–Level 1*	0.010	3.281
Original–Level 2*	0.001	3.281
Original–Level 3*	0.000	3.281
Level 1–Level 2	0.828	2.581
Level 1–Level 3	0.491	2.581
Level 2–Level 3	0.943	2.581

As individual variables, the cell count coverage for building façade, tree canopy, landscaping, road surface, and sky are significant predictors of a 0.05 value for VAS output (see Table 3) when examined with an ANOVA. Positive B values indicate a symbiotic relationship to preattentive processing, while the negative values for trees, landscaping, and sky indicate they significantly decrease the VAS output. The three most commonly coded cells for placemaking elements across the photographs are the building façade, road surface, and tree canopy, while secondary signs, art, and turf are more infrequent (see the mean cell count in Table 3).

**Table 3 / Placemaking Element Results for 200 Images, \*Significant Influence on VAS Output**

Placemaking element	Mean cell count	Std. dev.	Linear regression results compared to VAS output			
			Constant	B	R-square	Sig.
Primary sign	25.415	37.054	59.424	0.006	0.000	0.836
Secondary sign	8.835	11.210	58.304	0.143	0.012	0.118
Building façade*	106.010	59.701	53.016	0.062	0.065	0.000
Transparency	25.870	20.727	57.757	0.070	0.010	0.157
People	24.575	20.612	61.665	-0.085	0.015	0.087
Furniture	45.175	38.727	58.569	0.022	0.004	0.404
Art	4.140	12.596	59.902	-0.080	0.005	0.325
Tree canopy*	90.415	53.533	63.141	-0.040	0.021	0.039
Landscaping*	36.600	25.923	63.388	-0.104	0.021	0.008

Placemaking element	Mean cell count	Std. dev.	Linear regression results compared to VAS output			
			Constant	B	R-square	Sig.
Turf	9.230	16.987	59.849	-0.030	0.001	0.618
Sidewalk surface	43.135	33.108	60.531	-0.022	0.003	0.474
Road surface*	92.245	64.745	55.805	0.041	0.033	0.010
Car	27.260	26.405	60.297	-0.027	0.002	0.494
Sky*	60.565	45.632	65.190	-0.093	0.086	0.000
Other	0.550	2.587	59.826	-0.465	0.007	0.241

A multilinear regression of only these significant placemaking elements yields a significant model of 0.000. The R-square for the regression model (0.189) more than doubles the highest previous R-square, indicating a greater quantity of the variance explained. Not all individual placemaking elements yield a significant influence over the VAS output in this model.

**Table 4 /** Multilinear Regression Results for 200 Images

Placemaking element	B	Beta	t	Significance
Constant	57.178		9.950	0.000
Building façade	0.042	0.172	1.857	0.065
Tree canopy	-0.036	-0.133	-1.586	0.114
Landscaping	0.023	0.041	0.528	0.598
Road surface	0.063	0.280	3.757	0.000
Sky	-0.089	-0.282	-3.633	0.000

### Original Photographs

For the 26 original photographs, no placemaking elements held a significant influence on the VAS output. Those trending toward an influence are first-floor window transparency, people, and the sky (see Table 5). The building façade, road surface, and sky are most prominent in the cell count.

**Table 5 /** Placemaking Element Results for Original Photographs, Including Cell Count for Each and Significant Influence on VAS Output

Placemaking element	Mean cell count	N	Std. dev.	Linear regression results compared to VAS output			
				Constant	B	R-square	Significance
Primary sign	23.192	26	39.829	69.080	0.050	0.017	0.524
Secondary sign	7.923	26	9.090	72.530	-0.290	0.031	0.393
Building façade	133.769	26	77.681	62.069	0.061	0.099	0.118
Transparency	27.038	26	21.523	63.276	0.257	0.135	0.065
People	2.038	26	4.476	72.580	-1.152	0.117	0.087
Furniture	48.385	26	38.680	70.192	0.001	0.000	0.992
Art	0.769	26	1.986	71.554	-1.720	0.051	0.266
Tree canopy	58.846	26	48.723	74.175	-0.067	0.047	0.288
Landscaping	18.731	26	19.548	73.461	-0.172	0.050	0.273
Turf	15.923	26	24.625	71.603	-0.086	0.020	0.493
Sidewalk surface	51.808	26	37.966	72.666	-0.047	0.014	0.565

Placemaking element	Mean cell count	N	Std. dev.	Linear regression results compared to VAS output			
				Constant	B	R-square	Significance
Road surface	105.731	26	62.931	67.272	0.028	0.014	0.570
Car	26.808	26	24.562	70.209	0.001	0.000	0.995
Sky	78.615	26	53.066	77.960	-0.098	0.120	0.084
Other	0.423	26	1.501	70.753	-1.234	0.015	0.550

### Level 1 Placemaking Intensity

Level 1 intensity is the first and only stage during which preattentive processing (VAS output) significantly decreases. The sky is the only placemaking element with a significant detracting when analyzed on its own (see Table 6). The building façade's mean cell count decreases, while a tree placed on the sidewalk develops a larger cell count for tree canopy. The count for people, while a smaller proportion of the whole, greatly increases compared to the original 26 images.

**Table 6 /** Placemaking Element Results for Level 1 Intensity Images, Including Cell Count for Each and Significant Influence on VAS Output

Placemaking element	Mean	N	Std. dev.	Linear regression results compared to VAS output			
				Constant	B	R-square	Significance
Primary sign	26.121	58	37.719	59.514	0.016	0.002	0.743
Secondary sign	9.638	58	11.400	59.424	0.053	0.002	0.744
Building façade	117.621	58	56.111	54.992	0.042	0.030	0.196
Transparency	28.483	58	21.136	59.223	0.025	0.001	0.775
People	24.241	58	16.687	58.618	0.054	0.004	0.622
Furniture	46.034	58	47.419	58.262	0.036	0.016	0.347
Art	0.948	58	3.322	59.906	0.027	0.000	0.961
Tree canopy	83.466	58	57.986	59.140	0.009	0.002	0.765
Landscaping	29.172	58	22.700	62.082	-0.074	0.015	0.360
Turf	10.017	58	17.533	61.260	-0.133	0.029	0.202
Sidewalk surface	45.121	58	32.490	60.096	-0.004	0.000	0.948
Road surface	91.914	58	64.573	57.052	0.031	0.022	0.268
Car	25.414	58	26.945	61.635	-0.067	0.017	0.323
Sky*	61.379	58	43.894	69.483	-0.156	0.250	0.000
Other	0.431	58	1.535	60.128	-0.457	0.003	0.702

### Level 2 Placemaking

The sky continues to be the only element to significantly affect (and detract) the VAS output. Like the overall analysis of the 200 hundred images, the building façade and the road surface continue to trend toward a positive influence on preattentive processing (see Table 7).



**Table 7 /** Placemaking Element Results for Level 2 Intensity Images

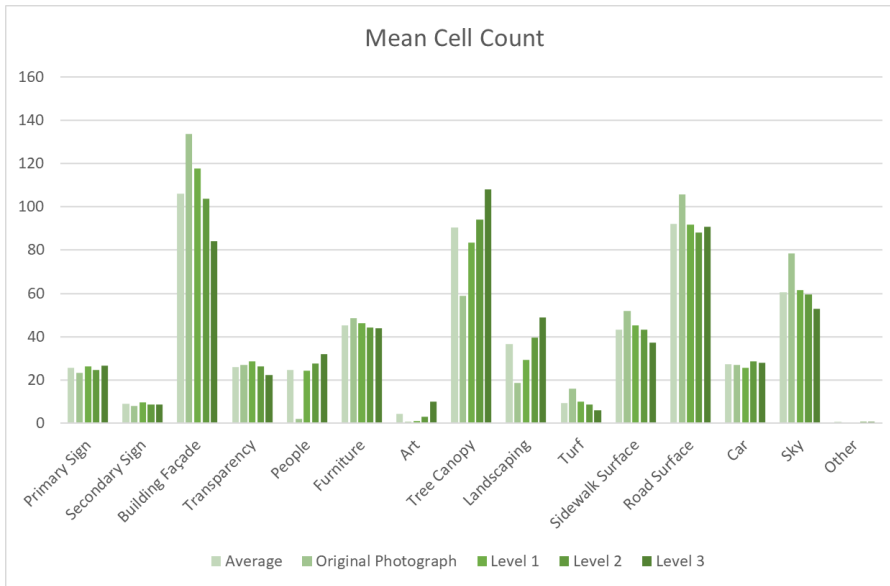
Placemaking element	Mean	N	Std. dev.	Linear regression results compared to VAS output			
				Constant	B	R-square	Significance
Primary sign	24.414	58	35.642	57.524	0.008	0.000	0.875
Secondary sign	8.638	58	11.886	56.164	0.181	0.024	0.246
Building façade	103.690	58	57.656	52.116	0.054	0.051	0.090
Transparency	26.293	58	21.466	54.772	0.112	0.030	0.192
People	27.690	58	19.187	57.894	-0.006	0.000	0.949
Furniture	44.276	58	33.633	57.152	0.013	0.001	0.815
Art	3.034	58	9.138	57.390	0.110	0.005	0.588
Tree canopy	93.966	58	51.614	61.906	-0.045	0.027	0.214
Landscaping	39.655	58	26.345	62.059	-0.109	0.043	0.118
Turf	8.603	58	15.671	58.257	-0.062	0.005	0.601
Sidewalk surface	43.052	58	33.854	60.322	-0.060	0.022	0.270
Road surface	88.000	58	65.194	53.187	0.052	0.059	0.067
Car	28.638	58	27.294	57.249	0.017	0.001	0.808
Sky*	59.414	58	44.532	64.626	-0.116	0.139	0.004
Other	0.707	58	3.524	58.296	-0.809	0.042	0.121

### Level 3 Placemaking

The sky cell count continues its trend to influence the VAS output; however, secondary signage is found to be the only statistically significant and positive relationship to the VAS output. This level has a higher count for tree canopy and road surface than building façade.

**Table 8 /** Placemaking Element Results for Level 3 Intensity Images, Including Cell Count for Each and Significant Influence on VAS Output

Placemaking element	Mean	N	Std. dev.	Linear regression results compared to VAS output			
				Constant	B	R-square	Significance
Primary sign	26.707	58	37.404	56.792	-0.019	0.003	0.692
Secondary sign*	8.638	58	11.406	53.345	0.339	0.081	0.031
Building façade	84.276	58	48.469	53.428	0.034	0.014	0.368
Transparency	22.310	58	19.195	57.956	-0.075	0.011	0.428
People	31.897	58	23.058	55.618	0.021	0.001	0.795
Furniture	43.776	58	34.523	56.386	-0.003	0.000	0.962
Art	9.948	58	20.162	56.668	-0.039	0.003	0.663
Tree canopy	107.966	58	45.908	0.000	-0.008	0.001	0.838
Landscaping	48.983	58	24.532	53.435	0.058	0.011	0.435
Turf	6.069	58	12.522	56.127	0.025	0.001	0.866
Sidewalk surface	37.345	58	30.340	58.100	-0.049	0.012	0.416
Road surface	90.776	58	66.139	53.775	0.028	0.018	0.317
Car	27.931	58	26.319	57.125	-0.030	0.003	0.661
Sky	52.810	58	43.737	60.120	-0.073	0.055	0.077
Other	0.569	58	2.747	56.088	0.330	0.004	0.620



**Figure 3 /**  
 Mean Cell Count for Each  
 Placemaking Element at Each  
 Intensity Level

## DISCUSSION

### *Impact of Image Development*

While building the placemaking intensity image library, the study approach avoided blocking the primary signage, as its visibility would be core to this study. For pedestrians in a real setting, the viewpoint is always changing—from across the street, to taking a few steps forward, or depending on if a tree is holding its leaves. The pedestrians also have a variety of heights and viewpoints. These original photographs were taken from a moment in time and at 5' height to maintain a broad application of the findings. As such, the number of cells coded to primary signage on average changes just slightly within the mid-twenties regardless of placemaking intensity. The images were not designed to be aesthetic placemaking opportunities but to feature an increasing quantity of visual excitement.

The number of cells counted for building façade, turf, sidewalk surface, and the sky continually declines as the images become more intense in their placemaking. The cells dedicated to road surface also decrease once at level 1 and then stay relatively steady (approximately 106 cells to approximately 88–95 cells in the levels featuring placemaking). This indicates a more complex streetscape filled with people, art, and tree canopies occupying space once featuring the building, sky, and sidewalk (see Figure 3).

### *Affordance Theory*

Our streets can be diverse places: from the building typologies to the types of furniture and art we may (or may not) enjoy, and the people with whom we walk. As Jacobs (1961) and Whyte (1980) wrote, it is this diversity of opportunities that invites more people to join the streetscape. The opportunities (social, economic, and aesthetic) can directly influence behavior.

Affordance theory is an ecologically oriented theory, influenced by biological perspectives, and intends to characterize, analyze, and explain the behavior and function of a human in different settings (Gibson, 1978; Gibson & Shaw, 1977). The ecologically oriented perspective focuses on the functional relationship between the organism and the environment and examines the responses of organisms to their environments by changing the environment's stimuli. This approach aims to identify the mechanism of the relationship between human behavior and the environment to improve this relationship and make the environment more humane.

Gibson introduced the concept of "affordances" to define the actionable features between a person and their surroundings (Gibson, 1978; Gibson & Shaw, 1977). In Gibson's (1978) opinion, affordances are relationships between the environment and an actor (person or animal) that do not have to be prominent or even known to the actor. Gibson (1986, p. 127) defined accurately defined affordance as follows: "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill." The main feature of affordance theory is that in Gibson's view, the role of "cognition" has been neglected, and he believed that there is an immediate relationship between stimuli or "affordance" and "action."

Affordance theory states that the world is perceived not only in terms of physical environment shapes and relationships but also in terms of environmental possibilities for action (affordances). This theory has been used to investigate and monitor the relationship between the functional aspects of the environment and how the subject tends to use the environment (Clark & Uzzell, 2002). People may feel the placemaking excitement, while still processing signage precognitively.

### ***Streetscapes and Signage***

Business owners' avoidance of placemaking in the streetscapes, particularly regarding street trees, may have validity. Many business owners think these trees will block their stores or encourage loitering. Across all 200 images, signage visibility in preattentive processing is at its best with plain buildings and exposed road surfaces. These surfaces lack an abundance of detail or color changes and thus serve as a visual affordance for the pedestrian to

precognitively recognize the sign when interpreted with VAS. This is further emphasized when analyzing the 26 original photographs. None of the streetscape elements held significant influence on precognitive behaviors. However, these images lack most streetscape elements. The amount of building façade continued to trend towards supporting visibility. Though we may not perceive signage visibility decreasing, these more plain settings afford precognitive signage visibility.

The landscape, trees, and sky significantly impact the VAS output percentage because the software, using brain science, targets greens and blues in an image as areas of precognitive priority. Furthermore, the greater concentration of sky in an image indicates a strong edge, another VAS analysis priority, between the roof line and the start of the sky. The trees, especially in the foreground, offer an abundance of textures, or edges, in the leaves.

The sky continues to be a significant or trending detractor from preattentive signage visibility across intensity levels 1–3. Planners and designers may use this knowledge to carefully design the scale of the streetscape. For example, building heights and the width of sidewalks and streets will impact the amount of visible sky, particularly in the periphery of the cone of vision. While building height may be limited for safety or aesthetics, the sidewalk width must also be considered. Other means to limit the amount of visible sky include the use of street trees, which are not significant or trending detractors at levels 1–3. A canopy creates a visual "ceiling" in a streetscape and can help keep the eye on the first-floor businesses and on-premise signage.

The secondary signage, such as advertisements indicating special deals in the business, the menu near the door, or signs placed on the sidewalk, support signage visibility before cognition at level 3 intensities. This is likely the influence of the research team placing secondary signage often near the primary, on-premise signage. In streetscapes of intense complexity, on-premise signage visibility may be afforded with additional attractions placed near the doorway or in the first-floor windows as they increase the visual richness VAS analyzes.

The functional aspects of a setting define how the person can use the environment. Gibson's theory states that these functional features and the psychological or behavioral reaction to the environment should be analyzed

together. This theory extends a strategy of looking at the functional understandings of different elements of the built environments and how the environment “affords” a specific action—in this case, the action of going toward the designated spaces. Changing design features of the built environment and adding placemaking elements can cause enhanced behaviors and desired actions we expect from pedestrians and possible customers. Affordance can function as a conceptual framework to improve design processes to better understand the relationship between environment and the user.

### ***Placemaking Opportunities***

The development of placemaking principles in the streetscape allows humans to visit, shop or dine, and live in a well-planned and designed environment. This study demonstrates how placemaking can negatively impact on-premise signage preattentive processing. It is the placemaking, though, that when properly executed for a community, can bring more people to an environment and offset the one-time, decreased VAS Output. In the Great Lakes Region, between 60% and 90% of survey respondents are willing to walk up to 20 minutes to visit retail stores, grocery stores, entertainment venues, restaurants, schools, convenience stores, and, not surprisingly, parks and transit stops. Using such a human-oriented approach to planning and urban design brings in new residents and provides more economic opportunities (Graebert, 2013). Built environment professionals, residents, and business owners have a responsibility to ensure the entire streetscape is an inviting place to promote shared wellbeing.

Designers and planners should be careful to integrate their knowledge to space streetscape elements appropriately for signage pre and postattentive visibility. A team has the shared responsibility to ensure, for example, that a building’s multiple ingress points (and presumably the on-premise sign) alternate with required street tree planting distances. Form-based code, too, can guide designers to limit the heights of buildings and sidewalk shade structures as well as their distance extending from the building. Landscape ordinances and landscape architects can choose the tree for the area to ensure appropriate branching patterns that balance shaded opportunities, keep the eye directed to the building’s first floor, and keep on-premise signs visible.

The building surfaces are generally flat in color. The windows on upper stories may provide diversity in taller buildings, but the photos are from the pedestrian shopper’s viewpoint and do not intentionally look upward to see the windows above. This knowledge may be utilized to guide unique placements of on-premise signage and thus encourage placemaking potential. Architects may add accented areas on the façade in consultation with urban planners and business owners to draw the eye. Here, sign designers can add unique typologies and colors to further draw the eye to a sign placed over an accented facade. Wayfinding designers may use more neutral color as a canvas to place their visually accented, directional information.

Placemaking can bring people to the streetscape for the businesses, and signage provides the information to guide the people. The two are linked as important teammates for economic development and distributing knowledge. As placemaking suggests interdisciplinary teams, sign manufacturers, designers, and installers can further engage with municipal planners, architects, and landscape architects to ensure the collective goals of placemaking are achieved and signs highlight each business and opportunity.

## REFERENCES

- 3M-VAS. (2022). 3M VAS. <https://vas.3m.com/>
- Alexander, C. (2015). *The city is not a tree: 50th anniversary edition*. Sustasis Press.
- Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: Towns, buildings, construction*. Oxford University Press.
- Beard, F. K. (2017). The ancient history of advertising: Insights and implications for practitioners: What today's advertisers and marketers can learn from their predecessors. *Journal of Advertising Research*, 57(3), 239–244. <http://dx.doi.org/10.2501/jar-2017-033>
- Billings, E., Lovett, E., & Wasserman, A. (2022). Ask the river: A public art and placemaking project. *River Research and Applications*, 38(1), 470–485. <http://dx.doi.org/10.1002/rra.3833>
- Cabannes, Y., Douglass, M., & Padawangi, R. (2018). Cities by and for the people. In Cabannes, M. Douglas, & R. Padawangi (Eds.), *Cities in Asia and for the people*. Amsterdam University Press. <http://dx.doi.org/10.2307/j.ctv7xbs0b>
- Chen, L., Lu, Y., Ye, Y., Xiao, Y., & Yang, L. (2022). Examining the association between the built environment and pedestrian volume using street view images. *Cities*, 127(1), 01–10. <http://dx.doi.org/10.1016/j.cities.2022.103734>
- Chew, L., Hespanhol, L., & Loke, L. (2021). To play and to be played: Exploring the design of urban machines for playful placemaking. *Frontiers in Computer Science*, 3(635949), 01–17. <http://dx.doi.org/10.3389/fcomp.2021.635949>
- Childe, V. G. (1950). The urban revolution. *The Town Planning Review*, 21(1), 3–17 <http://www.jstor.org/stable/40102108>
- Cilliers, E. J., Timmermans, W., Goorbergh, F. V. d., & Slijkhuis, J. (2015). Green place-making in practice: From temporary spaces to permanent places. *Journal of Urban Design*, 20(3), 349–366. <http://dx.doi.org/10.1080/13574809.2015.1031213>
- Clark, C., & Uzzell, D. L. (2002). The affordances of the home, neighbourhood, school and town centre for adolescents. *Journal of Environmental Psychology*, 22(1), 95–108. <http://dx.doi.org/10.1006/jevps.2001.0242>
- Crawford, P., Lee, E., & Beatty, M. (2015). Aesthetic perception of urban streetscapes and the impact of form-based codes and traditional zoning codes on commercial signage. *Current Urban Studies*, 3(3), 199–215. <http://dx.doi.org/10.4236/cus.2015.33017>
- Crook, T. (2019). Model institutions and the geography of social reform in early Victorian Britain. *The Historical Journal*, 62(3), 789–812. <http://dx.doi.org/10.1017/s0018246x18000171>
- Dumpelmann, S. (2019). *Seeing trees: A history of street trees in New York City and Berlin*. Yale University Press. <http://dx.doi.org/10.2307/j.ctv8jpp086.10>
- Ellin, N. (2006). *Integral urbanism*. Routledge.
- Ewald, W. R. (1971). *Street graphics: A concept and a system*. American Society of Landscape Architects Foundation.
- Forsyth, A. (2015). What is a walkable place? The walkability debate in urban design. *Urban Design International*, 20(4), 274–292. <http://dx.doi.org/10.1057/udi.2015.22>
- Frederick, U., & Clarke, A. (2014). Signs of the times: Archaeological approaches to historical and contemporary graffiti. *Australian Archaeology*, 78(1), 54–57. <http://dx.doi.org/10.1080/03122417.2014.11681999>
- Gibson, J. J. (1986). *The ecological approach to visual perception*. Psychology Press.
- Gibson, J. J. (1978). The ecological approach to the visual perception of pictures. *Leonardo*, 11(3), 227–235. <http://dx.doi.org/10.2307/1574154>
- Gibson, J. J., & Shaw, R. (1977). Perceiving, acting, and knowing: Toward an ecological psychology. *The Theory of Affordances*, (1), 67–82.
- Graebert, M. B. (2013). *The Impact of placemaking attributes on home prices in the Midwest United States*. Constructed Environment Conference, Lisbon, Portugal.

- Gulsrud, N. M., Hertzog, K., & Shears, I. (2018). Innovative urban forestry governance in Melbourne?: Investigating “green placemaking” as a nature-based solution. *Environmental Research*, 161(1), 158–167. <http://dx.doi.org/10.1016/j.envres.2017.11.005>
- Hess, D. B. (2006). Transportation beautiful: Did the city beautiful movement improve urban transportation? *Journal of Urban History*, 32(4), 511–545. <http://dx.doi.org/10.1177/0096144205284402>
- Holston, J. (1989). *The modernist city: An anthropological critique of Brasilia*. University of Chicago Press.
- Jackle, J., & Sculle, K. (2004). *Signs in America's auto age: Signatures of landscape and place*. University of Iowa Press.
- Jacobs, J. (1961). *The life and death of great American cities*. Random House.
- Kuo, F. E., Sullivan, W. C., Coley, R. L., & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823–851. <http://dx.doi.org/10.1023/a:1022294028903>
- Li, H. L. (1969). Urban botany: Need for a new science. *Bioscience*, 19(10), 882–883. <https://www.jstor.org/stable/1294709> <http://dx.doi.org/10.2307/1294709>
- Lynch, K. (1960). *Images of the city*. Massachusetts Institute of Technology Press.
- Matthews, T., & Gadalofo, S. (2022). Public art for placemaking and urban renewal: Insights from three regional Australian cities. *Cities*, 127(1), 01–14. <http://dx.doi.org/10.1016/j.cities.2022.103747>
- Mehta, V., & Rahman, M. (2021). Visualizing and communicating neighborhood identities. *Interdisciplinary Journal of Signage and Wayfinding*, 5(2), 55–62. <http://dx.doi.org/10.15763/issn.2470-9670.2021.v5.i2.a94>
- Merlin, P. (1980). The new town movement in Europe. *The ANNALS of the American Academy of Political and Social Science*, 451(1), 76–85. <http://dx.doi.org/10.1177/000271628045100108>
- Mircea, F. (2019). *Signage through the ages*. <https://medium.com/@flaviu.mirc/signage-through-the-ages-9e5e8b-c06d25>
- Moskell, C., & Allred, S. B. (2018). Residents' beliefs about responsibility for the stewardship of park trees and street trees in New York City. *Landscape and Urban Planning*, 120(1), 85–95. <http://dx.doi.org/10.1016/j.landurbplan.2013.08.002>
- Project for Public Spaces. (2022). *Home—Project for public spaces*. Retrieved September 18, 2022, from <http://www.pps.org/>
- Relph, E. (1976). *Place and placelessness*. Pion.
- Simon, H., Linden, J., Hoffmann, D., Braun, P., Bruse, M., & Esper, J. (2018). Modeling transpiration and leaf temperature of urban trees – A case study evaluating the microclimate model ENVI-met against measurement data. *Landscape and Urban Planning*, 174(1), 33–40. <http://dx.doi.org/10.1016/j.landurbplan.2018.03.003>
- Smith, W. H. (1977). Influence of heavy metal leaf contaminants on the in vitro growth of urban-tree phylloplane-fungi. *Microbial Ecology*, 3(3), 231–239. <https://www.jstor.org/stable/4250490> <http://dx.doi.org/10.1007/bf02010620>
- Trinch, S. L., & Snajdr, E. (2020). *What the signs say: Language, gentrification, and place-making in Brooklyn*. Vanderbilt University Press. <http://dx.doi.org/10.2307/j.ctv160btqs>
- van Ameijde, J., Ma, C. Y., Goepel, G., Kirsten, C., & Wong, J. (2022). Data-driven placemaking: Public space canopy design through multi-objective optimisation considering shading, structural and social performance. *Frontiers of Architectural Research*, 11(1), 308–323. <http://dx.doi.org/10.1016/j.foar.2021.10.007>
- Wang, M., Hyde, R. Q., Burley, J. B., Allen, A., & Macherer, T. (2015). Low-impact housing: River Rouge, Michigan. *Housing and Society*, 42(3), 193–206. <http://dx.doi.org/10.1080/08882746.2015.1121679>
- Wang, Y., & Akbari, H. (2016). The effects of street tree planting on urban heat island mitigation in Montreal. *Sustainable Cities and Society*, 27(1), 122–128. <http://dx.doi.org/10.1016/j.scs.2016.04.013>
- Wey, W. M., & Wei, W. L. (2016). Urban street environment design for quality of urban life. *Social Indicators Research*, 126(1), 161–186. <http://dx.doi.org/10.1007/s11205-015-0880-2>
- Whyte, W. H. (1980). *The social life of small, urban spaces*. The Conservation Foundations.
- Wolf, K. L. (2004). Tres and business district preferences: A case study of Athens, Georgia. *U.S. Journal of Arboriculture*, 30(6), 336–346. <http://dx.doi.org/10.48044/jauf.2004.041>
- Wyckoff, M. A. (2014). Definition of placemaking: Four different types. *Planning and Zoning News*, 32(3).
- Zebracki, M., Vaart, R. V. D., & Aslst, I. V. (2020). Deconstructing public artopia: Situating public-art claims within practice. *Geoforum*, 41(5), 786–795. <http://dx.doi.org/10.1016/j.geoforum.2010.04.011>



## Book Review:

# Public Space: Notes on Why it Matters, What We Should Know, and How to Realize its Potential

By *Vikas Mehta*

## Pat Crawford

Director  
School of Design  
South Dakota State University

pat.crawford@sdsstate.edu

In Vikas Mehta's new book, *Public Space: Notes on Why it Matters, What We Should Know, and How to Realize its Potential*, he builds on his significant scholarly contributions to understanding the social, political and physical complexities of public space. Dr. Mehta approaches public space from a deep disciplinary grounding in planning, urban design, sociology and architecture and his experience as Professor of Urban Design, the Fruth/Gemini Chair and Ohio Eminent Scholar of Urban/Environmental Design at the School of Planning, College of DAAP, at the University of Cincinnati.

The central premise of the book is to capture in one conversation the diverse disciplinary ways of understanding and knowing public space conversation. The book can be read straight through or slowly over time picking up sections in random order. With an A5 format (~4"x6") the book is 'approachable,' circumventing the heft of a college textbook. The viewer is drawn in by the cover with bright green block text on a black background. The simplicity of the cover conceals the visual complexity and richness that pulls the reader through the pages. The combination of disciplinary concepts is constructed through a diverse display of descriptive text, diagrammatic symbols, sketches, typographic hierarchy, graphic page design and color blocking. The page layouts make following the author's intended flow natural and creates space for pause and reflection. Each section is an approachable self-contained dialogue, like moving from conversation to conversation at a party with planning theorists, sign makers, and economists; landscape architects, historians, and social activists; architects, psychologists, and politicians; legal scholars, business owners and artists. Through the lively debate, readers are encouraged to broaden their understanding, or be gently reminded of how disciplinary

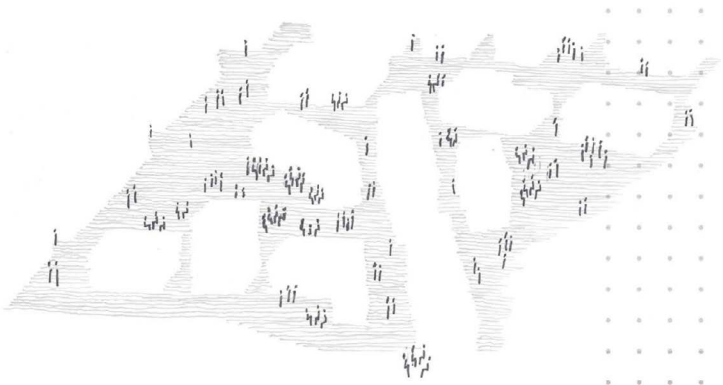
### Book Review

Mehta, Vikas. *Public Space: Notes on Why it Matters, What We Should Know, and How to Realize its Potential*. New York: Routledge, 2023.

ISBN-13: 978-1032137025

### Figure 1 /

Example diagram from *Public Spaces*.



expertise brings blinders, of how public space is conceived, perceived, and used.

The text is best approached as an experience that requires engagement. Vikas organizes the book into two broad sections. The introduction prepares the reader for the experience, who the book is for, and how to approach the volume. The context is then set with discourse on two framing questions, "Why care?" (pgs. 8-37) and "What is Public Space?" (pgs. 38-89). The second section addresses the challenges of public space, through the lens of Paradoxes (pgs. 90-139), Possibilities (pgs. 130-169) and Propositions (pgs. 170-222).

From the back cover, insights are provided into how disciplinary experts see Vikas's contribution to the scholarly work on public space. A few highlights are worth bringing forward.

"It is an insightful new guide that simplifies and demystifies the public space debate and affirms the value of good and just city life in the time of urban crisis. This book, like its author who is one of the leading authorities in urban design and public space, is innovative, clear and able to open pathways to new ideas." **Tigran Haas**, Associate Professor and Director of the Centre for the Future of Places, KTH Royal Institute of Technology, Stockholm, Sweden, Guest Research Scholar at LCAU, MIT.

"This is a must read for all those committed to exploring public space – whether undergraduate or graduate students, planning and design practitioners, those who operate and maintain public spaces, or aspiring civic leaders committed to making the best use of public spaces in their cities." **Miodrag Mitrašinić**, Professor of Urbanism and Architecture, Parsons School of Design, The New School university, New York City

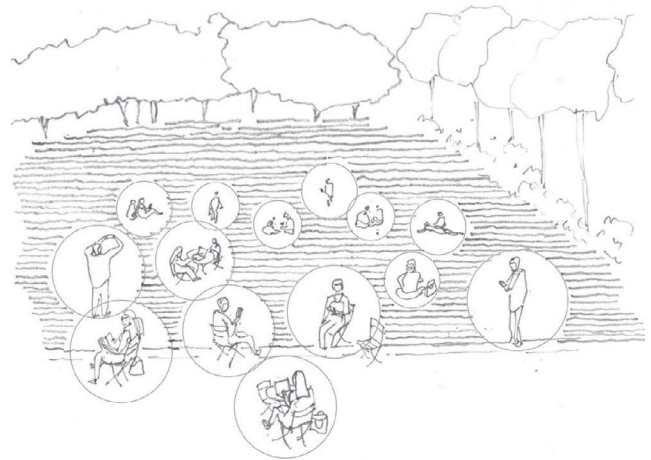


Figure 2 /

Example diagram from *Public Spaces*.

Vikas concludes the book with a challenge to everyone who designs, manages and uses urban spaces: "public space has immense capacity...only limited by our imagination..." (pp.220-221). *Public Space* literally smashes together different ways of seeing public space into a shared exhibition, the page, in the hopes of feeding our imaginations and fostering transformative conversations about public space and public life.

This book is a valuable contribution to makers and designers of public signage. Signage helps people to navigate the spaces and corridors, to understand the social expectations, and builds upon the physical aesthetic of a space. By stepping into the world of others, learning how others think about our shared spaces, we can contribute to the conversation.

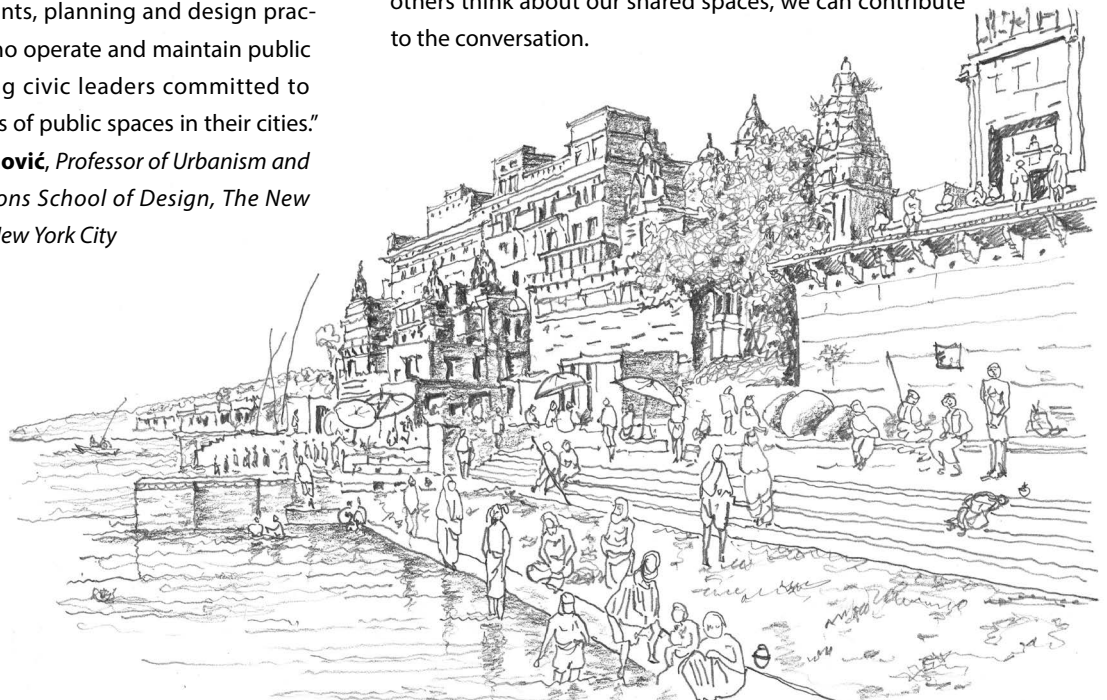


Figure 3 /

Example sketch.