Do Seats, Food Vendors, and Sculptures Improve Plaza Visitability?
Dina Abdulkarim and Jack L. Nasar

Environment and Behavior 2014 46: 805 originally published online 19 February 2013
DOI: 10.1177/0013916512475299

The online version of this article can be found at:
http://eab.sagepub.com/content/46/7/805

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
Environmental Design Research Association

Additional services and information for Environment and Behavior can be found at:

Email Alerts: http://eab.sagepub.com/cgi/alerts
Subscriptions: http://eab.sagepub.com/subscriptions
Reprints: http://www.sagepub.com/journalsReprints.nav
Permissions: http://www.sagepub.com/journalsPermissions.nav
Citations: http://eab.sagepub.com/content/46/7/805.refs.html

>> Version of Record - Sep 8, 2014
OnlineFirst Version of Record - Feb 19, 2013
What is This?
Do Seats, Food Vendors, and Sculptures Improve Plaza Visitability?

Dina Abdulkarim1 and Jack L. Nasar1

Abstract
Building on Whyte’s work on livable places, the present study developed a four-item scale to assess visitability and used it to test whether three attributes identified by Whyte—seating, food, and triangulation—increase visitability. The study used color slides of three plazas altered for the presence or absence of each attribute. Sixty participants (23 men and 37 women) rated slides of the plazas on each of four items on the Perceived Visitability Scale (PVS). The four items had high interitem reliability, and each item and their composite had high interobserver reliability. The visitability ratings showed that plazas with seats, food, or sculpture had higher scores than plazas without those elements; and the combination of seats and sculpture had higher scores than either element alone. Contradicting Whyte, there was no statistically significant effect of gender. Seats, sculpture, and the perceived compatibility of elements with one another may improve plaza visitability.

Keywords
sittable, vendors, triangulation, public art, public space, visitability scale, preference scale

Introduction
Public spaces are an important part of cities. They may enhance people’s quality of life, sense of attachment, collective and social culture, mental and

---

1The Ohio State University, Columbus, USA

Corresponding Author:
Jack L. Nasar, City and Regional Planning, The Ohio State University, 292 Knowlton Hall, 275 W. Woodruff Ave., Columbus, OH 43210, USA.
Email: nasar.1@osu.edu
physical health, and sociability (Amin, 2008; Madanipour, 2010; Whyte, 1980, 1988; Wooley, 2003). As a form of public space, plazas have potentially similar benefits. People use them to see and be seen by others (Gehl, 1987). Spending time in them may help people cope with or recover from the demands of life and work.

Whyte’s (1980, 1988) landmark Street Life Project studied the elements that made plazas livable. It not only brought attention to liveliness and its potential use for different kinds of places but also affected policy. However, although he unobtrusively observed use and reported environmental correlates (such as sitting space, food, sunlight, etc.) with use, he did not report the statistics that supported his conclusions. Other research on plazas that followed did report the statistics, but took a correlational approach and did not go beyond correlational designs to identify cause. As compelling as this research has been, it does not and cannot show whether the specific physical characteristics of plazas affected their vitality. To establish cause, one needs an experiment. The present study ran a controlled experiment to test the effects of three of the characteristics identified by Whyte’s work on livability. Because the concept of livability has broadened to encompasses many other aspects of a place (such as its comfort, safety, access), we replace the term livability with visitability. For this experiment, we first developed and tested a four-item scale to measure perceived visitability.

Background

When Whyte started the Street Life Project in 1971, he sought to identify the elements that made parks, playgrounds, and plazas in Manhattan vibrant and inviting. His team observed, photographed, and filmed people’s behavior in 16 plazas and three small parks in New York City over 3 years during different times of the day, days of the week, and seasons. They interviewed plaza users, took physical measures (e.g., dimensions of sitting spaces, sound levels), and documented a number of other attributes and conditions of the plazas in the study (such as size, layout, surrounding, sunny and shaded areas, gender and age of users). Although some people considered overcrowding a problem, he found no overcrowding. Instead, many suffered from underuse. During most of the day, the capacity of the studied plazas remained well below what the space could accommodate. At peak hours, the number of sitters in the highest used plaza in the study ranged between 33 and 38 per hundred feet of sitting spaces, whereas if people sat at the average density of buses, this ratio would be 60 per hundred feet. He reported that people tended to self-congest. They filled the space unevenly; dense spots getting denser.
He also claimed that people seemed to determine and not exceed a place’s capacity by choosing where to sit and when to leave. Thus, he noted that the approaches of some cities based on the misconception of over-crowdedness of public plazas (e.g., relief from pedestrian congestion) worsen the situation. Contrary to the notion that small cities were friendlier than bigger ones, Whyte argued that more interaction took place in bigger cities—not just in absolute values but in proportion to size too. He found that the presence of other people was the most important factor in attracting people to use the plaza. He also identified sitting space, food, triangulation, sunlight, wind, trees, water features, and access to the street as elements that can attract people and thus make a plaza livelier. Below are outlined more details about each one.

- Sitting space was the most important factor. In addition to proposing guidelines for height, length, width, and percentage, Whyte suggested that sitting needs to be comfortable, both physically and socially. It had to offer choice and flexibility. The space should include a number of sitting options (e.g., type: chairs, benches, ledges; location: front, back, edge, center; and sun exposure: sun, shade).

- Food contributes to livability by attracting people which in turn attracts more people. Whyte reported that even when something as simple as a food cart came to the plaza, more people and more vendors came.

- Triangulation involves an unusual or uncommon element that can lead strangers to stop and talk with one another, supporting social interaction among people by giving them something to talk about. Before and after studies of one of the plazas in the study, Whyte found that adding a sculpture in one plaza changed pedestrian patterns because it created new forms of interaction with it. People stopped to look at it, touch it, talk about it, and sit by it. Performers also offer triangulation. They draw people together to observe and talk about the show regardless of its quality and to also look at each other.

- For sunlight, he reported that people sat in the sunny spots, especially in the cooler months, but they avoided sunlight in hotter months. Thus, exposure to sunlight varied with the season.

- Deciduous trees, especially those close to sitting spaces or related to the passing scene of the plaza, offers visual appeal, enclosure, and protection from unwanted sunlight on hot days, while allowing sunlight and warmth on cold days.
• Water features such as waterfalls, fountains, and pools add vitality to the place when made accessible for users to touch, splash their hands, or play with. Measuring around 75 decibels, a waterfall masks traffic noise, replaces it with a sound perceived favorably, and offers privacy for conversations in public.

• Finally, for access to the street, Whyte reported that the best relationship between the street and the plaza was an integrative one where one flows into the other without strict separation. Busy corners brought users. The front row featured the biggest use when it had sitting where the street provided the visual interest of storefronts or people watching. Recall that Whyte argued that a crucial factor that attracted people (even those who chose to sit alone in public) was other people. To him, even sitting alone in a public place was an act of socialization; a passive one.

Whyte’s use of unobtrusive measures to address a policy issue and to transform the findings into regulations and incentives for design stands as a model for applied urban design research. That said, although he showed bar charts, he did not report the statistics (such as correlations and $p$ values) from which he drew his conclusions. Furthermore, because the research was correlational, it did not establish cause. Without a controlled study and statistics, one cannot assess whether each feature cited by Whyte does attract use and make a place livelier.

Others followed Whyte’s work, but they also tended to use a correlational approach. For example, the Project for Public Spaces [PPS] (2011), which grew from Whyte’s project, used the findings and observational approach over thousands of communities, and expanded the focus from plazas to other open spaces such as civic centers, markets, parks, waterfronts, multiuse spaces, downtowns, and transportation. PPS defines placemaking—a term that parallels Whyte’s concept of livability—as a process that hinges on community participation and depends on applying key variables (e.g., walkability, accessibility, proximity) and measurable data (e.g., retail sales, rent levels, crime statistics) to improve the quality of public spaces. It offers designers, planners, and educational organizations useful tools to work with the community on creating and improving neighborhoods (PPS, 2011). As a consulting organization, PPS may use statistics on the relationship between visitability and attributes of places, but those statistics are proprietary and not available to the public or scientists. Other studies that did report the statistics have confirmed the desirability of seating, food, sculptures, trees, fountains, and enclosure (Joardar & Neill, 1978) as well as some other features. One
study found that an index of liveliness, constructed from observations of behavior over 8 months in relatively comfortable temperatures, was related not only to two of Whyte’s features—seating and community gathering places (such as coffee shops, bars, and restaurants)—but also to personalization and sidewalk width (Mehta, 2007). The study centered on streets, not plazas, and it did not assess triangulation. A detailed study that did center on plazas found that both rated pleasure and activity levels observed over 6 months increased with increase in the perceived diversity of the plazas (Joardar, 1977), but they also increased with internal furnishings such as sculpture, greenery, and fountains, and the view out of the plaza to natural features (such as mountains and water).

Other observational and livability studies that report the analysis and statistics did not test Whyte’s claims about plaza livability. For example, Appleyard (1981) looked at the livability of residential neighborhoods by studying three streets with different traffic flow and found that negative effects related to increased traffic. Gehl (1987) looked at livability of residential neighborhoods by studying the activities that took place around buildings. He found that a good public space contains and supports three types of activities: necessary (going to school and work, shopping, and running errands), optional (leisure walking, sitting, or standing), and social (greeting, conversations, and other acts that require the presence of others). To understand patterns of activity along major downtown streets, one study observed activities on the sidewalk and collected data on the physical characteristics of the sidewalk (Nasar & Yurdakul, 1990). Another study, which focused on playgrounds, sought to find the physical features in playgrounds that would make children more active (Moore, 2010). Other research investigated the physical elements in garden spaces in hospitals and other health care services that can promote healing (Hartig & Cooper-Marcus, 2006). Research on active living, which parallels liveliness, has studied the walkability of places in relation to social and physical characteristics of the environment (Giles-Corti et al., 2005; PPS, 2011; Suqiyama, Francis, & Middleton, 2010). In sum, although these studies report the statistics, they did not study Whyte’s livable features. Through a controlled experiment, the present study sought to find out whether Whyte’s elements would likely attract people and thus improve visitability.

To study the effect of all eight variables that Whyte saw as creating lively plazas (sitting space, food, triangulation, sunlight, wind, trees, water features, and access to the street) would require at least 256 combinations (two levels of each variable against two levels of each other variable). Consideration of other attributes found associated with places that attract use would require
many more combinations. Thus, this study narrowed its focus to three key
variables stressed by Whyte as important and identified in other research as
important to activity (Joardar, 1977; Joardar & Neill, 1978; Mehta, 2007):
sitting space, food vendors, and sculptures for triangulation. This reduced the
number of comparisons (if each has two levels) to a more manageable eight
(2^3) combinations. We eliminated sunlight, wind, and access to the street
because of difficulties in doing visual simulations of them, and we eliminated
trees and water because there is already substantial research evidence on the
desirability and benefits of natural elements such as trees and water (Cole &
Hall, 2010; Hartig, 1991; Joardar, 1977; Kaplan & Kaplan, 1989; Ulrich,
Simons, Losito, Miles, & Zelson, 1991), of higher levels of activity in places
having greenery than in places without it (Joardar, 1977; Kuo, Bacaicoa, &
Sullivan, 1998; Sullivan, Kuo, & Depooter, 2004) and higher levels of activ-
ity associated with nature through its links to perceived aesthetics (Brown,
Werner, Amburgey, & Szalay, 2007).

Whyte identified sitting space as the most important factor, he consid-
ered food as the seed for activity because it draws people, and he suggested
that triangulation prompted people to talk and seemed to bond them. Recall
that other research also found activity levels associated with sitting space,
Thus, in theory, sitting space, food, and triangulation should improve visit-
ability, and we expected the results to remain stable with variations in both
the type of sitting, food, and triangulation and the size and the characteris-
tics of the plaza.

Whyte also cited gender differences in the plazas, with women tending to
sit further back than men, and he reported that the most successful plazas
have a higher ratio of women (i.e., women are more discerning than men
about the quality of the plaza). Women more so than men may notice and
prefer the safety afforded by certain plazas and certain locations in them.
Women report a higher fear of crime than men, due in part to feelings of
vulnerability (Stanko, 1995), and in public places, they suffer more inva-
sions of their personal space and sexual harassment than do men (Mozingo,
1989). A study of the perception and use of two plazas by men and women
in San Francisco confirmed gender differences in response to plazas
(Mozingo, 1989). It found differences in the percentage of women in each
plaza, differences in the locations liked or disliked, and differences in the
reasons given. In agreement with Whyte’s observed seating pattern, men
tended to prefer more of a “front yard” experience (public, connected to the
street, and its urban activity), whereas women tended to prefer more of a
“back yard” experience (more private, control, and comfort for socializing,
Abdulkarim and Nasar

Would women and men differ in their ratings of the visitability of plazas?

Method

Stimuli

Because of the difficulty of systematically manipulating features in real plazas, the study used color photographs of three public plazas. For each plaza, we used Adobe Photoshop CS5 to manipulate the presence or absence of each of the features (seats, food, and triangulation). Responses to color photographs and virtual reality models generalize well to on-site response (Stamps, 2010).

Using a full-factorial design results in eight effects. Across three plazas, this design requires 24 slides of plazas. To avoid tiring or boring participants, we had one half of the participants rate 12 plazas and the other half rate the other 12 plazas. We balanced the halves such that all treatments had the same number of observations, and they were orthogonal in that the sum of the products of their corresponding elements is 0 (NIST/SEMATECH, 2003). Table 1 shows the split fractions of the two levels of the three variables adapted from Ryan (2007). Figures 1, 2, and 3 show the simulations.

For sitting space, the simulations represented the presence of seats with the minimum amount of sitting space recommended by Whyte (1980), 1 linear foot of sitting space for every 30 square feet of plaza. They represented food vending with one vendor, and they represented triangulation with one or more sculptures. Whyte discussed sculpture as one source of triangulation. Joardar (1977) found that the presence of sculpture was associated with

<table>
<thead>
<tr>
<th>Table 1. The Two Split Fractions of the Study.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First fraction</strong></td>
</tr>
<tr>
<td>Treatment combination</td>
</tr>
<tr>
<td>S     F     C</td>
</tr>
<tr>
<td>Seats No food No sculpture</td>
</tr>
<tr>
<td>No seats Food No sculpture</td>
</tr>
<tr>
<td>No seats No food Sculpture</td>
</tr>
<tr>
<td>Seats Food Sculpture</td>
</tr>
<tr>
<td><strong>Second fraction</strong></td>
</tr>
<tr>
<td>Treatment combination</td>
</tr>
<tr>
<td>S     F     C</td>
</tr>
<tr>
<td>No seats No food No sculpture</td>
</tr>
<tr>
<td>SF    Seats Food No sculpture</td>
</tr>
<tr>
<td>SC    Seats No food Sculpture</td>
</tr>
<tr>
<td>FC    No seats Food Sculpture</td>
</tr>
</tbody>
</table>

Note: S = seats; F = food; C = sculpture.

and some protection from urban stresses). Would women and men differ in their ratings of the visitability of plazas?
Figure 1. Civic Center Park.

Note: Clockwise from top left: no seats, no food cart, no sculpture; seats; food cart; seats and food cart; seats, food cart, and sculpture; food cart and sculpture; seats and sculpture; sculpture.
Figure 2. Gansevoort Plaza.
Note: Clockwise from top left: no seats, no food cart, no sculpture; seats; food cart; seats and food cart; seats, food cart, and sculpture; food cart and sculpture; seats and sculpture; sculpture.
Figure 3. The Piazza at Schmidts.
Note: Clockwise from top left: No seats, no food cart, no sculpture; seats; food cart; seats and food cart; seats, food cart, and sculpture; food cart and sculpture; seats and sculpture; sculpture.
favorable impressions of the plaza and higher activity levels. Also, sculpture can serve as a landmark feature or focal point that would enhance the image and legibility of a place (Lynch, 1960). In addition, it, unlike other triangulation features such as performers, is a fixed-design feature. Thus, we used sculpture as the triangulation feature. To broaden the external validity and to allow an examination of the effects of Whyte’s variables in three real but different contexts, the study used three real plazas that varied in size and other characteristics: Gansevoort Plaza, New York, NY, The Piazza at Schmidts, Philadelphia, PA, and Civic Center Park, Denver, CO. Whyte saw more prospects for small-scale plazas in center cities, but he maintained that large-scale plazas had their own appeal, adding to the experience of a place in a way that no aggregation of small plazas can.

The Civic Center Park (Figure 1), completed in 1917 and restored in 2005, dates to the City Beautiful movement with its symmetrical design and axial alignment to the State capital (Denver Parks and Recreation Department, 2005). At 47,000 square feet, it is the largest of the plazas. The slide shows a round open area (11,000 square feet) with the amphitheater (33,000 square feet) in the foreground and the downtown buildings in the background. For seats, we added the circular amphitheater at the edges of the round portions, and to meet Whyte’s recommended seating, we added the circular seats in the foreground and the wooden benches in the middle ground along the sides of the rectangular portion of the plaza. For food, we added a hot dog cart in the middle ground left. To make it more visible, we added a hot dog and pretzel logo, a bright yellow board with a hot dog symbol in front, and two persons standing in line. For a sculpture, we placed a large brightly colored and balloon-like dog sculpture in the middle ground. Its size, colors, and central location make it visible.

Gansevoort Plaza (Figure 2), designed with residents and community leaders by PPS, is the smallest plaza (about 1,200 square feet) in this study. The step-shaped seating on the right side and cement cylindrical seats were in the real plaza. For seating, we added enough cylinders to meet Whyte’s recommended minimum amount. For food, we added a female vendor with a small ice cream bike, placed in the midground center to be visible without blocking the seating. We put the sculpture, four metal children in different colors on each other’s shoulders riding a metal dog, on the left. This placement fit the empty space defined by the cement balls there, without shrinking the small open area of the plaza.

The Piazza at Schmidts (Figure 3), part of an American Institute of Architects (AIA) award winning project in a historic neighborhood of Philadelphia, is larger (30,000 square feet). The slide shows part of the two
new buildings and a little more than half of the actual area of the plaza. The buildings have a residential identity and because of light reflections, the store-fronts appear dark and do not reveal information about the use of the interior space. The chairs and tables, along with the umbrellas, were part of the original design. For seating, we added an extra unit (four chairs and one table) between each two units and inserted an extra row of seating between each two rows. Because the plaza did not allow a food element toward the center, we moved it toward the foreground to make it more visible. For triangulation, we added three variations on bull sculpture, making it less of a focal point than the one sculpture in Gansevoort.

We varied the kind of sitting, food vending, and triangulation (sculptures) in each plaza to broaden the external validity. Sitting appeared as semimovable stools in one plaza, fixed chairs in groups of four around tables in another, and benches and theater-like stepped seating in the third. Food vending appeared as an ice cream bike in one, a juice cart in the second, and a hot dog cart in the third. The sculptures (for triangulation) varied in character and scale: One was multicolored with a small vertical structure, another was picturesquely painted with three detached parts, and the third was a shiny monochromatic with a large focal appearance.

To distract participants from the manipulations, we added 3 slides—one for each plaza showing elements other than the three test variables (Figure 4). One distracter had a stretch of newspaper distribution boxes and a flyer stand, the second showed people looking at large-scale boards displaying a community project, and the third showed two skate-boarding youngsters and a flyer stand. Thus, participants in each group saw 15 slides, 12 in the study and 3 distracters. Distracters were not included in the analyses.

We kept other aspects of the slides (such as sky color, brightness, and saturation) constant, and we removed undesirable elements such as street and store signs, litter, overgrown grass, and dead trees. We also kept natural elements at about 10% by replacing trees and grass with elements from the

Figure 4. Plazas with distracters.
Note: From the left: Civic Center Park, Gansevoort Plaza, The Piazza at Schmidts.
slide itself (such as buildings, fences, or paving). Because Whyte (1980) claimed that the presence of people attracted use, we also kept the number of people in each plaza constant across the conditions. Thus, if the condition with seats had three sitting people, the condition without seats also has three people, but they were standing or walking. Also, to minimize any biases arising from participants’ familiarity with the place, we chose plazas from states distant from the participants. Only 2 of the 60 participants claimed to recognize a plaza.

Participants saw the slides of the plazas on a full iPad screen (9.56 × 7.47 inches). To reduce order effects, each participant received a different random order of slides.

Participants

The sample had two groups of 30 participants for a total of 60 (23 men, 37 women). They lived in the 15th largest city (787,003 people) in the United States, and two thirds reported that they grew up in large cities, midsized cities, or large towns/small cities. Most reported that they were Caucasian, though 30% reported they were African American, Latino, Asian, or mixed. Reported ages ranged from 17 to 34 years (M = 20 years).

The interviewer approached people in the Ohio Union, a public gathering place at The Ohio State University, which houses more than 300 established students’ organizations, lounging and socializing areas, lecture rooms, retail stores, and food court. About 65% of those approached agreed to participate.

Estimating sample size for experimental designs depends generally on five parameters (Eng, 2003): effect size, estimated measurement variability, desired statistical power, significance criterion, and whether the analysis is one- or two-tailed. Determining sample size is also influenced by the experiment design and the type of data collected (e.g., whether the values of the dependent variable are measured on continuous or discrete scale). Using Park and Jung’s (2009) equation for calculating sample size for a population measured by Likert-type scale yielded a sample size of 39 for the four-item visitability scale, but a repeated measure design maintains the same power with a sample of 28.

Instrument

Because the simulation did not allow the observation of use of the plazas, the study used verbal measures to assess intended behavior, which, although not equivalent to actual behavior, are a good predictor of it (Ajzen & Fishbein,
Specifically, it obtained ratings on the applicability to the plaza of each of four statements aimed at assessing visitability or the degree to which it would attract people.

- I will walk out of my way to visit and spend time in that place.
- I will stop at that place if I happen to be passing by.
- That is a place where I would choose to meet a friend.
- I would regularly visit that place.

Participants rated each item on an 11-point scale for how much it applies to the participants experience of the place (from 0 = not at all to 10 = completely).

Multiple items allow a test for interitem reliability and if reliable can be better for drawing inferences than a single item. The first two items on the Perceived Visitability Scale (PVS) come from Whyte’s (1980, 1988) definition of livable space, and the last two items come from the PPS (2011) criteria of livable space. All four items should indicate visitability because they ask about whether a person would visit the place if passing by or further away, how often they would visit it, and whether or not would choose to meet another person there.

The study used the instructions from Pasini, Berto, Scopelliti, and Carrus (2009):

[I am] interested in how you experience the place in the photograph. To help [me] understand your experience, [I] have provided the following statements for you to respond to. Please read each statement carefully, and then ask yourself, “How much does this statement apply to how I would experience the place?” To indicate your answer, circle only one of the numbers on the rating scale beside the statements. So, for example, if you think that the statement does not apply to your experience of the place, then you would circle “0” (not at all), if it applies rather much, then you would circle “6” (rather much), but if you think that it would apply very much, you would circle “10” (very much). (p. 3)

The questionnaire also asked participants to report their gender, ethnicity, size of place where they spent most of their childhood, and year born.

To assess the degree to which raters have consistent responses on each item, we tested the interobserver reliability. The analysis found high interobserver reliability for each item and for the composite (average) of the four
items (walk out of way, $\alpha = .91$; stop to visit, $\alpha = .92$; meet friends, $\alpha = .92$; visit regularly, $\alpha = .91$; composite visitability, $\alpha = .93$). The composite scores on PVS ranged from 0 to 10, with a mean of 5.22 ($SD = 2.23$). To assess the degree to which items were consistent with one another and thus likely measuring the same construct, we tested the interitem reliability. The analysis indicated a high interitem reliability for the four items ($\alpha = .91$) suggesting they could be combined into a composite scale (PVS) to assess visitability.

**Procedure**

After obtaining consent, the interviewer placed the iPad in front of the participants and handed them the response sheet with the instructions. The interviewer also told the participant,

I would like you to indicate the degree to which you agree with each of these statements (pointing to the scale) on a scale from 0 to 10 where 0 is not at all and 10 is very much. There are no right or wrong answers. I am interested in how you experience the space in the photograph. Also, some of the photographs might look similar to you, but you will not be seeing the exact same one twice. Once you complete your four responses, you can scroll through the photographs like that (the interviewer demonstrated how). I have a total of fifteen photographs. Do you have any questions?

After addressing any questions, the interviewer moved away to give the participant privacy. On completion, the interviewer thanked and debriefed the participant. Responses from three interviews had missing or double-chosen data points. They were discarded and replaced with three new interviews.

**Results**

The study used a repeated measure ANOVA to test the effects of seats, food, and sculpture on visitability (PVS). It tested the effects across all plazas and conducted two additional tests, one with plazas added to the model and one with gender added to the model.

The analysis across all plazas found that PVS did differentiate between the presence and absence of the visitable elements. As expected, plazas that had seats, food, or sculpture had higher PVS scores than plazas without those elements. The mean for each element was larger when the element was present than when it was absent, and each main effect was statistically significant.
In agreement with Whyte, sittable space was most important. Seats had a large effect ($r = .80$), and sculpture and food had small effects ($rs = .23$ and $.10$, respectively). In addition, the combination of seats and sculpture increased visitability more than either element alone (Figure 5). This Seats × Sculpture interaction was statistically significant (Table 2). As for food, none of the two- or three-way interactions with it were statistically significant.

The model with plaza as a fourth variable yielded a pattern of results consistent with those found across the plazas. Seats, sculpture, or food increased visitability, and the combination of seats and sculpture had a higher visitability score than either one alone. Each element and the Seats × Sculpture interactions were statistically significant: Seats, $F(1, 29) = 93.47, p < .001$; Sculpture, $F(1, 29) = 20.03, p < .001$; Food, $F(1, 29) = 7.59, p < .05$; Seats × Sculpture, $F(1, 29) = 25.40, p < .001$. Plazas and the interactions of each element with plaza were also statistically significant: Plaza, $F(2, 29) = 38.48, p < .001$; Seats × Plaza, $F(2, 29) = 25.40, p < .001$; Sculpture × Plaza, $F(2, 29) = 4.43, p < .05$; Food × Plaza, $F(2, 29) = 13.47, p < .001$, but they were not cross-over interactions. The direction of effects was the same as those found across the three plazas. Adding seats or sculpture to each plaza improved its visitability, and seats mattered more than the sculpture. For seats, Schmidts had a large effect ($r = .51$), Civic Center had a medium to large effect ($r = .45$), and Gansevoort had a medium effect ($r = .28$). For sculpture, each plaza had a small effect (Schmidts, $r = .20$; Civic Center, $r = .13$; Gansevoort, $r = .06$). Adding food improved visitability in Schmidts but not in Civic Center or in Gansevoort. The effect size for Schmidts was small ($r = .15$).

The PVS also differentiated between the plazas. Civic Center scored higher than Schmidts or Gansevoort, and the difference between plazas was statistically significant, $F(2, 29) = 38.48, p < .001$. Post hoc pairwise comparisons showed that Civic Center (the largest plaza) scored higher ($M = 6.22$,

### Table 2. Statistically Significant Effects of Seats, Food, and Sculpture on Livability.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Not present</th>
<th>Present</th>
<th>$F(1, 89)$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seats</td>
<td>4.38 (2.13)</td>
<td>6.06 (2.01)</td>
<td>138.98</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Food</td>
<td>5.11 (2.27)</td>
<td>5.33 (2.19)</td>
<td>8.03</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Sculpture</td>
<td>4.94 (2.28)</td>
<td>5.50 (2.14)</td>
<td>26.89</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Seats × Sculpture</td>
<td></td>
<td>12.39</td>
<td></td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: The interactions of Seats × Food, Sculpture × Food, and Seats × Sculpture × Food were not statistically significant ($p > .05$).
Abdulkarim and Nasar

than either Schmidts ($M = 4.73, SD = 2.30$) or Gansevoort ($M = 4.71, SD = 1.97$) at a statistically significant level ($ps < .001$). The difference between Civic Center and either Schmidts or Gansevoort were moderate sized effects ($r = .32, r = .35$, respectively). There were no significant three-way or four-way interactions with plazas.

For the test of gender, the analysis had to take into account the use of two samples (one for each half of the factorial design). For this, analysis ran the entire set of data (with the complete design) twice, once for each sample. Results revealed that men and women did not differ in their ratings of the perceived visitability. The main effect of gender and all gender interactions with the three variables and the plaza were not statistically significant.

Conclusion

Unlike Whyte (1980), the present study tested visitability through a controlled experiment. The experiment confirmed some but not all of Whyte’s (1980) claims. In agreement with Whyte, the analysis found that the presence of seats, food carts, or sculpture (triangulation) and the combination of seats and sculpture improved visitability. However, in contradiction to Whyte, plazas that combined food carts with seats, with sculpture, or with seats and

Figure 5. Interaction of seats by sculpture on visitability.

$SD = 2.07$) than either Schmidts ($M = 4.73, SD = 2.30$) or Gansevoort ($M = 4.71, SD = 1.97$) at a statistically significant level ($ps < .001$). The difference between Civic Center and either Schmidts or Gansevoort were moderate sized effects ($r = .32, r = .35$, respectively). There were no significant three-way or four-way interactions with plazas.

For the test of gender, the analysis had to take into account the use of two samples (one for each half of the factorial design). For this, analysis ran the entire set of data (with the complete design) twice, once for each sample. Results revealed that men and women did not differ in their ratings of the perceived visitability. The main effect of gender and all gender interactions with the three variables and the plaza were not statistically significant.

Conclusion

Unlike Whyte (1980), the present study tested visitability through a controlled experiment. The experiment confirmed some but not all of Whyte’s (1980) claims. In agreement with Whyte, the analysis found that the presence of seats, food carts, or sculpture (triangulation) and the combination of seats and sculpture improved visitability. However, in contradiction to Whyte, plazas that combined food carts with seats, with sculpture, or with seats and
sculpture did not improve visitability. Perhaps, the effect of food carts differs in real plazas, where people line up by the cart which may also offer pleasant aromas of the food. Also, in real plazas, the desirable elements would attract people, which might attract other people. The drop in visitability for multiple elements contradicts a finding that preference and activity levels increased with diversity in the plaza (Joardar, 1977). Perhaps, this contradiction reflects the degree to which the diversity is ordered.

The findings also contradicted Whyte’s claims about the desirability of small plazas. He wrote, “I end, then, in praise of small places” (Whyte, 1980, p. 101). In our controlled experiment, people rated the largest plaza (Denver’s Civic Center Park) as more visitable than either of the smaller ones. These findings agree with findings of preference for well-defined open spaces (Kaplan & Kaplan, 1989; Nasar, 1998, 1994). Whyte (1980) also noted differences between men and women in how they use plazas. Recall that women feel more vulnerable and suffer more unwanted intrusions in public spaces than do men (Stanko, 1995), and tend to prefer more options and “back yard” spaces that offer more privacy, protection, and control (Mozingo, 1989). However, the present study found no gender differences in the rated visitability of the plazas or elements in them. We did not systematically vary the type or variety of spaces available in the plazas. Thus, in spite of the differences in perceived visitability of the plazas, women may not have detected features (such as privacy) that would make a plaza more or less desirable to them. It is also possible that for open plazas having little variation in the kinds of space offered, the choices of men and women do not differ.

To study the plazas, we developed and tested an instrument to assess visitability. The four-item PVS had high interitem reliability, and it differentiated between elements and between plazas. These findings suggest that it may represent a good scale to assess visitability. Furthermore, as willingness to approach and spend time in a place may also reflect valence (Russell & Mehrarian, 1978), the PVS may represent a behavioral intent measure of preference.

The study obtained verbal ratings from students for plazas during daytime on relatively clear spring days. As such, it suggests other directions of inquiry. Although the student responses might generalize to other groups (Stamps, 1999), research would do well to test other groups, particularly ethnic and cultural groups where personal space and territorial boundaries might differ. To reduce reactivity, research could use a between-subject design in which each participant sees only one condition. It could systematically add or remove elements in real plazas and unobtrusively observe use. It could compare PVS ratings to preference ratings, and it could compare observed
behavior to PVS ratings of the plazas or photos of them to learn how well PVS predicts actual use. Research could also test how the use of public spaces and thus effect of variables such as seats, triangulation (sculpture), and food vendors differs in other kinds of public spaces, during daytime and after dark, throughout the year and in different climates. Systematic unobtrusive observations of open plazas can reveal whether activity levels and the proportion of men and women vary together. Research on the effects of size on activity might clarify whether, other things equal, small or large plazas are more visitable and attract more use.

The present findings suggest that adding seats and sculptures can improve visitability of places. The variation in the size of the effects suggests that the choice of seats and triangulation relative to the plaza may matter. But the findings held across three different plazas and with three different manipulations of each element. Whyte’s (1980, p. 39) standard of “one linear foot of sitting space for every thirty square feet of plaza” worked, and it worked better in combination with triangulation through sculpture. Still, communities that install the elements should test them, through postoccupancy evaluations, to find out how well they work. The low cost of adding a few seats and a sculpture and testing the effects can pay off with a lively place. As Whyte noted in a somewhat different context (p. 101), “such places are priceless.”

Declaration of Conflicting Interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

References


**Author Biographies**

**Dina Abdulkarim** has a PhD in city and regional planning from the Ohio State University. She is also an artist. Both her research interest and art focus on urban living and placemaking as they relate to different social and cultural identities.

**Jack L. Nasar**, PhD, FAICP, is a professor of city and regional planning at the Ohio State University. His research centers on environmental perception, cognition, meanings, and behavior for neighborhood and urban design.