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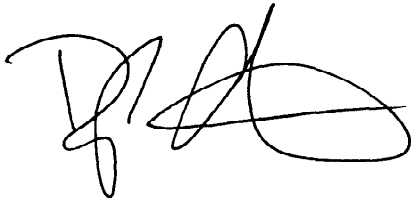
I'm writing this to you in reference to the city council's recent decision to remove several old-growth trees from a stretch of Colorado Blvd.

I would like to call your attention to the enclosed article from the Journal of Forestry, which shows a direct correlation to large, shade-producing trees in a commercial area to the amount of business the nearby retailers pull in. The tables on pages 389 and 399 summarize the findings.

Clearly, removal of those trees will have a negative impact on Pasadena's economy.

I hope you read this and are as alarmed at the decision to remove those trees as I am. I hope action can be taken before work begins over the next few months.

Thank you from a concerned Pasadena resident,

A handwritten signature in black ink, appearing to be 'D. Goldstein', written in a cursive style.

Douglas Goldstein

02/02/2009
7.B.2.

Business District Streetscapes, Trees, and Consumer Response

Kathleen L. Wolf

ABSTRACT

A multistudy research program has investigated how consumers respond to the urban forest in central business districts of cities of various sizes. Trees positively affect judgments of visual quality but, more significantly, may influence other consumer responses and behaviors. Survey respondents from all regions of the United States favored trees in business districts, and this preference was further reflected in positive district perceptions, patronage behavior, and product pricing. An overview of the research is provided, with implications for the economics of local communities.

Keywords: urban forestry, retail, public, preference, perception, valuation

Central business districts are the retail and civic centers of many urban neighborhoods and smaller cities. Main Street merchants now face competitive challenges from big-box retailers, regional malls, and online purchasing. As business associations implement district improvements and strategies to attract and retain shoppers, some retailers overlook the importance of a quality streetscape on visitors' encounters with a business district. The direct costs of an urban forest improvement program can be readily tallied; assessing the consumer response benefits is more difficult. Negative perceptions about trees based on costs can have broad implications, because business constituents often are politically influential and may voice opinions that impact public policy and decisionmaking throughout a city. Urban forest advocates can now point to extensive studies that document the environmental services that urban forests provide. However, business people do not consider such evidence to be salient to the bottom line of stores and shops. What can justify investment in tree planting and management in the retail streetscape? Merchants must be able to see some potential of return on green investment. A series of studies has explored the psychosocial response of shop-

pers to outdoor consumer environments, revealing consistently positive associations between streetscapes having trees and consumer preferences, perceptions, and behavior.

The survey research has targeted the Main Street business districts of large, mid-size, and small cities. The research program helps us to better understand and reconcile the tensions that often are associated with trees in consumer environments. Exceptional efforts by local collaborators have made it possible for our research teams to sample business districts and their associated users throughout the United States. This article summarizes the most significant outcomes of the surveys and the implications for urban forest programs in business districts.

Background

Marketing researchers have long considered the attributes of products and stores and, in addition to utilitarian concerns, have evaluated the role of aesthetics in consumer behavior. For instance, effects of store elements of music, lighting, color, scent, layout, signage, and service staff are complex (Lam 2001). Store environments can affect shoppers' behaviors through responses of

emotion, cognition, and physiological state, without the shopper necessarily being conscious of such influences. Interior elements contribute to store image; for instance, classical music and soft lighting are associated with high-quality image. Evaluations also are influenced by elements that are perceived as cues of service, merchandise quality, and general characterization of store types. Some environmental conditions, such as temperature and noise levels, affect one's sense of comfort and can influence the amount of time spent in a particular environment.

Consumer response to retail settings is but one application of the theories of person/environment interaction. Social scientists distinguish the physical-tangible domain of an environment from interpersonal and sociocultural domains (Stokols 1978). Response to an environment arises from a person's myriad assessments of a physical setting. Observers interpret literal characteristics of a place to make judgments of function (e.g., school versus hospital) or way-finding. Observers also make connotative or inferential judgments about the quality or character of a place and the people who inhabit it (Nasar 1998). An observer mentally overlays physical form with meanings or representations, integrating mediating information gained from prior experiences, social learning, and education.

Remarkably, few marketing studies have looked beyond the door of the store, to assess the consequences of streetscape character and shopper response. Psychological assessments of urban landscapes suggest that aesthetic response is more than a mere reaction to what is beautiful or pleasant, but is one expression of a complex array of perceptual and cognitive processes (Kaplan and

Kaplan 1989). Imbedded within visual preferences are reactions to cues that help one to make sense of an environment. Response to visual attributes is rarely neutral; often, there are associated judgments and behaviors. Urban scenes containing trees (particularly large ones) are consistently highly preferred, and the general public rates the benefits of urban trees highly (Lohr et al. 2004). Urban natural elements also contribute to impressions of place. Positive meanings and values are associated with the urban forest (Chenowith and Gobster 1990, Hull 1992). Natural amenities influence perceptions of place type and function (Herzog 1989).

Methods Overview

A four-concept framework—visual quality, place perceptions, shopper patronage, and product pricing—guided a progression of three survey research projects. Surveys were developed and distributed sequentially in US cities to measure the values of trees in revitalizing business districts of large cities (greater than 250,000 population), the downtown shopping district of one midsize city (population of Athens, Georgia, is approximately 100,000), and the Main Street districts of smaller cities and towns (10,000–20,000 population). Details of the methods, respondents, and analysis procedures for each of the individual studies can be found in prior publications (Wolf 2003, 2004a, 2004b, 2005); an overview is provided here.

The surveys for each study were similar and integrated elements of preference stimuli, contingent behavior, and contingent valuation methods to elicit shopper response. Each survey started with a preference ratings exercise, using up to 30 images that depicted streetscapes with varying urban forest character while reducing variability of other visual content. Each survey also contained a scenario that portrayed a shopping place, sometimes familiar, sometimes hypothetical, and asked the respondent to project their shopping behavior using rating scales and categorical responses. Scenarios basically differed as to whether they were “with trees” or had “no trees” in the streetscape, and the different versions were randomly distributed to respondents. Surveys included additional questions about urban tree perceptions and demographics.

Study participants were contacted using nested sampling. First, business districts or communities were identified based on place profiles. Then, likely shoppers and vis-

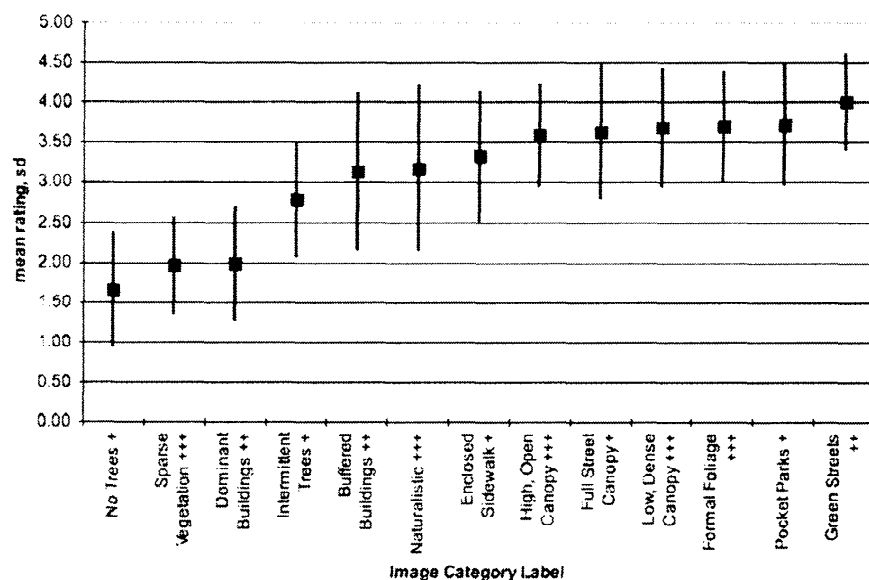


Figure 1. Summary of image preference categories and ratings. Source study for image: +, small city; ++, midsize city; +++, large city.

itors for each business context received surveys by mail, randomly selected from address lists provided by list brokers or local government property records, or were contacted on site, in person using a sampling scheme. It should be noted that the survey response rate for the mail-out surveys was low, 15% or less (of mailings totaling 1,000–3,500), probably because of, in part, the complexity of the contingent behavior tasks and perhaps because the issue of trees in commercial streets is not perceived as urgent. No nonresponse assessments were conducted.

Analysis methods also were similar across each of the surveys. Descriptive statistics, followed by factor analysis, revealed categories of response in the preference ratings. For scenarios, individual response items were first tallied and then combined using data reduction methods to look for underlying categories, and then compared for differences in response between conditions of streets having and not having trees. In some instances comparisons also were made between respondent subgroups.

As intended, the respondents of the three studies were urban residents. Survey participants in the large- and small-city studies generally were slightly older, somewhat more affluent, and less culturally diverse than the general US populace. Respondents in Athens, the midsize city, were younger and had reduced household incomes, not

surprising because the University of Georgia campus is adjacent to the business district. Although there was some variation in respondent traits, the consistency of response across all studies and places suggests generalizable outcomes.

Visual Quality

Image preference ratings were sorted into three to five visual categories per study (each containing at least two images), with mean ratings ranging from 1.65 to 4.00 on a rating scale of 1 to 5. Figure 1 summarizes the distribution of all category means across the three studies, including descriptive labels. Figure 2 displays examples of category images, representing the entire array of preference means.

Reviewing the content and rating trends, ratings increase steadily with the presence of trees. Image categories depicting business district settings having tidy sidewalks and quality buildings, but no trees, were at the low end of the preference range. Images having well-tended, large trees received the highest preference ratings, even though plants obscured other elements (such as historic buildings) that often are the targets of business improvements programs. Kaplan and Kaplan (1989, p. 45) summarized preferences for images containing varied levels of balance between human elements and nature across multiple studies. Similar assessment methods were used in

High



Green Streets (mid-size)
4.00 (0.60)

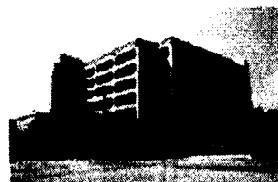


Pocket Parks (small)
3.72 (0.77)



Formal Foliage (large)
3.70 (0.70)

Medium



Buffered Buildings (mid-size)
3.13 (1.00)



Naturalistic (large)
3.17 (1.04)



Enclosed Sidewalk (small)
3.32 (0.83)

Low



No Trees (small)
1.66 (0.72)



Sparse Vegetation (large)
1.96 (0.61)



Dominant Buildings (mid-size)
1.98 (0.71)

Figure 2. Image category content across studies. Preference means (standard deviations) for image samples from categories of small-, midsize-, and large-city studies. Means for all 13 categories ranged from 1.65 to 4.00 on a rating scale of 1 to 5.

these studies. Public judgments of visual quality of certain rural or wildland area views are usually higher than for urban scenes. Interestingly, the most highly preferred business streetscapes have ratings that compare with those of forested and outdoor recreation settings.

Reduced visibility of storefronts and signage is a major concern of merchants with regard to trees on the sidewalk. Across the upper range of ratings, both openly pruned and dense canopied trees were visually valued, suggesting that pruning and management for building views can enable greater street-level visibility while sustaining the amenity values that big trees provide for shoppers. Limbing-up and canopy thinning of large trees is a better management strategy for visual quality enhancement than topping at sign levels or planting smaller trees such that their mature canopy height is the same as business windows and signage. In addition, order and tidiness at the street interface is appreciated and can be attained if merchants combine resources to support consis-

tent tree maintenance and sidewalk cleaning.

Place Perceptions

While viewing one scenario, respondents were asked to rate their level of agreement with statements about the place using a Likert scale (Kerlinger 1992). Means were derived across all items for each of the statistically derived categories and then compared between the forest conditions (Table 1) using alpha levels that were adjusted for multiple comparisons.

Table 1. Mean ratings for place perception categories.

| Perception category | Large cities ^a | | Small cities ^{**} | |
|------------------------|---------------------------|-------------|----------------------------|------------|
| | No trees | With trees | No trees | With trees |
| Amenity and comfort | 3.00 (1.28) | 5.69 (1.05) | 3.8 (1.62) | 5.8 (0.91) |
| Maintenance and upkeep | 4.27 (1.39) | 5.94 (0.87) | | |
| Merchant interaction | 4.24 (0.98) | 4.90 (0.94) | 4.4 (1.14) | 4.9 (0.97) |
| Quality of products | 3.59 (1.07) | 5.00 (1.14) | | |

Likert rating scale: 1 = strongly disagree, 4 = neutral, and 7 = strongly agree. Reported values are means (standard deviation). Means were compared on perception categories by urban forest condition and within city sizes. Statistical significance: ^aone-way analysis of variance, $P < 0.000$; ^{**}independent samples t -test, $P < 0.000$.

Trees are associated with higher ratings of amenity and visual quality in this and other studies. Positive judgments about maintenance also were associated with the presence of trees, despite efforts to present the same level of building care and street tidiness in the scenarios. Respondents also attributed social traits and characteristics of the in-store experience based on urban forest conditions. Judgments of products and merchants were more positive in forested places as were inferences about product value, product quality, and merchant responsiveness. Trees in the streetscape may be the equivalent of in-store conditions that boost shoppers' judgments of the image of a place. Favorable expectations of the shopping experience are initiated long before a consumer enters a shop's doors.

Shopper Patronage

Study participants indicated their probable patronage behavior with regard to travel to the business district, visitation patterns, and willingness to pay (WTP) for parking while considering the streetscape scenarios. Variables presented an ordered array of categorical response choices. Tables of response frequencies were analyzed to evaluate again the relationship of reported actions to streetscape character.

Response on most patronage variables, across each study (Table 2), was found to be significantly higher when comparing "with trees" and "no trees" conditions. An inverse pattern of response was evident. Responses for "no trees" settings are concentrated at the low end of each of the patronage variable's values and become less frequent moving toward the high end. Streetscapes "with trees" generated fewer low value responses, and response frequencies increased across higher values. Interestingly, the association of positive patronage response to forested streetscape is not linear; responses to "with tree" conditions exhibit a slight decline at the variables' highest

Table 2. Results summary for shopper patronage.

| Patronage variables | Large cities with trees | Midsized city with trees | Small cities with trees |
|---------------------|-------------------------|--------------------------|-------------------------|
| | Travel time | More time* | |
| Travel distance | Greater distance* | | Greater distance* |
| Duration of visit | Time* | More time** | More time* |
| Frequency of visits | More frequent* | More frequent** | More frequent* |
| Parking fee WTP | Higher fee* | | Higher fee* |

Results indicate comparisons between the "with tree" and "no tree" district conditions, within each city size. Statistical significance: Pearson's χ^2 and Cramer's V tests were used for comparisons of categorical response frequencies, * $P < 0.000$ and ** $P < 0.001$. WTP, willingness-to-pay or respondent stated price.

response levels but remain at higher frequencies than for the barren streetscape. For instance, while longer visits were associated with places having trees, visit length peaked at about 2 hours and then declined. Perhaps there are thresholds to visitation and travel behavior associated with urban central business districts.

Why is patronage behavior important to consider? Expanding the range of a district's customer base and increasing the amount of time spent by returning customers are two common marketing strategies. Having more people spending more time in the district probably translates to greater sales revenue (Underhill 1999). For instance, respondents claimed greater travel distances for a retail district having trees, resulting in an expanded trade area radius that potentially adds thousands of people within dense urban population centers.

Urban forest advocates often are challenged to show fiscal benefits from trees in urban settings. Respondents reported being willing to pay more for parking in vegetated districts. Having more visitors who stay longer and possibly purchase more, combined with a modest increase in parking fees, may generate the revenue needed to offset tree installation and maintenance expenses for a business association or Chamber of Commerce.

Product Pricing

The urban forest is a public good, rarely generating products that can be directly exchanged on markets. A pricing assessment was done using contingent valuation method (Mitchell and Carson 1989) to understand the impact of streetscape trees on local economics. Respondents were presented with a list of goods and services, representing product classes generally used by marketers, and were asked to state prices for each. Convenience goods are widely available and purchased with little deliberation. Shopping goods are purchased after planning and comparison and are selectively distributed. Finally, specialty goods have high brand recognition and consumer loyalty; thus, little comparison shopping is done before purchase.

Table 3 lists respondents' valuations and shows the positive price increment associated with the presence of trees in the large and small cities. On-site surveys in Athens assessed consumer spending on a per visit basis for shopping and entertainment activities and found significantly higher values associated with trees for both (analysis of variance, $\alpha < 0.05$). One interesting difference in the large- to small-city comparison is the relative values of shopping and specialty goods, with shopping attaining higher prices in small cities.

Table 3. Products pricing summary.

| Product category | Large cities* | | Small cities** | |
|------------------|---------------|---------------|----------------|---------------|
| | No trees | With trees | No trees | With trees |
| Convenience | 8.98 (2.74) | 13.78 (5.00) | 5.93 (3.09) | 7.48 (4.54) |
| Shopping | 33.52 (11.49) | 47.36 (18.54) | 69.42 (42.41) | 92.22 (59.76) |
| Specialty | 51.88 (18.30) | 73.24 (30.79) | 63.96 (26.78) | 74.32 (30.70) |

Means compared on product categories by urban forest condition and within city sizes. Means (standard deviation) are in \$US. Measures indicate WTP using respondent determined and open-ended pricing scales, with outliers removed. Statistical significance: *one-way analysis of variance, $P < 0.000$; **independent samples t -tests, $P < 0.005$.

When standardized across all goods categories and scenarios, the amenity margin for trees in large cities was 12% and 9% for small cities. The difference may be due to differences in local economies of big and small cities or the US economic downturn that occurred in the period between the two studies.

Conclusions

The four-concept framework for this research program—visual quality, place perceptions, shopper patronage, and product pricing—guided a comprehensive measures approach that shows the value of a green consumer environment. The product pricing results have been of greatest interest to merchant audiences, but other measures yield insights as to why shoppers may be willing to pay more for products in central business districts that have a quality urban forest.

Marketers use the term "atmospherics" to refer to the attributes of a store that influence its character and mood, such as music and color. Research about atmospherics explores the physical conditions that are correlated with behavioral response. Although some social scientists first denied anecdotal reports, research in the 1990s confirmed that pleasant store settings are significant predictors of willingness to spend time in a store and of intentions to spend more money than originally planned (Donovan et al. 1994). It appears that trees are a significant atmospheric element of the business street and are one of the first central business district attributes that a visitor encounters.

These studies recommend an expanded view of the functions of benefits of trees beyond ecosystem values and an expanded resource management approach. Marketing is a familiar activity in forestry, as applied to forest products or consulting services. This work indicates that forests can be a significant element in place marketing. In addition to products and services, retailing marketers have increasingly turned to crafting marketing programs that promise positive experiences within consumer environments. Urban neighborhood districts, exurb cities in the urban-wildland interface, and tourism-oriented communities that are adjacent to wildland forest preserves can all use the Main Street urban forest as a place marketing amenity to enhance local economies.

There are many additional research opportunities. Data outcomes should be validated in several ways. First, these studies re-

lied on stated pricing and behavior; revealed WTP studies rely on the actual price paid for market goods that have an identified level of an environmental attribute. Hedonic pricing could be used to capture value increments by comparing cohorts of districts that are similar but differ on the character and quality of urban forest conditions. Another important validation would be to compare actual on-site visual preference ratings with those expressed for photographic images.

A benefit/cost analysis is an obvious next step. Forest planting and management costs can be estimated easily. Results of these studies could be used to calculate tentative fiscal benefits and then used to estimate net value of trees in business districts.

This research has received some attention around the United States within urban planning, arboricultural, and community revitalization publications. Demonstrating consumer response benefits generates interest in streetscape forests, but great effort is required to successfully plan and manage trees in the consumer environment. It is important to note that each of the studies asked study participants to indicate their responses to business districts, each having a unified character throughout, and not to individual merchants or shops that may or may not have fronting trees. A districtwide urban forestry improvement program is the best way to attain the perceptual richness and sense of place that trees can generate.

Trees in business districts face challenges of limited root and canopy volumes, compacted and low nutrient soils, water stress, and interactions with utilities. Pedestrians and passing vehicles pose daily risks in terms of tree damage and health. Pruning strategies must balance building visibility with plant viability. Additional research and development is needed to generate better knowledge about how to integrate trees into

commercially zoned settings, as well as all urban land-use zones. Some management challenges are ubiquitous to all urban settings. Other challenges are unique to specific urban contexts, such as trees and infill development, high volume streets and arterials, urban greenbelt restoration, and roof gardens. Although the general concepts of traditional forest management apply to city trees, the needs of particular urban circumstances (such as central business districts) merit dedicated science and best management practices.

Issues of urban forest extent and health may not be of high priority to certain urban stakeholders such as merchants and retailers. Although retailing research has probed to great extent how shoppers react to the elements of store interiors, few marketing studies have considered the influence of the outdoor retail environment. A quality urban forest in the downtown streetscape generates diverse environmental services, and this research program reveals additional community economics benefits.

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