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BUSINESS DISTRICT STREETSAPES, THE URBAN FOREST AND CONSUMER RESPONSE

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ABSTRACT: A multi-study research program has investigated how consumers respond to having a quality urban forest in central business districts. The studies have been done in cities of small, medium and large populations, and in all regions of the United States. Trees positively affect judgments of visual quality but, more significantly, appear to influence other consumer responses. Respondents favor trees in business districts, and this preference is further reflected in positive district perceptions, patronage behavior and product pricing. An overview of the research is provided, with implications for the economics of central business districts.

Key Words: urban forestry, social science, retail environments, economic valuation, public preference

INTRODUCTION

Central business districts (CBD) are the civic centers of both urban neighborhoods and smaller cities. Main Street merchants face many competitive challenges from big box retailers, regional malls and on-line purchasing. As business associations implement district improvements strategies to attract and retain shoppers, some retailers overlook the importance of a quality streetscape on visitors' encounters with and impressions of a business district.

The direct costs of an urban forest improvements program can be readily tallied; assessing the consumer response benefits is more difficult. Negative perceptions about trees based on costs can have broad implications, as retailing constituents are often politically influential and may voice opinion on local policy and decision-making that extends to all land uses within a city.

Urban forest advocates can now point to extensive studies that document the environmental services that urban forests provide. Yet business people don't 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 shoppers to outdoor consumer environments. The studies reveal 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. Exceptional efforts by local collaborators have made it possible for our research teams to sample business districts and associated users throughout the United States. The research program helps us to better understand, and reconcile, the tensions that are often associated with trees in retail environments. This article summarizes the most significant outcomes of the survey research, and the implications for urban forest programs in business districts.

BACKGROUND

Marketing researchers have long considered the aesthetic attributes of products and stores, in addition to utilitarian concerns, and evaluated the role of aesthetics in consumer behavior. Aesthetic response to place and space encompasses more psychological dimensions than a mere reaction to what is beautiful or pleasant. Imbedded within preference for certain visual qualities can be reactions to important informational and perceptual cues (Kaplan and Kaplan 1989). In addition, as suggested by Gestalt theory, visual attributes may be processed as configurations, with associated judgments.

Studies indicate that effects of store environmental elements of music, lighting, color, scent, layout, signage and service staff are complex (Lam 2001). Some of these elements influence shoppers' behavior through their effects on shoppers' emotion, cognition and physiological state, without the shopper necessarily being conscious of the affects. Combinations of elements have been studied to assess associations of store image; for instance classical music and soft lighting are linked to high quality image. Cognition, or information processing, is also influenced by elements that are perceived as cues of level of service, merchandise quality, and general characterization of store types. Some indoor environmental conditions, such as temperature and noise levels, affect one's sense of comfort and can influence whether people stay in or enjoy a particular environment.

Consumer response to store attributes is but one application of the psychological theories of person/environment interaction. When studying human dimensions and behavior social scientists distinguish the physical-tangible domain of an environment from interpersonal and sociocultural domains (Stokols 1978). Response to environments arises from a person's myriad assessments of a physical setting. Observers interpret rather literal characteristics of a place to make judgments of function (e.g. school vs. hospital) or wayfinding. Observers also make connotative or inferential judgments about the quality or character of a place and the people who inhabit it (Nasar 1998). People cognitively overlay physical form with meanings or representations, integrating mediating information gained from prior experiences, social learning and attitudes.

Remarkably few marketing studies have looked beyond the door of the store, to assess the consequences of streetscape character and shopper response. Psychological studies of landscape aesthetics in urban contexts suggest that aesthetic response is one expression of a complex array of perceptual and cognitive processes (Kaplan and Kaplan 1989) that may influence behavior. Urban scenes containing trees (particularly large ones) are consistently highly preferred. Natural elements in the urban environment also contribute to impressions and judgments of place. Positive meanings and values are associated with the urban forest (Chenowith and Gobster 1990, Hull 1992). Natural amenities influence perceptions of urban place 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 U.S. cities to measure the values of trees in revitalizing business districts of large cities (greater than 250,000 population), the downtown shopping district of a mid-sized city (about 100,000 population), and the Main Street districts of smaller cities and towns (10-20,000 population).

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 thirty 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 on whether trees were or were not present in the streetscape, and the different versions of the surveys 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 and geographic distribution strategies. Likely shoppers and visitors for large and small city districts received surveys by mail, randomly selected from address lists provided by list brokers or local government property records. On-site respondent contact was used for the mid-sized city, using a temporal and spatial sampling scheme. It should be noted that the survey response rate for the mail out surveys was low, sixteen percent or less (of mailings totaling 1,000-3,500), probably due in part to the complexity of the contingent behavior tasks, and perhaps because the issue of trees in commercial streets is not perceived as urgent. Nonetheless, the consistency of response across all studies and places suggests generalizable outcomes.

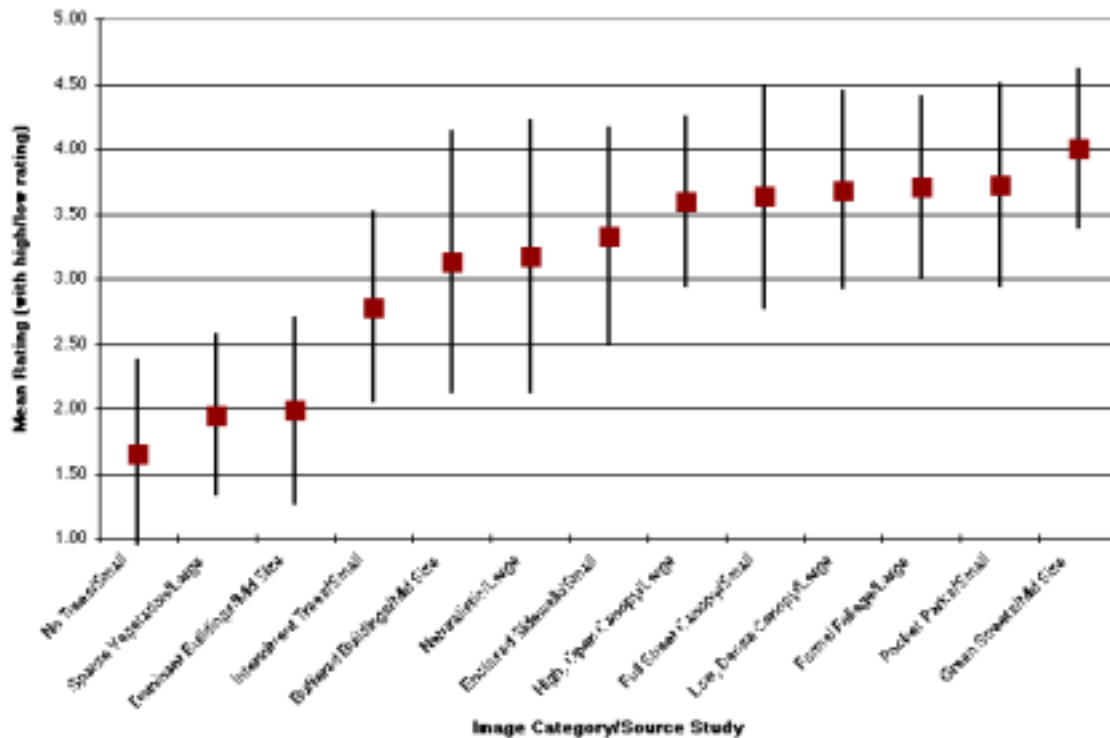
Analysis methods were also similar across each of the surveys. Descriptive statistics, followed by factor analysis, revealed categories of response for the preference ratings. For scenarios, individual response items were first tallied, then combined using data reduction methods to look for underlying categories, then compared for differences in response between conditions of streets having and not having trees. In some instances comparisons were also made between respondent subgroups. Details of the analysis procedures and outcomes for individual studies can be found in prior publications (Wolf 2003, Wolf 2004a, Wolf 2004b, Wolf in review).

RESULTS - VISUAL QUALITY

Image preference ratings 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 category means across the three studies, and Figure 2 displays image examples.

Reviewing the content and response trends, ratings increase steadily with the presence of trees, particularly large 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 the plants obscured other elements (such as historic buildings) that are often the targets of business improvements programs. Interestingly, though public judgments of visual quality of rural or

FIGURE 1: Summary of ratings for preference categories of three studies



wildland areas views are usually higher than ratings for urban scenes, the most highly preferred business streetscape scenes have ratings that exceed those of some forested and outdoor recreation settings (Kaplan and Kaplan 1989).

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 whose 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 consistent tree maintenance and sidewalk cleaning.

RESULTS - PLACE PERCEPTIONS

While viewing one scenario, respondents were asked to rate their level of agreement with statements about the place on a Likert scale of 1 (low) to 7 (high agreement). Means were derived across all items for each of the statistically derived categories, and then compared across the forest conditions (Table 1) using alpha levels that were adjusted for multiple comparisons. We would expect that trees would be associated with higher ratings of amenity and comfort, as they provide shade and can have attractive features. Positive judgments about maintenance were also associated with the presence of trees, despite efforts to present the same level of building

FIGURE 2: Category preference ratings-representative images

High



Green Streets (Mid Size City)
mean 4.00, SD 0.60



Pocket Parks (Small City)
mean 3.72, SD 0.77



Formal Foliage (Large City)
mean 3.70, SD 0.70

Medium



Intermittent Trees (Small City)
mean 2.78, SD 0.73



Naturalistic (Large City)
mean 3.17, SD 1.04



Enclosed Sidewalk (Small City)
mean 3.32, SD 0.83

Low



No Trees (Small City)
mean 1.65, SD 0.72



Sparse Vegetation (Large City)
mean 1.95, SD 0.61



Dominant Buildings (Mid Size City)
mean 1.98, SD 0.71

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 inferences are made 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 impacted long before a shopper enters a shop's doors.

TABLE 1: Mean Ratings for Place Perceptions Categories

	Large Cities [^]		Small Cities*	
	No Trees	With Trees	No Trees	With Trees
Amenity and Comfort	3.00 SD 1.28	5.69 SD 1.05	3.8 SD 1.62	5.8 SD 0.91
Maintenance and Upkeep	4.27 SD 1.39	5.94 SD 0.87		
Merchant Interaction	4.24 SD 0.98	4.90 SD 0.94	4.4 SD 1.14	4.9 SD 0.97
Quality of Products	3.59 SD 1.07	5.00 SD 1.14		

[^] one-way ANOVA, $p < .000$; * t-Tests, $p < .000$

TABLE 2: Results Summary for Shopper Patronage

Patronage	Large Cities With Trees	Mid-sized City With Trees	Small Cities With Trees
travel time	*more time		
travel distance	*greater distance		*greater distance
duration of visit	*more time	[^] more time	*more time
frequency of visits	*more frequent	[^] more frequent	*more frequent
parking fee WTP	*higher fee		*higher fee

X^2 tests and Cramer's V; * $p < .000$, [^] $p < .001$

RESULTS - SHOPPER PATRONAGE

Using categorical response questions, participants considered their probable patronage behavior. Tables of response frequencies were analyzed to again evaluate the relationship of reported actions to streetscape character.

Response on all patronage variables, across each study (Table 2) was found to be positively (and in most instances significantly) related to the presence of trees. An inverse pattern of response was evident. Responses for settings without trees are concentrated at the low end of each of the variables' categories and diminish in frequency moving toward the high end. Then responses associated with scenarios having trees are less frequent at the lowest end of the arrays, increase in frequency, then slightly decline at the variables' higher value levels but remain at higher frequencies than for the barren streetscape. Perhaps there are thresholds to visitation and travel behavior associated with urban central business districts. For instance, while longer visits were associated with places having trees, visit length peaked at about two hours, and then declined.

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 visitors within dense urban population centers.

TABLE 3: Products Pricing Summary (in dollars U.S.)

Product Class	Large Cities *		Small Cities ^	
	No Trees	With Trees	No Trees	With Trees
Convenience	8.98 SD 2.74	13.78 SD 5.00	5.93 SD 3.09	7.48 SD 4.54
Shopping	33.52 SD 11.49	47.36 SD 18.54	69.42 SD 42.41	92.22 SD 59.76
Specialty	51.88 SD 18.30	73.24 SD 30.79	63.96 SD 26.78	74.32 SD 30.70

* t-Tests and one-way ANOVA, *p<.001, ^p<.005

Urban forest advocates are often challenged to demonstrate 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 small increase in parking fees may generate the revenue needed to offset tree installation and maintenance expenses for a business association or Chamber of Commerce.

RESULTS-PRODUCT PRICING

The urban forest is a public good, rarely generating products that can be directly exchanged on markets. In order to understand the impact of streetscape trees on local economics, a pricing assessment was done using contingent valuation method (Mitchell and Carson 1989). Respondents were presented with a list of goods and services representing product classes generally used by marketers. 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 demonstrates the positive price increment associated with the presence of trees in the large and small cities. The Athens case study evaluated consumer spending on a per visit basis, comparing visit length and session spending for shopping and entertainment activities, also finding statistically significant higher values associated with trees (ANOVA, alpha <0.05). One interesting difference in the large to small city comparison is the relative values of shopping and specialty goods, with the latter commanding higher prices in large cities.

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 may be due to the U.S. economic downturn that occurred in the period between the two studies.

DISCUSSION AND CONCLUSIONS

The four-concept framework for this trees and commerce research program - visual quality, place perceptions, shopper patronage and product pricing – was frustratingly ambitious at the outset, but has proven to effectively demonstrate 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. While 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 CBD attributes that a visitor encounters.

These studies recommend an expanded view of the functions of benefits of trees beyond ecosystem values. The urban forest can be a significant element in place marketing. In addition to greater attention to products and services, retailing marketers have increasingly turned to crafting marketing programs that promise positive experiences within consumer environments. The urban forest contributes to a sense of retail place that is appealing and preferred.

There are many additional research opportunities. Data outcomes should be validated in several ways. First, these studies relied on stated pricing and behavior; revealed willingness-to-pay 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 images.

A benefit/cost analysis is an obvious next step. Forest planting and management costs can be readily estimated. Results of these studies could be used to calculate tentative fiscal returns across all shops within targeted business districts, and then used to estimate net value of trees from a retail perspective.

This research has received some attention around the U.S. 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 district wide 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. 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 contexts. 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. While 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.

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