The Environmental Psychology of Shopping

Assessing the Value of Trees

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***Abstract**: A multi-study research program has investigated how consumers respond to trees in various business settings in cities and towns. Some studies focused on central business districts, others tested perceptions along freeways and arterials. Results are remarkably consistent. Trees not only positively affect judgments of visual quality but, more significantly, also appear to influence other consumer responses and behaviors. Survey respondents from all regions of the United States favor trees in retail settings, and this preference is further reflected in positive perceptions, patronage behavior and product pricing. An overview of the research is presented, followed by guidelines for design with trees.*

Place, Perception and Consumer Behavior

In recent decades social scientists documented the connection between the retail environment and shopper activity. Meanwhile, gardeners and philosophers have celebrated the pleasures of trees and nature for centuries, noting the role of plants in aesthetics, cultural symbolism and therapy. Research by psychologists and sociologists confirms the benefits that people gain from nature experiences. However, the two research pursuits – investigations of human experiences of retail place and studies of nature settings – have rarely intersected.

More recently, atmospherics research has examined how consumers' store perceptions are affected by environmental cues such as light, sound, color and product placement. Atmospherics studies find that general perceptions, in turn, influence behavior; however, the research is largely limited to store interiors.[1] Taken together, the studies indicate that the behavior influences of indoor places include approach/ avoidance, time spent in the environment and sales.

External conditions deserve greater attention, as store and shopping center exteriors present initial perceptual cues to consumers. Features such as storefronts, entrances, display windows, building architecture and parking lot character can create favorable or negative impressions that affect the frequency of return, amount spent during a visit, types of products purchased and time spent at the shopping venue. These place elements must be pleasing to the shopper to induce approach behaviors for a retail store or service to be successful.

The lifestyle center is a recent concept that provides walkable, shared outdoor spaces that are tucked around shops and stores. A character of place derived from traditional "main streets" is the basis for these new shopping centers. The success of lifestyle centers may affirm that positive atmospherics start at the curb and sidewalk.

Urban forestry addresses the planning and management of all city trees, whether they are street trees, in parks or around homes.[2] The science of urban forestry covers a range of studies of human experience, perception and behavior in nature settings. One research program has explored the role of trees in consumer environments, with a focus on main streets and central business districts. This article will highlight and integrate some of the key conclusions from these studies.

Survey Methodology

Largely funded by the U.S. Forest Service, a battery of shopper surveys were designed to assess if visual quality, place perceptions, shopper patronage and pricing perceptions were influenced by trees. For these studies, visual quality describes settings that people find more pleasing and desirable. Place perceptions were defined as the mental representations or assumptions that people hold for a place. Shopper patronage describes the frequency and duration of consumers' actions, such as length of a visit. Lastly, pricing perceptions measured the consumers' willingness-to-pay for products and services.

Individual survey projects covered central business districts for large cities (those with populations greater than 250,000), a downtown shopping district for a mid-sized city (Athens, Georgia, which has a population of approximately 100,000 people), and main street shopping districts in smaller cities and towns (having populations of 10,000-20,000.) Two additional surveys measured the affect of trees on regional malls (viewed

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[1] L.W. Turley, and Ronald E. Milliman, "Atmospheric Effects on Shopping Behavior: A Review of the Experimental Evidence," *Journal of Business Research.*, Vol. 49, 2000, pp. 193–211.

[2] E. Gregory McPherson, "Urban Forestry in North America," *Renewable Resources Journal*, Vol. 24 (No. 3), 2006, pp. 8-12.

from freeways) and small open-air or strip shopping centers (located on arterials.)

All of these surveys were structured similarly and used preference stimuli, contingent behavior and contingent valuation methods to elicit shopper response. Each survey started with a preference ratings exercise, using images depicting streetscapes with varying forest character while reducing the variability of other visual content. Some of the images were of actual settings with which participants were familiar; others images were of hypothetical conditions that were prepared using digital editing.

Each survey also contained a scenario that portrayed a shopping place and asked respondents to project their shopping behavior using rating scales and categorical responses.[3] Scenarios basically differed as to whether they were "with trees" or had "no trees" in the streetscape. Those with trees portrayed a quality, well-managed urban forest throughout, rather than trees that were scattered or haphazardly placed. The different versions were randomly distributed to respondents by mail or during sidewalk intercepts,[4] using accepted social science practices of sampling and respondent recruitment, followed by data analysis.

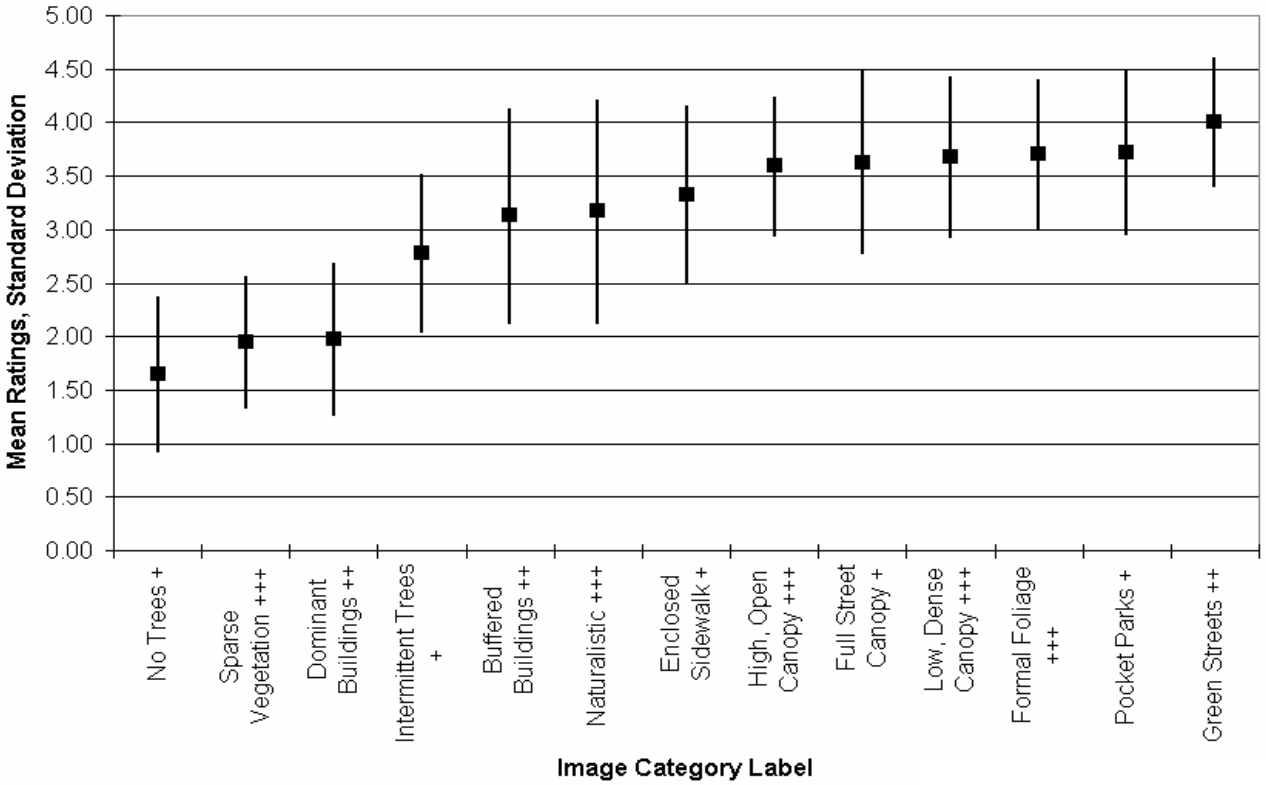
What Were the Results?

Studies of the past 40 years about humans and landscape generally find that people of all ages and cultural backgrounds prefer natural views to built settings, and that trees enhance public judgment of visual quality in cities.[5,6] Analysis across the trees and business studies add to our interpretations of perceptions and behavior.

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 scale of 1 (low) to 5 (high). Chart 10-1 summarizes

Chart 10-1
Summary of Image Preference Categories and Ratings



Source study for image: + small city, ++ mid-size city, +++ large city

[3] Respondents were asked to respond to perceptual verbal items using rating scales, and to indicate likely patronage behavior within categorical indicators of time and distance. Both sets of metrics were derived from prior urban forestry perception and retail marketing studies.

[4] In each study, a sample frame of potential shoppers was identified within geographic range of study sites, and included cities in northern and central U.S. Surveys were distributed by random sampling using commercial mailing lists or sidewalk intercepts. Survey mailings ranged in number from several hundred to several thousand, depending on the scope of each study. Response rates ranged from 10% to 80% across studies.

[5] Roger S. Ulrich, "Human Responses to Vegetation and Landscapes," *Landscape and Urban Planning*. Vol. 13, 1986, pp. 29-44.

[6] Richard C. Smardon "Perception and Aesthetics of the Urban Environment: Review of the Role of Vegetation," *Landscape and Urban Planning*. Vol. 15, 1988, pp. 85-106.

Figure 10-1
Category Images of Trees



the array of category content evaluated and the mean responses (with standard deviations) across the main street studies. Figure 10-1 shows sample category images.

Across all of the studies, consumer ratings increased 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 scores. Images having well-tended, large trees received the highest preference ratings, even though plants obscured other elements (such as historic buildings).

Place Perceptions

In a second survey section, respondents were asked to rate their level of agreement with statements while viewing one place scenario. The average responses were derived for categories, and then compared between the forested and "no tree" conditions. Again, trees were associated with higher ratings of amenity and visual quality across the studies. Moving beyond the obvious visual content the respondents made inferences about the settings. Positive scores for maintenance were given to districts with trees, despite efforts to present the same level of building care and street tidiness. Respondents also attributed social traits and characteristics for in-store experiences. Judgments of products and merchants were more positive in forested places, as were inferences about product value, product quality and merchant responsiveness. It seems that favorable expectations of shopping experiences are initiated long before a consumer enters a store.

Patronage Behavior

Study participants indicated their probable patronage behavior with regard to travel to the business district, visitation patterns and willingness-to-pay for parking while considering the street and sidewalk scenarios. Table 10-1 shows where higher responses were found for places having trees, compared to no-tree settings, within cities of different sizes. Patronage behavior is important. For example, respondents claimed they would travel farther to visit a business district having trees in both large and small cities. This could translate to an expanded trade area radius that adds thousands of people within urban population centers. Once there, they report that they will stay longer, which could mean greater sales revenue.[7]

Product Pricing

Wildland forests are harvested for market products, such as timber; however, the urban forest is a public good, rarely generating products that can be readily bought and sold. Contingent valuation[8] was used to understand the impact of streetscape trees on local economics. Respondents were presented with a list of goods and services and were asked to state the prices for each of them. While there was some price variability according to city size, trees were consistently associated with higher price points. Table 10-2 shows the stated

Table 10-1
Patronage Behavior Comparisons—Places "With Trees" Compared to "No Trees"

Patronage Measures	Large Cities	Mid-sized City	Small Cities
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 willingness to pay	*Higher fee		*Higher fee

Note: p<.05=statistically significant income; * is p<.001, ^is p<.001

[7] Paco Underhill, *Why We Buy: The Science of Shopping*. Simon and Schuster, New York, NY, 1999.

[8] Economists utilize several strategies, including contingent valuation methods (CVM), to value non-market goods and services provided by nature and ecosystems. CVM surveys have been used to assess public willingness-to-pay for use, conservation or restoration of natural resources, with most applications in wildland or rural settings. Issues of CVM reliability and validity were carefully considered in the research design.

Table 10-2
Pricing Comparisons for Products

	Large Cities ^		Small Cities *	
Products Category	**No Trees**	**With Trees**	**No Trees**	**With Trees**
Convenience	$8.98	$13.78	$5.93	$7.48
Shopping	$33.52	$47.36	$69.42	$92.22
Specialty	$51.88	$73.24	$63.96	$74.32

Note: All values in $U.S.; p<.05=statistically significant income; * is p<.001, ^is p<.0001

prices for different categories of products compared across "with tree" and "no tree" settings. After standardizing valuations, consumers claimed that they were willing to pay 9% more in small cities and 12% more in large cities for equivalent goods and services in business districts having an urban forest.

Demographic Differences?

Surveys included demographics questions. Survey participants in the large and small city studies were generally slightly older, somewhat more affluent and less culturally diverse than the general U.S. populace. Respondents in Athens, the mid-size city, were younger and had reduced household incomes, which is not surprising for a college town. While there were some minor differences in response associated with respondent traits, the high degree of consistency across all studies was remarkable.

Better Design With Trees

Trees are a living resource that change in character and form over many decades. This dynamic design element not only offers opportunities, but also can create tensions in the built environment. Here are some guidelines for integrating trees and other vegetation into the outdoor retail place.

Place Branding

Each species, or cultivar, has a distinct mature form, size and other attributes. Plant selections can "brand" a place through subtle, yet observable, distinctions of texture, seasonal color and plant massing. Within a shopping center, diverse tree groupings and arrangements help people distinguish sub-zones, thereby providing cues for orientation and wayfinding. Working within a selected plant palette, the landscape designer can promote a mood of variety within unity, or a place perceived to be coherent overall with pockets of great visual interest.

Order and Tidiness

Respondents preferred scenes where vegetation is presented in patterns, and there is order within the street scene. Careful and routine maintenance is also important, as tidiness improves preference ratings across all landscapes. Again, there is more to this than meets the eye; during interviews, shoppers claimed that the level of care for plants in the sidewalk zone provided cues about the level of care and customer service they might expect from nearby merchants.

Signs and Forest Co-design

An oft-repeated concern in merchant interviews was the tension between placement of trees and the visibility of signs, awnings and storefronts. Many of these visual conflicts can be avoided by the co-design of signage and vegetation. Compare sign height and mature tree height. Select and plant taller trees that will grow above signage. Routine pruning can be used to thin branches and lift canopy, enabling better views and more light to filter to the ground. Color and materials choices for signs should contrast with the foliage, drawing the eye to visual accents.

Prevent Infrastructure Conflicts

Other concerns of merchants relate to tree roots and branches interfering with utilities and pavings. Many of these conflicts can be avoided by designing planting spaces to expected tree size. Plants are genetically inclined to attain a certain size in both canopy and root areas. Conflicts arise when such growth zones are too confined for mature plant size. Tree technologies, such as structural soils, permit the installation of pavings and pipes near trees, yet provide for air, water, and nutrient needs of plants.

Trees Make Dollars and Sense

Across multiple studies a comprehensive measurement approach was used to better understand consumer perceptions and behavior in the presence of trees. Statistically significant differences were found on four groups of measures – visual quality, place perceptions, shopper patronage and product pricing – with forested districts having higher ratings and values. It is important to note that the highest ratings were granted to places having full, mature tree canopy, indicating careful maintenance across decades.

While not specifically studied, it is likely that comparable responses would be found for shopping centers, particularly those having active, outdoor spaces. There are many research opportunities. Additional studies could explore consumer response to nature in a variety of center settings, and provide benefit/cost analysis.

City trees provide environmental benefits, the usual justification for urban forestry investment, and are an important concern as the public gains greater interest in urban sustainability. These studies demonstrate that trees serve other functions, particularly for retail and commercial interests. Trees and landscapes can be significant elements in place marketing. Economists have noted that shopping was once a utilitarian activity to fulfill needs and wants, but today's shoppers are pursuing places that offer social, memorable experiences. Trees help create place and connect to deeply felt preferences and appreciations that people have for nature. The urban forest is an important part of the vibrant, satisfying places that shoppers enjoy.

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