

Research Updates

Attitudes toward Plants and Gardening



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Summary. Recently there has been an increased interest in the role of plants in human well-being and in the general public's perception of the value of plants. Knowing the nature and extent of the value of plants to people can affect the way plants are used in public and private landscapes, the amount of money invested in the establishment and maintenance of plants, and the satisfaction derived from the plantings. In conjunction with the annual National Gardening Association consumer market study, a question was asked to determine if observations from previous, limited studies were applicable to a wide range of American households.

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Each year, the National Gardening Association (NGA) contracts the Gallup Organization to conduct a consumer market research study called the National Gardening Survey (NGS). The purpose of this survey is to measure the types of lawn and garden activities in which U.S. households participate, how much money consumers spend annually on their lawns and gardens, the types of gardening products purchased, demographics of U.S. households involved in lawn and garden activities, and a wide range of other lawn- and garden-related topics. Results of the NGS are based on face-to-face, in-home interviews with a representative (stratified) national probability sample of >2000 households in all 50 states, with a sampling error of $\pm 3\%$ ($P \leq 0.05$).

In 1989, a section was added to the NGS asking respondents' agreement with seven statements about the value and importance they place on plants and gardening. The statements were selected to reflect themes various researchers had identified as significant in peoples' responses to plants and gardening. The statements, refined by B.B. to fit the NGS format and survey approach, were as follows:

- Trees and flowers in a city are not important beyond their beauty or pleasing appearance
- One of the most satisfying aspects of gardening is the peace and tranquility it brings
- The flowers and plants at theme parks, historic sites, golf courses, and restaurants are important to my enjoyment of visiting there
- Well-maintained landscapes and street plantings offset the loss of

nearby natural areas to development

- Gardening gives me a sense of control over my environment
- Being around plants makes me feel calmer and more relaxed
- The natural world is essential to my well-being

Survey respondents were handed an exhibit card with the seven statements to read and asked, "Which, if any, of the statements listed on this card about the value and importance of plants do you agree with? Please call off the number of each of these statements that you agree with. You can choose more than one." The statements represented a range of attitudes toward plants and gardening from marginally positive to extremely positive.

The survey results were reported to the NGA as frequencies and percentages of agreement responses for the total sampling and within categories of specific demographics. As the responses were virtually exclusive (agree vs. not agree) and exhaustive over the demographic classes, these results could be allocated to contingency tables for tests of independence (Remington and Schork, 1970). The raw data were not available to further discriminate respondents across multiple demographics. While this cross analysis might further isolate characteristics of differing respondent groups, we did not believe it would materially improve interpretation.

Agreement percentages by the total sample for the seven statements are presented in Table 1, along with response comparisons for gardening participation. This demographic listing compared opinions of respondents (68% of sample) who participated in lawn and gardening activities, who might be expected to have more positive opinions of plant and gardening importance, with nonparticipants whose opinions were drawn from passive experiences or perceptions. The following discussion related the seven statements and research documentation for the total sample and participation groups.

Trees and flowers in a city are not important beyond their beauty or pleasing appearance. Interviews with inner-city residents in Detroit revealed that parks and street trees were second only to education in perceived value of municipal services offered (Getz et al.,

Table 1. *Percentage of respondents within demographic groups agreeing with survey questions.*

| Survey question | General population | Participate in gardening | | | Sex | | |
|---|--------------------|--------------------------|-------|-------------------|------|--------|-------------------|
| | | Do | Don't | Test ^z | Male | Female | Test ^z |
| Plants not important beyond beauty | 12 | 11 | 15 | * | 12 | 12 | NS |
| Gardening satisfaction is peace/tranquility | 37 | 45 | 21 | ** | 35 | 39 | NS |
| Plants important to visit enjoyment | 50 | 55 | 41 | ** | 46 | 54 | ** |
| Landscapes offset nearby natural area loss | 33 | 37 | 25 | ** | 35 | 32 | NS |
| Gain sense of control over environment | 24 | 29 | 13 | ** | 25 | 22 | NS |
| Plants help me feel calmer/relaxed | 40 | 44 | 33 | ** | 36 | 44 | ** |
| Nature essential to well-being | 46 | 51 | 35 | ** | 47 | 45 | NS |
| Sample size (no.) | 2121 | 1437 | 684 | | 1010 | 1111 | |
| Gardening (%) | 68 | 100 | 0 | | 70 | 66 | |

^z χ^2 test of independence.

NS, *, ** Nonsignificant or significant at $P = 0.05$ or 0.01 , respectively.

1982). In addition, trees are an important factor in determining where people choose to live (Getz et al., 1982) and their satisfaction with residential neighborhoods (Frey, 1981; Kaplan, 1985), and land values tend to be higher in areas near trees (Correll and Knetson, 1978; Payne and Strom, 1975). Since these research studies indicate that plants are valued for more than purely aesthetic qualities or as amenities, this question was intended to determine if this concept was widely held by the general public. An aesthetics-only view was agreed with by 12% of the respondents. Conversely, 88%, representing 81.4 million households, felt that trees and flowers were indeed important beyond their beauty. While there was a small, significant difference between the respondent groups in observed and expected agreement frequency, both have a comparably high perception of plants beyond simple aesthetics.

One of the most satisfying aspects of gardening is the peace and tranquility it brings. A 1976 unpublished survey conducted by R Kaplan through the American Horticultural Society (AHS) found that "probably the most important satisfaction participants derive from gardening entails the peacefulness and tranquility" that they experience. More than 60% gave questions related to peace and quiet the highest rating on the five-point response scale. In the NGS survey, a third of the general population agreed with this statement. While there was less agreement with this statement by gardeners in the NGS study than in the AHS study, this personally therapeutic quality was recognized by nearly half of the gardeners and perceived by a fifth of the nongardeners.

The plants and flowers at theme parks, historic sites, golf courses, and restaurants are important to my enjoyment of visiting there. Several studies document a preference for landscapes with plant materials over those with only man-made objects (Herzog, 1989; Kaplan et al., 1972; Thayer and Atwood, 1978), and one study documents a willingness to expend time and gasoline to drive through an urban area that is high in vegetation to reach a particular destination (Ulrich, 1974). However, we found no studies exploring the recreational value of plants as an integral part of tourist attractions or similar sites. The extensive use of plants in these locations is indicative of their value to the attending public. This statement sought to determine if public perception of plants in these locations substantiated the importance of their use. Agreement by half the respondents documents public recognition of plants' impact on their visit enjoyment and adds to the justification of plant investment to maintain the level of user satisfaction at these tourist sites.

Well-maintained landscapes and street plantings offset the loss of nearby natural areas to development. While many people express concern over the loss of natural areas to development, what constitutes a natural area is difficult to define. It appears that the primary condition is a predominance of vegetation and a lack of human artifacts, such as roads or buildings (Zadik, 1985). Studies on the impact of trees and vegetation on satisfaction in residential locations report positive response to cultivated plants, such as street tree plantings (Kaplan, 1985; Talbot and Kaplan, 1984), and urban scenes containing vegetation are pre-

ferred over those without (Herzog, 1989; Kaplan et al., 1972; Thayer and Atwood, 1978). This survey statement explores the perceived effectiveness of incorporating vegetation with human structures as an acceptable alternative to expanses of vegetation. One-third (33.1%) of the respondents agreed with this statement, suggesting that while landscapes are valued, the need for "natural areas" is held in even higher esteem. Nongardeners reflected this view more strongly than those who participated in landscaping-type activities. This apparently high regard for natural areas may indicate an idealized concept of nature (analogous to the "ideal" American family of a natural mother and father with two children that has ceased to predominate) rather than an actual need or desire for a recognized type of "natural" landscape.

Gardening gives me a sense of control over my environment. In an unpublished report, Kaplan found this to be a significant consideration, if not predominate factor, in satisfaction for gardening among respondents to the AHS survey. It is theorized that one of the distressing factors in modern life is the feeling of lack of control over one's surroundings, especially as it relates to the workplace. If, in fact, gardening does provide this sense of control, it could be a contributing factor to improved mental health. More than a fourth of the gardeners agreed, the lowest positive response level to any of the statements, indicating it is an important plant value for only some. Few of the nongardeners without direct gardening activity experience viewed this as an attribute.

Being around plants makes me feel calmer and more relaxed. This question, as another indicator of the

value of plants to mental health, was based on studies demonstrating that viewing plants resulted in physiological changes measuring reduction in stress (Ulrich, 1981), as well as self-reported feelings of calm and relaxation (Ulrich, 1979). A 40% response rate indicates this is a widely held perception, including the one-third of the nongardeners, for whom that plant contact is passive.

The natural world is essential to my well-being. Considering that we cannot live without plants and the effort put forth by various environmental groups to impress this on the public, this question was targeted at determining the success of these educational, informational, and promotional efforts. A 46% general agreement rate may be viewed by these groups as a low success level, considering the importance of this perception in directing both public and private funding. It is notable that the statements regarding the importance of plants for us as tourists and to the natural world for our overall well-being had the highest agreement level. About half of the general public accepted and valued created landscapes just as they valued the natural world, but for two-thirds the created landscape did not offset the lost natural areas nearby. This would suggest a significant desire for nature from the general public at this time.

Demographic analysis

The NGS includes a wide range of demographics as marketing information. The categories of gardening participation and sex (Table 1), age (Table 2), and education level and home ownership (Table 3) were analyzed for possible subgroup differences in general perceptions of plant and garden values. The following discus-

sion relates the separate demographics across the seven survey statements.

Participation in gardening. According to this study, in 1989, 68% of the households in America participated in one or more types of horticultural activities around their homes. As anticipated, those who participated in gardening had significantly higher agreement by an average of 16 percentage points with all of the statements regarding the benefit or importance of plants, and lower agreement with the statement that plants were not important beyond their beauty.

Sex. Only two statements indicated a difference in how men and women felt about plants. Women found plants in public locations more important to the enjoyment of their visits. This reinforces the importance to the hospitality/tourist industry of maintaining plants to attract female clientele. Being around plants also helped women feel calmer and more relaxed at a significantly higher rate, or at least a higher percentage of women recognized a difference in how they felt with plants around. This could have several implications, particularly in high-stress work sites, such as offices, where interiorscaping and well-landscaped, outdoor lunch areas could help improve worker productivity.

Age. There were significant differences among households within different age groups in response to all statements except "being around plants makes me feel calmer and more relaxed" (Table 2). While varying group responses within each statement may be identified by applying the ± 3 -point sampling error comparison, the 18-to-24 age group exhibited the most frequent and highest numerical differences among the statements. For that group, the importance

of plants in recreational sites was much higher than the average, and the value of the landscapes to offset the loss of nearby nature much lower than average. The other age groups responded consistently for both statements, suggesting that, for the 18-to-24 range, there may be a strong desire for the presence of plants, with a preference for landscapes that predominate in plants, to the exclusion of man-made structures. Many studies on the responses to plants have been conducted with college students (Herzog, 1989; Kaplan et al., 1972; Thayer and Atwood, 1978; Ulrich, 1979, 1981). The NGS data suggest that age group represents a unique viewpoint, and it may be important to expand the range of subjects in future studies. This concept is reinforced by Zube et al. (1983) in a study of attitudes toward landscape assessment with subjects from 6 to more than 70 years of age. The low response (30%) of the 18-to-24 age group to the statement that the "natural world is essential to my well-being" seems to be in conflict with their earlier responses regarding plants, and may indicate the need for more effective, hands-on education that allows young people to experience the importance of the natural world in the production of their food, fiber, and air quality. Half of the 18-to-24 age group participated in gardening, the lowest participation level of any age group. The lower agreement to the "peace/tranquility" and "sense of control" statements reflects total responses. The lower participation in gardening is associated with the decreased overall agreement with these statements.

Education. There was a significant difference in the responses to six of the seven statements among respondents who had completed differ-

Table 2. Percentage of respondents within demographic groups agreeing with survey questions.

| Survey question | Age (%) | | | | | | Test ² |
|---|---------|-------|-------|-------|-------|-----|-------------------|
| | 18-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | |
| Plants not important beyond beauty | 13 | 12 | 7 | 14 | 15 | 14 | * |
| Gardening satisfaction is peace/tranquility | 22 | 41 | 36 | 40 | 41 | 41 | ** |
| Plants important to visit enjoyment | 60 | 45 | 54 | 57 | 52 | 38 | ** |
| Landscapes offset nearby natural area loss | 22 | 38 | 33 | 38 | 31 | 34 | ** |
| Gain sense of control over environment | 19 | 25 | 19 | 25 | 31 | 24 | ** |
| Plants help me feel calmer/relaxed | 40 | 44 | 38 | 39 | 42 | 36 | NS |
| Nature essential to well-being | 30 | 53 | 48 | 55 | 47 | 41 | ** |
| Sample size (no.) | 311 | 511 | 412 | 283 | 271 | 327 | |
| Gardening (%) | 49 | 62 | 64 | 76 | 77 | 83 | |

² χ^2 test of independence.

NS, *, ** Nonsignificant or significant at P = 0.05 or 0.01, respectively.

Table 3. Percentage of respondents within demographic groups agreeing with survey questions.

| Survey question | Education | | | | Home ownership | | |
|---|--------------|-------------|---------|-------------------|----------------|-----|-------------------|
| | Grade school | High school | College | Test ^z | Yes | No | Test ^z |
| Plants not important beyond beauty | 29 | 13 | 8 | ** | 12 | 13 | NS |
| Gardening satisfaction is peace/tranquility | 28 | 34 | 43 | ** | 42 | 28 | ** |
| Plants important to visit enjoyment | 39 | 47 | 57 | ** | 52 | 48 | NS |
| Landscapes offset nearby natural area loss | 21 | 31 | 39 | ** | 36 | 28 | ** |
| Gain sense of control over environment | 17 | 24 | 24 | NS | 27 | 17 | ** |
| Plants help me feel calmer/relaxed | 31 | 36 | 48 | ** | 40 | 39 | NS |
| Nature essential to well-being | 16 | 45 | 53 | ** | 50 | 39 | ** |
| Sample size (no.) | 155 | 1164 | 792 | | 1359 | 763 | |
| Gardening (%) | 62 | 85 | 68 | | 80 | 46 | |

^z χ^2 test of independence.

NS, **Nonsignificant or significant at P = 0.01.

ent levels of education (Table 3). In all cases, the responses show a direct increasing trend relating level of positive response to plants/nature and level of education. Other NGS demographics on occupation categories and income level were reviewed (data not presented) for a possible coincidental basis for this trend. This consistency of agreement was observed only in the educational level attained, again reinforcing the need for better, more effective plant and natural world education, particularly in elementary and high schools.

Home ownership. To home owners, gardening provided a greater sense of control over their environment and a greater sense of peace and tranquility than to non-home owners (Table 3). Yet, more than half the homeowners, even with an 80% participation in gardening activities, disagreed with both statements. One might speculate that home owners perceive landscaping and maintenance as a necessity and responsibility rather than as a form of recreation. Their stronger belief that the landscape offsets the loss of nearby nature may reflect their choice to purchase a home and move to one of those developments that resulted in the loss of nearby natural areas.

Conclusion

Surveys such as this identify more questions than they answer. However, two conclusions can be reached from

the data collected in this study. First, observations from other studies of peoples' response to plants/vegetation/nature do, in fact, apply across a wide group, but many demographic factors (age, education, etc.) affect individual perceptions of plants. These variables need more evaluation to effectively use the information gained through research. Second, experience and education regarding plants is needed immediately in our elementary and high schools.

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