Relationships between Plants, Behavior, and Attitudes in an Office Environment

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Additional index words. interior plantscape, interiorscape, human issues in horticulture

Summary. The effects of plants in the workplace on the opinions and attitudes of workers was assessed. Attitudes of employees regarding plants were favorable, and most surveyed agreed that plants in the office made it a more desirable place to work. Office workers were aware of the benefits, such as improving air quality, that plants provide. No behavioral changes in response to the addition of plants to the office environment were demonstrated. There were no significant differences between gender, position in the corporation, and age regarding perceptions of plants in the office environment.

The environment is an increasingly important topic in the news, and the impact of nature and plants on behavior and attitudes in both indoor and outdoor settings is a question of expanding interest. Since the 1970s, major companies have incorporated interior plantscaping as part of their policy. This practice is not founded on empirical research, although some have claimed that plants

increase productivity, decrease absenteeism, and improve morale (Horsbrough, 1972; Kaplan, 1978; Lewis, 1972; Menninger, 1972). Research designed to investigate systematically the impact of plants in the interior environment has been minimal to date.

Laviana (1985), in an experimental setting, was able to show affective and qualitative characteristics of an interior-landscaped office. Among his conclusions were that plants improved a person's perception of the environment, and a space occupied with plants was judged to be more acceptable than one without plants. Campbell (1979) found that plants and other living things (fish) in an office make the visitor more comfortable and welcome. Aitken (1989) analyzed the effects of nonverbal environmental factors, including plants, on the perceived attitudes of a visitor to a business. Results indicated that there were positive effects on the perceived attitudes projected by the use of healthy horticultural products in a business environment.

The objectives of this study were to assess the effects of plants in the workplace on the opinions and attitudes of workers, and to determine if plants in the office environment affect job satisfaction. The hypothesis was that the introduction of plants into a work setting would affect workers' ratings of attitude and job satisfaction.

An 11-story building located in northern Virginia was used for this study. Our study was conducted in conjunction with an air-quality study that was the determining factor in site selection and plantscape design. The company under study conducted complex computer systems analyses and was located on the ninth and 11th floors of the building. The experiment began with the removal of all personal plants from both floors. Three months after the removal of all plant material, the first of three surveys was distributed. One week after the first survey was administered, the 11th floor was plantscaped professionally, and the employees on the ninth floor were reminded not to have any plant material in their offices. Plantscaping included one to three desk- or floor-sized plants for the private offices ($n = 117$), and planters, desk- or floor-sized plants for the open areas ($n = 40$). Photographic artwork was installed on the ninth floor during

the experiment to provide an environmental change to both floors. The second survey was administered 6 months after plants were installed on the 11th floor. The ninth floor was plantscaped professionally 2 weeks later. The third survey was distributed 3 months after the ninth floor plant installation. Throughout the experiment, all plants were maintained by a professional interior plant maintenance company.

Twenty-three questions were repeated across the three questionnaires. Seventeen of these questions were answered on a five-point, Likert-type scale (i.e., 1 = "strongly disagree" to 5 = "strongly agree"). The remaining six questions were either multiple choice or fill-in-the-blank. Eight of the Likert-type scale questions pertained to the perceived quality of work space, two to the desire for control over placement and care of plants or the placement of artwork in one's office, and seven to the employee's current opinion of plants and artwork in various settings. Demographic questions assessed the respondents' work locations, gender, smoking habits, age, and types of office space. Employee identification numbers were used in order to track responses across each questionnaire. All employees were informed that their answers would be confidential and at no time would the company examine individual answers.

The percent return for each survey was 41, 59, and 53, respectively. Fourteen employees completed all three questionnaires. Analysis of variance, multiple analysis of variance, and t tests were conducted on the data. The analyses revealed no qualitative or significant differences in the data across the three administrations of the survey or within any one survey. Thus, we found no evidence that plantscaping influenced behavior, attitudes, or work satisfaction.

Before plants were introduced, there were no differences in the attitudes of workers on the two floors; all employees enjoyed their jobs and liked their work environment. This did not change over the course of the study. When only the 11th floor was plantscaped, there were still no differences between the two floors in workers' opinions and attitudes. The fact that the employees did enjoy their jobs and were satisfied with their work environment resulted in a "ceiling effect" when

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attempting to measure improvement in worker satisfaction.

The attitudes of employees concerning plants were favorable, with responses to questions regarding plants in the Agree to Strongly Agree range across all three surveys. There were no differences in responses between employees on the ninth and 11th floors. Although there were no statistically significant differences across surveys or between floors, more employees Strongly Agreed with the statement, "Plants in the office make it a more desirable place to work" after plants were introduced. Also, Agree was the mean response to the statements, "Plants improve the air quality of an office" and "Being around plants makes me feel calmer and more relaxed." While this suggested that people enjoy plants in the office, and many believe that plants cause them to feel calmer and more relaxed, we could not demonstrate any behavioral changes or attribute objective employee benefits to the addition of plants in the office.

Analysis of the demographic variables showed no significant differences between gender, position in the corporation, age, and time the survey was given, both within each survey and across the three surveys.

While this research project presented many challenges, there were several lessons learned for use in developing further investigations of the effects of plants in the workplace. The employees at the site should show variability with regard to their satisfaction of environment and job. Detailed briefing of research methods should be done with company member(s) who assist with distribution and collection of the survey instrument. The return rate improved for the second and third surveys as experience and knowledge of research needs and methods were increased. Behavioral

data, such as absentee records, performance reviews, or productivity, in addition to self-report or questionnaire data, could be valuable dependent measures in this type of investigation. Selecting a site with a larger and more diverse population (most at this site performed similar jobs) and a variety of work environments, such as a factory or manufacturing plant, might provide more information on the impact of plantscaping on work productivity, attitudes, and job satisfaction.

Literature Cited

- Aitken, J.E. and R.D. Palmer. 1989.* The use of plant to promote warmth and caring in a business environment. Amer. Cult. Assn. 11th Annu. Meeting, St. Louis.
- Campbell, D.E. 1979.* Interior office design and visitor response. J. Applied Psychology 64:648-653.
- Horsbrough, P. 1972.* Human-plant proximities: A psychological imperative. Indiana Nursery News 33(4):1-4.
- Kaplan, R. 1978.* The green experience. In: R. Kaplan and S. Kaplan (eds.). Humanscape: Environments for people. Wadsworth Publ., Belmont, Calif.
- Laviana, J.E. 1985.* Assessing the impact of plants in the simulated office environment: A human factors approach. PhD Diss., Kansas State Univ., Manhattan.
- Lewis, C.A. 1972.* Public housing gardens-landscapes for the soul, p. 277-282. In: Landscapes for living. U.S. Dept. Agr. Yearbook of Agr., Washington, D.C.
- Menninger, C.F. 1972.* Recreation and morale. Hort. Bul. Menninger Clinic 6:65-67.

Acknowledgements

This study was funded with a grant from the American Landscape Contractors of America, Interior Plantscape Division.