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**SUBURBAN LAWNS: DIMENSIONS OF MEANING,
ACTIVITIES, AND ENVIRONMENTAL CONCERNS REPORTED BY
HOMEOWNING COUPLES IN GEORGIA AND MICHIGAN**

By

Lois Carol Shern

AN ABSTRACT OF A DISSERTATION

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

DOCTOR OF PHILOSOPHY

Department of Family and Child Ecology

1994

Dr. Ann C. Slocum

ABSTRACT

SUBURBAN LAWNS: DIMENSIONS OF MEANING, ACTIVITIES, AND ENVIRONMENTAL CONCERNS REPORTED BY HOMEOWNING COUPLES IN GEORGIA AND MICHIGAN

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Mounting evidence points to detrimental effects to the environment and human health from the overuse and misuse of fertilizers and pesticides. Of increasing concern in the United States is the use of these chemicals on the lawn.

A biohistorical, ecological conceptual approach provided the framework for pursuing the objectives of the study. Differences and commonalities of meaning, use, and care of the suburban lawn were explored through in-depth interviews with husbands and wives who currently used or did not use a chemical lawn care service. Responses revealed many commonalities and few differences between spouses, geographic location, and chemical lawn service use-nonuse. They support the view that contemporary American values, attitudes, and practices regarding the lawn are deeply rooted in historical antecedents and unquestioned by homeowners.

Very few family activities were reported occurring on the lawn. The primary activity related to the lawn was maintenance. Respondents value their lawns for aesthetic, psychological, normative, and economic reasons. A lawn is considered a source of beauty, pleasure, and economic value; an integral part of one's home, sending a clear message to others about the kind of people who live

Lois Carol Shern

in the house. Respondents consider the use of lawn chemicals to be necessary to maintain an ideal lawn. The use of lawn chemicals is not perceived as a threat to the environment because one's lawn is so small and minimal amounts of chemicals are used. None of the respondents had ever considered their lawn as a potential source of environmental pollution.

A second objective of this study was to determine homeowners' reactions to protective clothing and equipment that could be worn when applying pesticides. Respondents did not perceive a need to wear protective clothing themselves. However, while respondents viewed the respirator and the total protective clothing outfits as "scary," when asked what a lawn service technician should wear, the majority of them chose outfits affording maximum protection. Respondents reasoned that these employees worked with chemicals for extended periods of time and should be protected.

Recommendations and implications for further research and educational efforts are addressed.

TO

My Mother, Carolyn Rem Jacobson

**for instilling in all of us a love of learning,
love for one another, and love for the Lord.**

ACKNOWLEDGEMENTS

To the Georgia and Michigan couples for their assistance and genuine interest in the study. Thank you for taking time from your busy schedules to talk about your lawns.

To Mark Bitman for his photographic expertise and Devan Haan for volunteering to model for the clothing pictures.

To Maria and Andrea Slocum for their patience and competence in transcribing interviews from audio tapes to computer printouts.

To Judy Pfaff for her support, statistical advice, friendship, and early morning walks.

To Marty McNeal, good friend and fellow interviewer, for taking time from her busy life to recruit and interview the homeowners. Her diligence in coding and analyzing transcripts was much appreciated.

To members of my doctoral committee: Dr. Linda Nelson and Dr. Esther Onaga, Department of Family and Child Ecology faculty, and Dr. Frank Fear, Chairperson of Resource Development, for their interest, expertise, and continued support.

To the chairperson of my doctoral committee and director of the dissertation, Dr. Ann Slocum. Without her continued encouragement, commitment, interest and enthusiasm, and friendship the completion of this degree would have been an unfulfilled dream.

To Deborah Johnson, for sharing her home and providing an outstanding role model for positive thinking and perseverance against overwhelming odds. Thanks for a wonderful six months.

To my husband, Ron, for his unstinting love, encouragement, and support throughout the years and his willingness to participate in a commuter marriage for six months. And to our children, Robin and Rande, and our many friends in Georgia and Michigan who helped both of us in so many ways during this endeavor.

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CHAPTER I

INTRODUCTION

Public concern about the environment has evolved sporadically and slowly over the past quarter century. Growing world population, finite natural resources, and technological advances that offer both benefits and risks are creating an increasing awareness that environmental deterioration is accelerating and portends serious problems for future human life (Brown, 1981; Milbrath, 1989). Recent environmental accidents, such as oil spills, water contamination from toxic chemicals, and nuclear accidents are directly impacting the lives of individuals. There is a growing realization that everyday human activities, when multiplied by millions, have a profound, irreversible effect on the natural environment.

Iozzi (1989) states that environmental problems are largely social problems. Advances in science and technology cannot solve the environmental crisis without taking in consideration the mediating effects of existing societal attitudes, values, and lifestyles. Devall and Sessions (1985), two leaders in the deep ecology movement, describe the continuing environmental crisis as a crisis of character and of culture.

Environmental issues and problems demand that society choose from among various alternatives what "should" be done, not just what can be done.

A critical ingredient of the cultural orientation of people toward their environment is the values that form part of their world view (Hutterer & Rambo, 1985).

Americans share a strong anthropocentric tradition in western culture that views humans as being apart from nature and somehow immune from ecological constraints. This set of values and beliefs has been called the Dominant Social Paradigm (Pirages & Ehrlich, 1974). This paradigm entails the belief that resources are limitless, continuous growth and progress are necessary and good, science and technology will solve all problems, and private property and a laissez-faire economy are inalienable rights.

There is increasing evidence to suggest that there is a paradigmatic shift occurring in the orientations of Americans toward the natural environment. Dunlap and Scarce (1991), in a detailed review of all known longitudinal data, reported that public concern for the environment has "reached an all-time high...a growing majority of Americans see environmental problems as serious, worsening, and increasingly threatening to human well-being" (p. 657). While the strength of this environmental concern remains unclear, this trend offers additional support for the idea that a new environmental paradigm is steadily growing.

Dunlap and Van Liere (1978) were among the first to identify the New Environmental Paradigm. This alternative set of beliefs and values asserts that

restricting growth is desirable and the integrity of ecosystems must be protected. It rejects the anthropocentric notion that nature exists solely for human use. However, a 1990 Roper survey (Miller & Keller, 1991) reported that 6 in 10 Americans said that protecting human health from pollution is one of the most important reasons for protecting the environment. About 4 in 10 believed that protecting natural resources for future generations is one of the best reasons. When asked which one, human health or ecology, is the major reason for protecting the environment, nearly three-quarters said it was to protect people's health.

An important environmental health issue is that of the safety of chemicals. In the past 25 years, concern has arisen around the world over the extent to which chemicals in the environment are affecting human health. Humans are exposed to thousands of environmental chemicals and their short-term and long-term impact on health, reproduction, and development are poorly understood (Blair, 1989; Dunnette, 1989; Huff, 1993).

The publication of Silent Spring by Rachel Carson (1962) alerted the public to the fact that pesticides were affecting nontarget organisms and damaging the natural environment. Dunnette (1989) states that "community public health risks from exposure to environmental chemicals appear to be small relative to other public health risks..." (p. 169). Yet a growing number of human exposure studies document acute and chronic health problems resulting from pesticide exposure and the need to explore the consequences of their continued use (Davis, Brownson, Garcia, Bentz, & Turner, 1993; Fenske et al., 1990; Geiger, 1993;

Jeyaratnam, 1990; Olson, Sax, Gunderson, & Sioris, 1991; Savage et al., 1988).

American farmers have long believed that chemicals, e.g. fertilizers and pesticides, are beneficial to agricultural production. However, the nonfarm public appears to be more likely to focus on the perceived risks of chemicals rather than the benefits. An area of growing concern is the use of chemicals for lawn care.

Strong voices are heard addressing both sides of the chemical lawn care use issue. In many issues dealing with opposing viewpoints, a resolution evolves from the analysis of facts. However, as with so many environmental issues, here the facts only seem to confuse. Environmental activists and pesticide advocates interpret scientific data (often the same data) to support their particular viewpoint. Currently the U.S. Environmental Protection Agency has been charged with the task of weighing data from both sides and trying to effect some resolution that protects public health while allowing chemicals to be used on lawns.

The main purpose of this study is to explore and further the understanding of the meanings and values American homeowners hold regarding the lawn and what actions they take with regard to the use of lawn care products and services. A second goal is to investigate the perceptions of homeowners with regard to protective clothing which can be worn when applying lawn pesticides.

Background of the Problem

The single-family detached home is still the residence of choice for most Americans (McAndrew, 1993). Cultural and aesthetic perceptions of the

landscape place real and perceived benefits on a green, weed free residential lawn. This grassy expanse surrounding the house is viewed as providing a setting for the home, linking together the trees, shrubs, and flower beds, as well as the surrounding neighborhood yards, into a harmonious whole. It also provides an open expanse on which family outdoor activities can take place.

The yard, with its grass, trees, shrubs and flowers, is a homeowner's personal piece of nature. For some, this setting may fulfill an emotional need for peace and tranquility. It can provide a refuge from the congestion and crowding of the city. For others, the manicured, green grass is viewed as symbol of status and class.

Whichever the case may be, Americans lavish time, attention and money on keeping their lawns green, thick, and weed free. If a homeowner does not have the time to care personally for the lawn, a lawn care company can be hired to do the job. The use of chemicals to produce healthy (disease free) and attractive lawns, trees, and shrubs is commonplace. It is estimated that the average American homeowner uses ten times more chemicals per acre than do farmers (U.S. Senate, 1990).

The studies that have looked at residential homeowners' use of lawn chemicals report that individuals seldom use any kind of safety precautions (Grieshop & Stiles, 1989). Rarely do homeowners report using any kind of protective clothing or equipment.

The use of protective clothing and equipment has been recognized as a major strategy for protecting workers from chemical exposure since the 1970's.

A new EPA regulation issued in 1992 to limit exposure of agricultural workers to pesticides mandates that employers must train workers to use protective equipment, like gloves or goggles. Recommendations listed on the product label in regard to personal protective equipment (PPE) are to be used to guide the choice of what is to be worn. Currently the new rules do not apply to government-sponsored pest control, home gardens or lawns, or the lawn care industry. Many lawn care companies use various kinds of personal protective equipment but there are no industry wide standards. A Canadian study of homeowners reported that there was significant reduction in exposure to the herbicide 2,4-D by wearing protective clothing but few wear it (Harris, Solomon, & Stephenson, 1992).

Today's residential lawn may well be a suburban family's most direct interaction with nature. In an age of increasing concern related to the natural environment, residential homeowners holding the traditional American values related to lawns and landscape may find themselves in an uncomfortable situation. The need to use a wide array of chemicals and precious water to maintain the idealized American lawn is at odds with the growing environmental and health related concerns about pollution and the use of limited natural resources. In a recent Better Homes and Gardens survey, 62% of more than 10,000 respondents reported that they were cutting back on lawn chemicals in order to help the environment (Cooper, 1994).

It is recognized today that human actions are causing many global environmental changes (Turner, Clark, Kates, Richards, & Mathews, 1991).

Stern, Young, & Druckman (1991) write that global environmental change matters to people because it has the potential to harm what they value. Stern and his colleagues identify two main classes of responses that people make in anticipation of environmental change

Mitigation which includes all actions that prevent, limit, delay or slow the rate of undesired impacts by acting directly or indirectly on environmental systems. For example, they can intervene directly in the proximate causes of global warming by limiting the use of certain nitrogen fertilizers to reduce nitrous oxide emissions. And adaptations which are responses that do not alter the rate of environmental change but limit the effect on what people value. For example, the use of a drought resistant crops so that if climate change produces drought, crop failure and famine do not result (p. 105).

Stern (1992) argues that the consequences of global change depend upon how society changes while its environment is changing. How society changes depends on individual responses.

Rationale

In order to understand how to encourage environmentally responsible behavior, it is necessary to identify factors that influence the behavior. Identifying attitudes, perceptions, and actions of homeowners with regard to the residential lawn and exploring beliefs that underlie lawn-environment-chemical attitudes can provide valuable insight into the perceived meanings and values that individuals associate with their lawns. An awareness of these perceived meanings may lead to an understanding of why individuals and society find the ideal lawn so important and highlight the impact that individual actions can have on both local and global environmental problems.

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Meanings, beliefs, and values are incredibly difficult to define and quantify but they are at the heart of this investigation. Friedel (1993) suggests that there are some fairly clear sources for many values. These include scarcity, functionality, aesthetic appreciation, and association. In this study aesthetic appreciation and associative qualities have been identified as being of primary importance to understanding the value placed on the lawn. For a variety of reasons people make associations between an object, in this study the lawn, and various feelings, beliefs, concerns, and attitudes. Coming to understand these associations, which are rarely stated, includes a historical approach as well as a systems perspective.

Biohistory: A Conceptual Framework

Understanding the human causes and consequences of environmental change requires a systems perspective which allows a researcher to consider the full physical, social, and psychological environmental context of a situation while trying to understand the specifics of a unique experience. This approach offers a means by which the researcher can attempt to clarify the reciprocal interactions between smaller and larger systems so that influences from both directions can be considered.

Ecosystem models propose that larger systems provide a context, meaning, and significant influence for the subsystems which are part of the larger system. Interactions of the systems and subsystems illustrate the interdependence of parts and wholes and the influence that system components have on the greater whole.

Human ecology is concerned with interaction and interdependence of humans with the environment (Bubolz & Sontag, 1993). Boyden (1979) states that

the aim of human ecology is to improve understanding of the patterns of interaction between different aspects, or components, of human situations, and thus to contribute to the ability of societies to formulate prudent and effective policies for the future (pp. 11).

This study will utilize the biohistorical approach to studying the interrelationships between human beings and the other components and processes of the ecosystem. This approach has been used by Boyden and his colleagues in UNESCO's Programme on Man and the Biosphere (Boyden 1970, 1979, 1986, 1987, 1992; Boyden, Dovers, & Shirlow, 1990; Boyden, Millar, Newcombe, & O'Neill, 1981). Biohistory provides a rational framework for integrative research on human situations, all of which involve continual interplay, over time, between cultural and biophysical processes, and all of which are the product of such interplay in the past. Boyden emphasizes the importance of historical data in order to achieve a sense of perspective and an understanding of how events in the past influence the realities of today.

This framework, while being concerned with the properties of the whole system, also focuses attention of the life conditions and well-being of the individual human being. The two main orientations of this approach include (a) interrelationships between the biosphere and society and (b) interrelationships between humans and society.

Interrelationships between the Biosphere and Society

Humans live in a biosphere (nature) made up of the atmosphere, soil, energy from the sun, plants, animals, water. Human culture has grown out of, interacted with, and is totally dependent upon the biosphere. Boyden presents a subset of variables (Figure 1, center) that can be combined in two ways.

Boyden uses the terms Human Society and Nature (Figure 1, top) to describe the sub-sets of variables from his first perspective. In this perspective, Human Society includes all institutions and organizations, artifacts or products of labor, societal arrangements, societal activities as well as the products of culture such as knowledge, technology, belief and value systems, and societal aspirations. Human Society, in turn, impacts on the various kinds of biological or natural systems, the Biosphere.

The interrelationships between the Biosphere and Human Society include flows of energy, renewable and non-renewable resources, organic and inorganic wastes, and the impacts of societal activities on soil, the atmosphere, the oceans, and on populations of plants and animals. These are identified as biometabolism (organic material and energy that flow through humans themselves), technometabolism (inputs and outputs of materials and energy that result from technological process), and other (energy from things like volcanoes).

Boyden then takes the same sub-sets of variables that comprise Nature and Human Society and changes their orientation by combining them in a different manner (Figure 1, bottom labels). Abstract Culture is defined as the intangible aspects of human situations comprising culture and cultural arrangements.

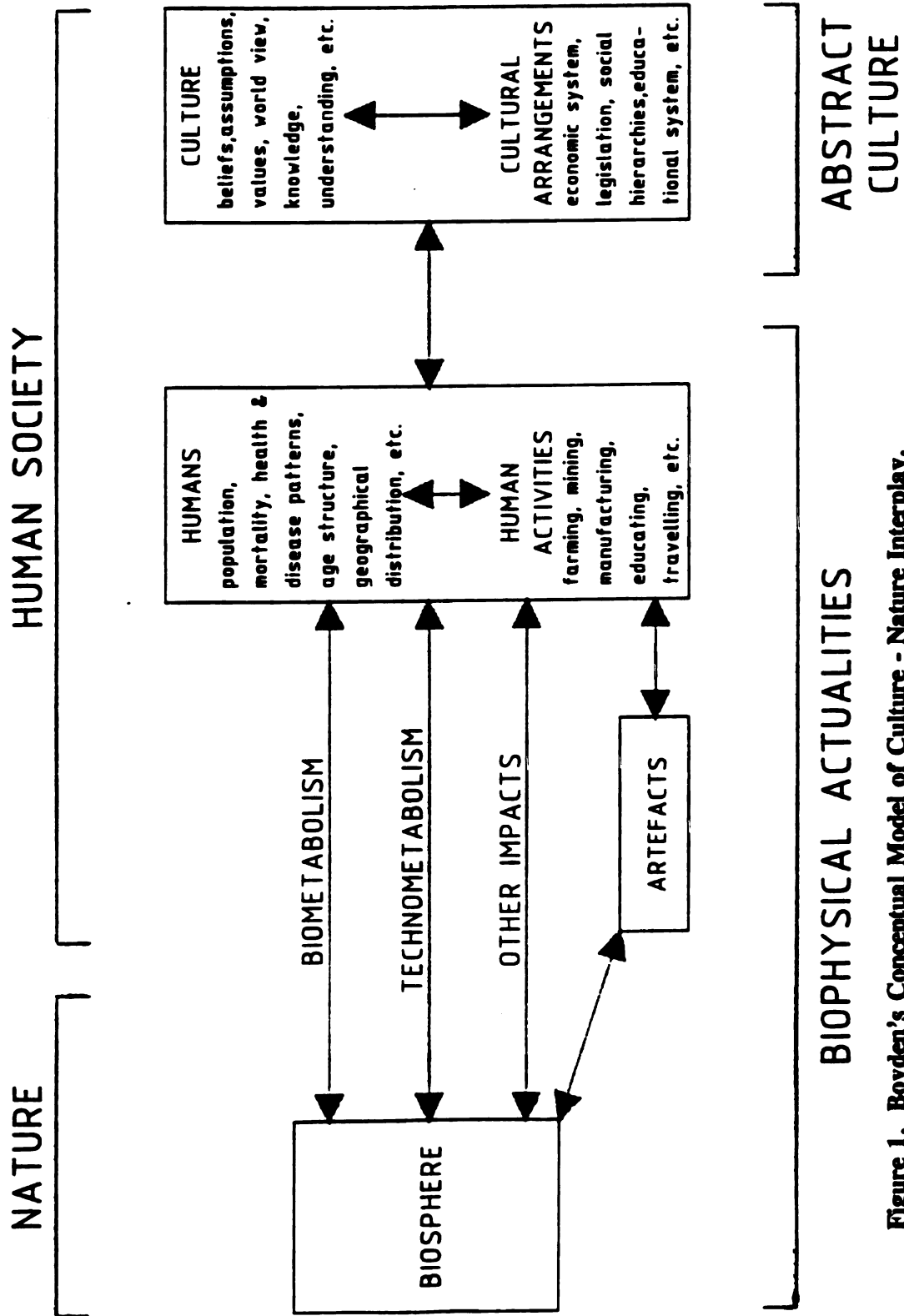


Figure 1. Boyd's Conceptual Model of Culture - Nature Interplay.
 Boyden, S. (1992). *Biohistory: The interplay between human society and the biosphere*.
 Paris France: UNESCO and Park Ridge, NJ: Parthenon Publishing Group. (p. 96).

Culture includes beliefs, assumptions, attitudes, and values. Cultural arrangements include such things as the economic, political, and institutional structures of humans. Biophysical Actualities include all other aspects of the system, including the ecosystems and organisms of the biosphere, human artifacts, and humans themselves and their activities.

Abstract Culture and Biophysical Activities are linked in many ways. For example, the value system of a society has important connections with its economic and political arrangements, and these in turn influence human activities which then have impacts on the biosphere.

Interrelationships between Humans and Society

The second focus of Biohistory is on individual humans (or groups of humans) and their experience of life. The life experience of humans can be viewed as being made up of two sets of variables: total environment and human experience (Figure 2).

Individuals can be regarded as being separated from the total environment by a series of filters which determine what aspects of the total environment impinge directly on them and become part of their immediate environments. These filters may be cultural or economic.

Human experience includes life conditions and the biopsychic state. Life conditions include the personal (immediate) environment and the behavior pattern. The immediate environment is that part of the total environment which impinges directly on individuals and which is experienced directly by them. The immediate environment includes both material variables (e.g., air quality, noise

TOTAL ENVIRONMENT

previous

HUMAN EXPERIENCE

life conditions

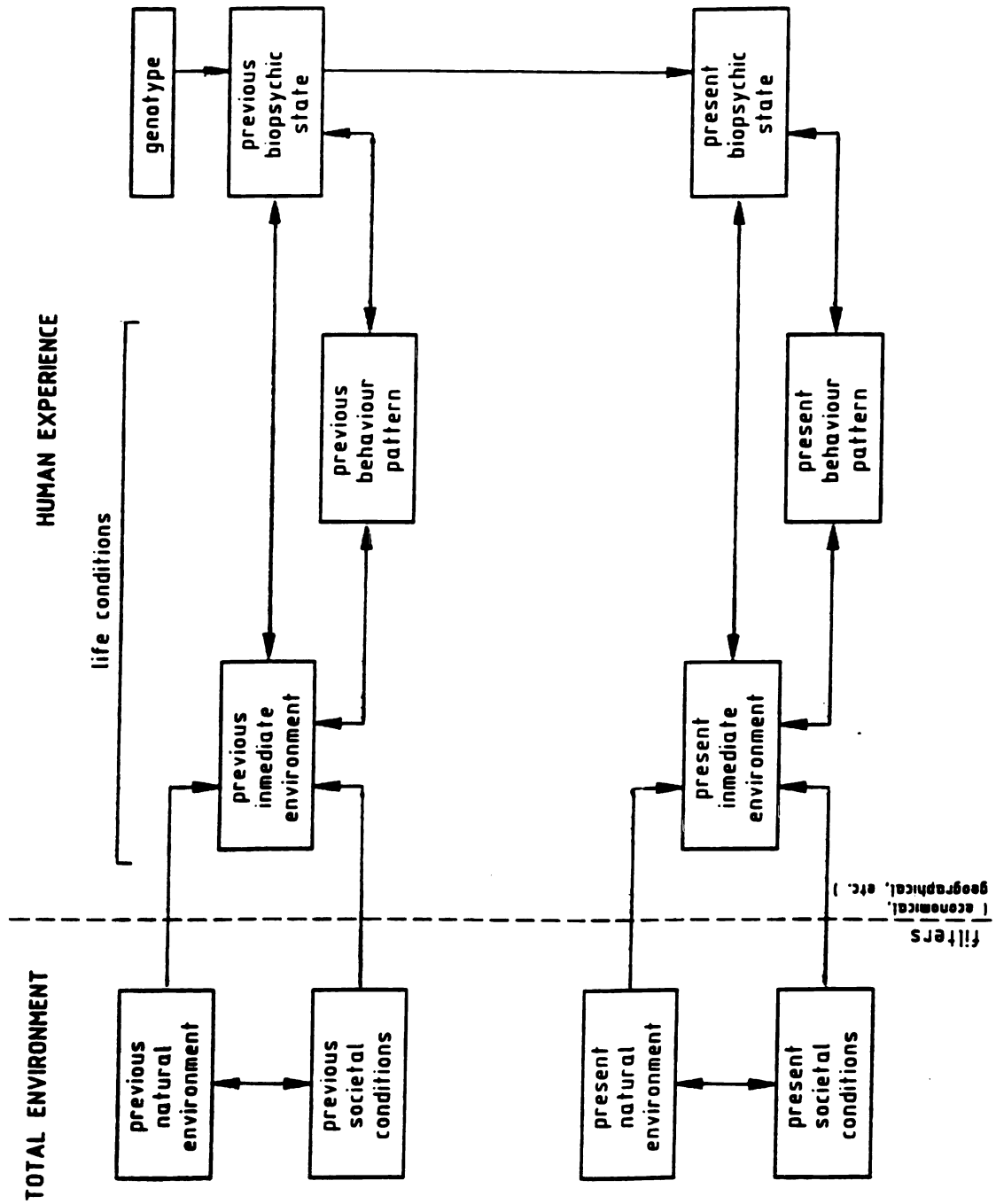


Figure 2. Boyden's Presentation of Interrelations between Total Environment and Human Experience.
 Boyden, S. (1992). *Biohistory: The interplay between human society and the biosphere*.
 Paris, France: UNESCO and Park Ridge, NJ: Parthenon Publishing Group. (p. 101)

levels) and psychosocial and intangible variables (e.g., family support, messages from society). The behavior pattern is what people do and how they spend their time (e.g., physical work, social interaction, creative behavior). Both real life conditions and perceptions of the components of life conditions have important influences on the biopsychic state. The properties of the total environment also have great influence on human experience.

The biopsychic state, short for biological and psychological, is the actual state of body and mind of individuals at any given time. It incorporates all aspects of the human organism that comprise health and well-being; and it includes both tangible or measurable variables (e.g., blood pressure, body weight) and intangible variables (e.g., sense of personal involvement, pride, feelings of fulfillment). It also includes knowledge and understanding, aspirations, and values. The biopsychic state of an individual is a function of genetic constitution and previous and present life conditions.

Interrelationships between Nature, Culture, and the American Lawn

The interrelationships between nature, culture, and the ideal American lawn will be explored in this study. Grass is a living, growing natural organism that requires nutrients from the soil, atmosphere, energy from the sun, and water. The ideal American lawn, which is comprised of an emerald green, thick, weed free, monoculture grass is an artifact of Human Society. It one of a special class of resources designed and constructed by humans and invested with meaning and symbolic and aesthetic value. In order to maintain the culturally desirable American lawn, substantial amounts of chemicals, water, energy, time, and

money must be expended. Many human activities are necessary to maintain the lawn. Cultural beliefs and values, as well as economic, legal, and social arrangements support its continuing existence. Cultural and economic filters play an important role in determining interactions with the lawn. People who live in apartments generally do not worry about mowing a lawn. In some cultures, walls rather than grass, separate houses from the street.

In American culture the lawn is part of the immediate natural environment which impinges directly on individuals and is experienced directly by them. Human activities related to the lawn influence, for better or worse, the biosphere.

Life conditions related to the lawn include variables such as climate, topography, and water, air, and noise quality. Psychosocial intangible variables include societal and neighborhood norms and cultural messages about the importance of the lawn. Behavior patterns encompass activities related to lawn care and family activities that take place on the lawn.

Both real life conditions and perceptions are important influences on the biopsychic state of an individual. The biopsychic state is influenced by the lawn in both physical and mental ways. Physical variables can include rest and relaxation as well as illness from strained muscles or pesticide exposure. Mental variables can include pride in the lawn, fear of ridicule, a need to belong, appreciation of nature, perceptions of costs and benefits, and preferences related protective clothing. Knowledge and values are important components of the biopsychic state.

Research Objectives

This research is qualitative in nature and as such the objective is not to test hypotheses. The objectives of the research are to:

- 1. Identify Georgia and Michigan suburban homeowners' activities related to lawn maintenance and family use and perceived meaning of the lawn.**
- 2. Compare spousal lawn activities and perceived meaning of the lawn.**
- 3. Explore homeowners' beliefs about environmental and health concerns related to the use of lawn chemicals.**
- 4. Investigate the role of clothing as a nonverbal clue in the perception of danger related to the use of lawn chemicals.**

Research Questions

The research questions for each objective are stated below:

Research Question for Objective 1:

Are there differences and commonalities between Georgia and Michigan homeowners with regard to (a) demographic characteristics, (b) lawn maintenance activities, (c) family usage activities, and (d) perceived meaning of the lawn.

Research Question for Objective 2:

Are there differences and commonalities between spouses with respect to (a) lawn maintenance activities and (b) perceived meaning of the lawn.

Research Question for Objective 3:

What kinds of environmental and health concerns do homeowners have regarding the use of chemicals on their lawns?

Research Questions for Objective 4:

- 1. Do homeowners view any particular type of clothing or personal protective equipment as a nonverbal clue signaling danger about the products and services being used?**

2. What kind of clothing would a homeowner choose for a lawn care technician to wear when applying pesticides?

3. Does clothing worn by lawn care applicators influence the overall perception of the lawn care company?

Theoretical Definitions

Ideal American Lawn. An area of ground surrounding a house on which is grown a weedfree, thick, green, monoculture grass that is kept mowed to a prescribed height.

Pesticides. Chemicals that can kill organisms that humans consider to be undesirable. Pesticides include herbicides that are used to kill undesirable plants (weeds), insecticides that are used to kill undesirable insects, fungicides that are used to kill unwanted fungi, and rodenticide which are used to kill undesirable rodents.

Operational Definitions

Operational definitions were developed at several stages in the research process, some at the inception of the study and others as categories emerged. The interview guide questions were considered just that, a guide. They provided a departure point for discussion. In analysis, all responses that fit a particular category were included even if they did not occur at the point in the interview where the question was asked.

Environmental Concerns. A person's responses to the Environmental Scale (Appendix A-III, Q. 8) and questions related to environmental concerns (Appendix A-III, Q. 9, Part B, C, D).

Family Activities. A person's responses to the question, "What kind of activities take place on your lawn?" (Appendix A-III, Q. 2).

Health Concerns. A person's responses to the Health Scale (Appendix A-III, Q. 9) and questions related to concerns about pesticides and health (Appendix A-III, Q. 9, Part A).

Lawn Maintenance. A person's responses to the question "What do you, yourself, do to take care of the lawn?" (Appendix A-III, Q. 3).

Perceived Meaning of the Lawn. Perceived meaning of the lawn includes six domains that reflect a person's beliefs, values, attitudes and actions with regard to the lawn that emerged primarily from responses to questions 1, 2, 3, and 4 (Appendix A-III).

Assumptions

The assumptions underlying this research are:

- 1. Qualitative research is an adequate and appropriate method for gaining insights into people's actions and subjective perceptions, preferences, and feelings.**
- 2. Individuals will truthfully report their preferences, actions, and perceptions with regard to the lawn.**
- 3. It is likely that there are differences between attitudes, perceptions, and activities of husbands and wives which preclude considering the couple as a single unit for analysis.**
- 4. There is variation among individuals and groups as to the perceptions of advantages and disadvantages associated with the use or nonuse of products and services necessary for maintenance of the lawn.**

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CHAPTER II

REVIEW OF LITERATURE

The review of literature is organized in three major sections. The first section discusses the Biosphere and Human Society. The importance of the lawn is illustrated by the economic and technological activities that are generated through products and services that are deemed necessary to maintain the lawn. Descriptions of current practices highlight the effects of lawn practices on the natural environment and the literature relevant to the concerns arising from these practices is reviewed. The use of clothing as a means of protection when applying pesticides is addressed.

The second section discusses Human Experience which includes life conditions and the biopsychic state. Life conditions include the personal (immediate) environment and behavior patterns. The review of literature includes discussion and review of research about meanings, values, and attitudes associated with the lawn and the natural environment.

The third section traces the evolution of the American lawn. It explores the historical roots of the lawn, the beliefs and meanings that have evolved related to the lawn, and the contemporary forces which continue to shape the lawn.

The Total Environment

The Biosphere and the Lawn

Grass is part of a natural ecosystem composed of plants growing in soil which require sunlight, water, and nutrients. Lawn grass is one of many wild grasses that have been domesticated for human use and can be thought of as a very special type of garden (Sombke, 1994). But lawn grass is not used for food.

The lawn is an artifact of society. Created from a natural occurring plant, it has been modified by humans and invested with meaning and aesthetic value. For many Americans a uniform, weed free, green lawn is essential to being considered a respectable, responsible homeowner.

Human Society and the Lawn

Turf management, growing grass as an ornamental crop, has undergone constant experimentation and change since the earliest sheep-grazed village commons. Many varieties of grass have been developed to accommodate climatic differences. There are two main types of grasses grown in the United States: cool-season grasses which grow well across the northern and midwestern states, and warm-season grasses, which grow better in the hot, humid southern states. Common Southern grasses that grow in Atlanta, Georgia include bermuda, zoysia, centipede, fescue, and St. Augustine. Midwestern grasses include Kentucky bluegrass, fescue, and perennial ryegrass. Trying to grow an inappropriate grass in an unfriendly geographic, climatic location can cause great frustration, environmental damage, and is ultimately doomed to failure.

It is estimated that in the United States the total area in turfgrass is about 25 million acres or 40 thousand square miles, an area slightly less than that of Pennsylvania (Roberts & Roberts, 1988). Five million of these acres are golf courses, cemeteries, athletic fields, and other open spaces.

Economic Impact

The 1990 EPA National Home and Garden Pesticide Use Survey reported that 66.8 million households have a private lawn (Whitmore, Kelly, & Reading, 1992). These lawns cover an estimated 20 million acres with an average size of about one-third acre. They also estimated the annual retail sales of residential lawn care products and equipment to be \$6.9 billion. Hoses, nozzles, and sprinklers to water lawns and gardens accounted for \$51.2 million and \$19.6 million was spent on grass seed. The average homeowner spent \$445 in 1993 on lawn/landscape maintenance (Homeowners spend...1994). And Americans 50 years of age and older accounted for nearly half of all these expenditures on maintenance services. Goldin (1977) calculated that the average residential lawn may cost more per acre to maintain than it does to raise a crop of corn, rice, or sugarcane.

Lawns are generally viewed as only one part of the total landscape design. No studies were found that directly addressed the monetary value of a lawn. A 1986 study, commissioned by the Nursery Products Division of Weyerhaeuser looked at the value of landscaping (Weyerhaeuser Company, 1986). It included original research by the Gallup Organization, Trendnomics, and the National Gardening Association.

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Among its findings were:

- 1. New home buyers and buyers of previously owned homes estimated that landscaping adds 14.9% to the value or selling price of their home on the average.**
- 2. Sixty-two percent of all U.S. homeowners consider landscaping a good or better investment than an investment in other types of home improvements, including kitchen and bathroom remodeling.**
- 3. Ninety-five percent of real estate appraisers agreed that landscaping adds to the dollar value of residential real estate.**

If a landscape is well designed, it will mature and become more valuable.

Landscape industry members have suggested that at least five percent of a home's value should be spent on landscaping. The Associated Landscape Contractors of America estimate that landscaping adds 15% to the value of a home (Evans, 1992).

Advantages and Disadvantages

The advantages of well planned landscaping include reduced air pollution and noise levels, temperature and wind control through proper placement of trees, creation of "green feelings", and human health improvement by using features that ionize the air (Pierce, 1989). But the ideal American suburban lawn that requires minimal grass diversity, control of insects, weeds, and fungus by use of pesticides, additions of fertilization, and irrigation is expensive, labor intensive, and as more and more people are beginning to believe, environmentally unsound.

A frequently repeated claim in the lawn care literature is that through photosynthesis a 50-by-50 foot lawn generates enough oxygen to meet the needs of

a family of four. This statement does not take into account the various kinds of pollution that accompany the maintenance of the ideal American lawn. Annual pollution emissions from lawn utility machines in California are equivalent to the emissions produced by 3.5 million 1991 model automobiles driven 16,000 miles each (Bormann, Balmori, & Geballe, 1993). The EPA estimates that one hour of operating a walk-behind mower puts as many pollutants into the air as driving an automobile for 11-12 hours (Maimgren, 1994). Other potential environmental problems such as chemical run-off and water pollution, grass clippings in landfills, safe disposal of empty pesticide containers and used oil, and unknown health effects of chemical use are of increasing concern.

Lawn Equipment

A variety of lawn equipment is needed to maintain the average lawn. Lawn mowers, edgers, clippers, leaf blowers, string trimmers, seeders, fertilizer spreaders, and aerators are considered staples for lawn care. In 1991, the U.S. lawn equipment industry estimated \$4.6 billion in sales to both the domestic and international markets. The international markets are primarily Canada and the European Community (U.S. Department of Commerce, 1992).

Fertilizers

Fertilizers for lawns are generally a mix of nitrogen, phosphorus, and potassium just as agricultural fertilizers are. By weight only 5 to 10% of the fertilizer sold in the United States is purchased to fertilize lawns, but this market accounts for 25% of the industry's profits.

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Yard Waste

The sheer volume of yard waste in municipal landfills began to be a serious problem in the 1980s. Yard waste, primarily grass clippings, is estimated to make up about 20% of all the garbage generated in the United States (Yard waste...1994). It is the second largest component (by weight) of the municipal solid waste stream. During the summer and fall months, yard waste can constitute 25 to 50% of all municipal solid waste. As of July 1993, 20 states had enacted or had pending legislation to ban all yard waste from landfills.

Individual homeowners and municipalities have been encouraged to compost and use clippings for mulch. Recycling yard waste not only saves time but also money in disposal costs. But yard waste composting is also being scrutinized for potential harmful effects due to pesticide residue. A recent study commissioned by the Massachusetts Department of Environmental Protection reported that while pesticide residue was present in the clippings, they are typically found in low levels (they registered in parts per billion). Workers at composting sites have not reported any skin rashes or other extraordinary events (Code, 1991).

Water

Lawns need water to grow. An average acre of lawn needs more than 27,000 gallons of water each week. It has been suggested that Americans routinely overwater by 20 to 30%. While the amount of water needed varies greatly by region of the United States, lawn care increases water use by as much as 30% in the summer (The Earthworks Group, 1989). As water becomes increasingly valuable, many communities are taking a hard look at the water

used on lawns. Lawn watering restrictions are frequently a priority when a region is enduring a drought.

Groundwater concerns. Groundwater contamination by chemicals is also of major concern. Groundwater comprises 96% of the world's total water resources. Ninety percent of rural residents and 50% of people in the United States rely on groundwater as their drinking water source.

The far reaching effects of chemicals are illustrated by findings from a study done by Nations and Hallberg (1992) who sampled rainfall for pesticides in three areas in Iowa: two rural localities and an urban area. Fourteen pesticides, ten herbicides and four insecticides, were detected from October 1987 through September 1990. Samples from the urban site had detections of the same agricultural chemicals found at the rural sites, but in lesser quantities. In addition to the herbicides, three of the four insecticides detected in rainfall were found only in urban samples. Concentrations were greater at sampling sites near fields where pesticides are applied.

The EPA has found that pesticides and nutrients are present in urban runoff, but are not as prominent as metals such as lead (U.S. EPA, 1983). Lunsford (1994) reports that phosphorous from the run-off of fertilizers continues to a problem in the midwest. It is believed that the impact of phosphorous is greater in surface water than ground water. Creating a buffer zone of 50-100 feet near lakes and ponds where fertilizers could not be used is recommended.

Studies looking at the movement of chemicals in turfgrass are ongoing. Watschke and Mumma (1989) report that studies examining the movement of

pesticides and nutrients on runoff areas and sloped turf have not detected any pesticides in as low as a part per billion. Watschke concludes that well-managed turfgrass has a positive impact on water quality. Dense, quality turfgrass stands affect the overland flow process to such a degree that runoff is insignificant and inhibits percolation of fertilizers and pesticides into the groundwater.

Morton, Gold and Sullivan (1988) reported that total inorganic-*N* losses in percolate average from 3.1 to 13.1% of the amounts applied to sloped experimental lawns maintained under high and low input irrigation and chemical management. Gold, Morton, Sullivan & McClory (1988) found no significant leaching of two herbicides, 2,4-D and dicamba, from simulated home lawns with a sandy loam soil. Petrovic (1993), in a review of studies looking at leaching, reported that pesticide leaching is highly dependent on soil texture and the time from application to the first significant precipitation event. Lawn fertilization was found to have only a minor impact on nitrate levels in groundwater where other land uses like corn production and septic tanks have resulted in high nitrate levels. Niemczyk and Filary (1988) have studied vertical mobility of pesticides in soil. The study included nine insecticides and evaluated their vertical mobility to the first, second, fourth and in some cases tenth inch below the thatch. They reported that insecticides applied to turf with thatch pose little or no potential for downward mobility. Harrison, Watschke, Mumma, Jarrett, & Hamilton (1993) measured very low levels of runoff from sloped turfgrass plots. Their data suggests that under normal rainfall conditions the quantities of dissolved

pesticides and fertilizer nutrients in runoff and percolate transported from turf sites are low.

Mechenich and Shaw (1994) surveyed residents of two subdivisions with private wells and septic systems in central Wisconsin about their use of various household and lawn chemicals. Of the 139 respondents, 109 reported fertilizing their lawns an average of 1.8 times per year. Nine participants reported never fertilizing their lawns and ten reported using a commercial lawn service.

When asked about the amount of fertilizer they used, 74% said they used the amount specified on the bag, 18% said they used more, and two users said they did not read the instructions on the bag. Approximately half (n = 68) of the residents reported applying a mixture of broadleaf weed killer and fertilizer on their lawn. An average use rate of 1.2 times per year was reported. Thirty one participants reported never using this type of product. Crabgrass killer was applied once a year, on average, by 31 users. The most commonly used lawn and garden insecticides were diazinon (51 users), malathion (16 users), and carbaryl (17 users). The majority reported using less than one cup of undiluted product per year, but some used more than 10 cups per year. When asked about the severity of groundwater contamination in their subdivisions and in the county, 63% stated it was "serious" and 13% ranked it as "very serious." When asked about water contamination sources the study found there was, in general, no relationship between opinion about contamination sources and one's own chemical use practices. The majority of the respondents (67%) identified agriculture as the cause of the problems.

Pesticides

The use of pesticides on lawn grass began after World War II as chemical companies turned their research efforts toward peacetime uses of chemicals. By 1991 the world market for pesticides reached nearly \$35 billion (U.S. Dept. of Commerce, 1992). The professional and consumer markets for pesticides in the United States were each estimated to represent about \$1.1 billion in sales at the manufacturers' level in 1991 (Hodge, 1993). Insecticides accounted for approximately 75% of the total consumer market; the remaining 25% included herbicides, fungicides, and rodenticides. Herbicides accounted for a little less than half of the professional market; insecticides for approximately 30%, and fungicides, rodenticides and other the remaining 20%. The agricultural market was estimated to be about \$4.9 billion in sales.

Currently there are about 45,000 pesticide products marketed in the United States. Public Citizen's Congress Watch (Weiss, 1989) reported that of the 40 pesticides that the EPA estimates comprise over 95% of chemicals used by lawn care firms:

- 1. Twelve are suspected human carcinogens.**
- 2. Twenty one have been shown to cause long-term health effects in lab animals or humans.**
- 3. Twenty have been shown to cause short-term damage to the central nervous systems of humans.**
- 4. Thirty six cause eye, skin or throat irritation in humans or animals.**
- 5. One has been completely tested and reviewed by the EPA for its full range of long-term health effects.**

In 1988, more than 700 million dollars worth of pesticides, about 67 million pounds, were sold for use on American lawns (U.S. General Accounting Office,

1990). Chemical lawn care sales were estimated at \$1.7 billion in 1993 (Roche, 1993). The average American lawn is treated with five to ten pounds of pesticide per acre (Schultz, 1993).

Homeowner's use. Numerous pesticides are commonly used both inside and outside American homes. The EPA estimates that 69 million American households, or more than 85% of the nation's total families, store and use pesticides (Lang, 1993). Research exploring the use of pesticides in the home environment began in the late 1960s and early 70s. The majority of studies that have looked at homeowner's pesticide use have combined inside and outside usage. For a review of this research see Appendix B. These studies show that homeowners, in general, do not read labels, do not follow commonsense safety precautions, do not know what products commercial applicators have applied, and believe pesticides do good and rarely think that they do harm.

Health risks. Many questions remain unanswered about short-term and long-term health risks associated with pesticide use. The focus of current research about pesticides has changed from how much and what is used to the environmental and health effects associated with the use of these products. The lack of a national database in the United States impedes an accurate counting of the incidence of death and injury from acute pesticide poisoning. Chronic health effects such as cancer, deterioration in neurologic functions, immune effects, and reproductive and birth defects are sources of concern and controversy. An area of great uncertainty is the effect of pesticides on infants and children. (See Appendix C for a review of literature related to pesticides and health.)

The degree of risk resulting from human exposure to pesticides and other chemicals is a hotly debated issue and is likely to continue for some time. Interpretation of the same data by scientists produces divergent viewpoints about the significance and implications of the information. Whitford (1993) writes, "Since there are no scientific absolutes people are left to draw their own conclusion about the risks and benefits, based on their perceptions and knowledge of the facts" (p. 9).

One reason the task of determining benefits and risks is so difficult is that research shows that individual often demonstrate unrealistic views and behaviors toward hazardous activities. Most of the current literature dealing with risk perception has focused on people's abilities to estimate the likelihood of technological, health, and environmental hazards. This research indicates that people are reasonably accurate in estimating the risk of fatal injury, but they tend to overestimate the likelihood of infrequent causes and to underestimate the likelihood of frequent causes (Fischhoff 1985; Fischhoff, Slovic, Lichtenstein, Read, & Combs 1978; Lichtenstein, Slovic, Fischhoff, Layman, & Combs 1978).

Lawn care technicians appear to be a group who may be especially at risk from the use of lawn chemicals. Lawn care workers engage in tasks that result in exposure to pesticides and many other potential carcinogens such as diesel fuel, organic solvents, gasoline, metal fumes, paints, zoonotic viruses, microbes, and fungi. Children and other bystanders may also be at risk from exposure to lawn chemicals.

Lawn care exposure. A ChemLawn company study reported that an evaluation of the health of 100 applicators who applied pesticides for at least nine years showed no long-term adverse health effects attributable to the applicators' work with chemicals. It was estimated that these applicators were exposed more than 10,000 times what a homeowner can expect, and 100,000 times what a next door neighbor can expect (Nightline debate...1991).

Leonard & Yeary (1990) measured occupational exposure to four insecticides and two fungicides by 151 tree and shrub applicators who used hand-held equipment when spraying pesticides. The study was conducted for three consecutive years: 1985, 1986, 1987. Inhalation exposures were reported not to exceed any governmental recommendations or manufacturer defined acceptable levels for the products studied. Based on these results and the study conditions, they supported the recommendation that respirators need not be worn during the mixing, loading, and application process for the pesticides that were studied.

Yeary and Leonard (1993) continued to address inhalation exposure in application of pesticides to urban lawns, trees, and shrubs. Air sampling was conducted of the breathing zone air of applicators (n = 200), indoor air of pesticide warehouse facilities and offices (n = 82), indoor air of residential properties (n = 82), and ambient air of residential properties (n = 55). Results indicated that pesticides were not detected in 80% of the 500 samples collected. When detected, the time weighed average (TWA) values were generally less than 10% of any established or suggested standard.

Hurto and Yearly (1993) reviewed current research dealing with exposure to pesticides for both the applicator and the bystander. Applicator research shows that skin exposure is the most significant route of absorption on reentry to treated areas and for pesticide applicators. The highest exposure levels are to the lower portion of the body, including legs and groin area. Since hands only represent five percent of the body area, wearing gloves may not make that much difference if significant exposure has occurred to the feet and legs.

This review reported that indirect bystander exposure to turfgrass pesticides may occur in several ways. Indirect bystander exposure usually occurs through contact with dislodgeable foliar residues. This is generally defined as the pesticide fraction remaining on foliage that has the potential to be transferred to skin of animals or humans who come into contact with the pesticide-treated foliage. Total residue of pesticides found on turfgrass foliage was reported to range from 25 to 65% of the applied rate. This range was affected by pesticide formulation, turfgrass cultural practices, and environmental conditions. Within a day of application dislodgeable residues were usually less than 10% of the applied rate. One to 3 days after application three percent of the applied rate was detectable and less than one percent after seven days. Liquid spray results in more potential exposure than granular applications. They also reported that the few studies that have looked at spray drift and volatilization show exposure to be minimal.

A unique study by Leonas and Yu (1992) identified the deposition patterns that spraying a liquid would produce on clothing worn by homeowners using

typical lawn and garden equipment. Results from this study showed that the deposition pattern and level of exposure were dependent on the type of equipment used for application. A low volume backpack sprayer and Dial-A-Garden® sprayer produced significantly higher levels of deposition than a Sprayette®, ordinary backpack sprayer, rotary/broadcast spreader, and drop spreader. The two dry spreaders resulted in the least exposure with little exposure above the knee. For all types of equipment, the areas of greatest deposition were the feet, lower and upper legs, and the hands. Deposition was greatest on the front vs the back of the garment.

Protective clothing. For both homeowners and professional applicators a major source of protection from pesticide exposure has been identified as protective clothing. Studies indicate clothing provides a physical barrier that reduces pesticide penetration (Branson, Ayres, & Henry, 1986; Laughlin, Easley, Gold, & Hill, 1986; Raheel, 1987, 1988; Staiff, Davis, & Stevens, 1982) and can reduce dermal absorption (Davies et al., 1982; Nigg, Stamper, & Queen, 1986).

Slocum, Nolan, Shern, Gay, and Turgeon (1988) developed and tested protective clothing for lawn care technicians. Three volunteer company employees worn the experimental clothing while performing their regular duties. Three employees worn the regular company uniform. Results of biomonitoring showed that the protective clothing significantly reduced the amount of pesticide absorbed relative to the regular uniform.

Concern for workers' health and research on the effectiveness of protective clothing lead the EPA to promulgate the 1992 Worker Protection Standard.

Under this standard agricultural workers and pesticide handlers must wear personal protective equipment (PPE) as specified on the pesticide label. PPE is defined as coveralls, respirators, protective eyewear, and chemical-resistant suits, gloves, footwear, aprons and headgear. Long and short-sleeved shirts, long and short pants, shoes and socks and other items of regular work clothing are not defined as PPE but could be worn in the absence of specific label directions. Thus depending on the product used and method of application, a variety of protective clothing and equipment may be required.

Heightened public concern about chemicals in the environment, reports of illness from long-term, low-level exposure to pesticides, Federal regulatory trends, and the litigious nature of society encourage companies to make the work environment as safe as possible, and to establish a record of concern for worker health. Yet while several types and styles of protective garments are now available commercially, the use of protective clothing and equipment for applicators has not been widespread in the lawn care industry.

Company attitudes toward use of protective clothing and equipment may be rooted in concerns about the image and nonverbal messages protective clothing communicates. Trade literature shows an awareness of the role of work clothing in nonverbal communication, particularly with respect to promotional and public relation messages. Applicators' uniforms are discussed as a "billboard" that "shows who you are and tells customers about your services" and "reinforces your company's - and your - professional identity" (Uniforms can showcase...,

1990). It may be that company officials believe protective clothing presents a negative image.

If this is the case, lawn care companies face a difficult dilemma, eg. how to provide employees with clothing and equipment that offer more protection without increasing public perception of health and environmental risk associated with their products or services. The company is challenged to choose uniforms that will provide improved protection without generating concern for product safety among those who see employees at work.

While there is an extensive body of nonverbal communication research, there is no published research that will assist companies in evaluating nonverbal messages of safety or danger associated with work uniforms. Uniforms of a number of groups have been studied to determine the meaning they have to the public or to clients. These groups include police (Gundersen, 1987; Joseph, 1986; Singer & Alan, 1985), nurses (Brown & Goldsten, 1968; Hawkins, Claghorn, & Zentay, 1966), and religious orders (Reidy, 1967). Professional clothing of counselors (Amira & Abramowitz, 1979; Roll & Roll, 1984), teachers (Chowdhary, 1988), and business women (Dillon, 1980; Forsythe, Drake, & Cox, 1984; Scherbaum & Shepherd, 1987) have also been studied. This body of literature provides information about the visual cues that suggest authority and power, approachability and interaction, credibility and competence, and other personal qualities. Studies indicate that there may be one salient piece of a uniform that viewers use as a cue, for example the policeman's hat (Volpp & Lennon, 1988) or a nurses' cap (Lafferty & Dickey, 1980).

There is also some basis for reasoning that perceptions of an individual's clothing may be the basis for an extended inference to the group or city.

Workman and Johnson (1989) found that the manner in which cabdrivers dressed influenced visitors perceptions of the city. Nicely dressed drivers elicited a more favorable impression.

No studies of perceptions of lawn care uniforms were located in the published literature. One trade article suggests that negative perceptions of protective clothing exist. During the presentation of findings from a series of consumer focus groups dealing with lawn care, Culpepper said, "Unfortunately, people see protective clothing and equate that with danger" (Study determines..., 1994). It may be that conventional wisdom in the industry promotes avoidance of anything that looks protective.

Two studies were located that specifically addressed the homeowner's use of protective clothing. Rucker, Grieshop, Peters, Hansen, & Frankie (1988) collected data from 415 California residents via a mail questionnaire. Close to one half of the respondents said they wore some type of protective equipment and/or clothing when applying pesticides. The most frequently listed item was gloves, mentioned by about 24% of the group. Very few other items of protective clothing were mentioned as being worn. When asked what they did with the clothing after wearing it to apply pesticides, 22.7% said "nothing" and 74% said they "washed it". Reasons given for not wearing protective gear included the expense and possible social ridicule involved in use of these kinds of items,

perceived protection by the government, and belief that there was little danger associated with using such low dosages of the products.

Harris, Solomon, & Stephenson (1992) studied the effect of protective clothing with regard to exposure to the herbicide 2,4-D with a group of home gardeners (n = 22) and bystanders (n = 22). Bystanders were individuals living within the household who did not apply the herbicide. Half the applicators wore protective garb which included clean coveralls, gloves, and rubber boots. The non-protective group wore clothing of their own choice (typically long pants, running shoes, and short sleeved shirts). Analysis of urine collected from homeowners for 96 hours following applications found the highest exposures occurred in the nonprotected group and were consistently associated with spills. No residues of 2,4-D were detected in bystanders' urine samples. Residues of 2,4-D were detected in five of the 76 air samples taken during the home applications. Recommendations were that homeowners can reduce exposure by using rubber gloves, overalls, and rubber boots in all phases of the application process.

A second study looking at 2,4-D exposure was conducted with 10 volunteers who were immediately exposed after turf spraying and a second group of 10 volunteers who were exposed 24 hours after application (Harris & Solomon, 1992). Each group of 10 volunteers were divided into two groups: one wore long pants, t-shirts, socks and shoes and the second wore shorts, t-shirts and went barefooted. Immediately after exposure plots were sprayed the first group of volunteers undertook a 60 minute exposure session, walking and sitting on the

grass for timed intervals. At the end of the session volunteers washed their hands and ate a picnic lunch but did not shower or otherwise decontaminate their skin for 6 hours. Twenty four hours later a the second group of volunteers began their 60 minute exposure session on the same plot. Volunteers alternated walking and sitting or lying for 5 minute periods throughout the 60 minutes. Air samples and urine collections were used to measure the exposure to the herbicide 2,4-D. Three people who wore shorts and were barefooted and contacted the turf immediately after the 2,4-D application had detectable residues in their 4-day urine samples. Dislodgeable residues of 2,4-D taken during the exposure sessions showed a rapid decline from 1 hour following application (8%) to 24 hours following application (1%). The authors recommended that people can reduce exposure to non-detectable chemical levels by staying off treated turf for 24 hours or until after rainfall or irrigation.

Summary

Grass is a natural occurring organism that grows in the soil and requires sunlight, water, and nutrients. Grass has been modified and changed to create an artifact: the ideal American lawn which is a uniform, weed free, green, thick, stand of grass cut to a prescribed height. These lawns require inputs of water, chemicals, special kinds of equipment, and human energy and time to maintain them. The existence of the ideal American lawn is supported by multibillion dollar industries that supply products necessary to the care of the lawn: seeds, equipment, fertilizers, pesticides, and protective clothing/equipment. A service industry has evolved that is dedicated to caring for the lawn. Positive outputs

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from the lawn grass include oxygen from photosynthesis, erosion control, and cooling. Negative outputs include grass clippings in land fills, pollution from gasoline engines, empty pesticide containers, used oil, real and potential groundwater contamination, and unknown health and environmental effects from the chemicals used on the lawn.

Human Experience and the Total Environment

The study of relationships between the natural environment (nature) and people's psychological and biological behaviors is truly multidisciplinary. Investigators in agriculture, anthropology, biology, forestry, geography, health, history, interior design, landscape architecture, natural-resource management, psychology, recreation, sociology, and urban planning have all contributed to the growing body of literature.

Environmental Aesthetics

Sadler and Carlson (1982) call the field of study which explores humans' relationships with nature, "environmental aesthetics". They write

We all interpret, in one way or another, the positive and negative features of the physical settings we occupy, pass through and visit. The aesthetic effect of places and landscapes is an important dimension of this pervasive sensory ecology. A sense of beauty or even harmony enhances our lives; a sense of blight or discordance correspondingly diminishes them. It is almost impossible to prove scientifically these kinds of effects on well-being, but the general principle is widely accepted (p. 1).

They point out that all environments, natural or man-made, evoke feelings and have aesthetic dimensions. They view aesthetic quality as an amalgam of physical properties and social values. Therefore, environmental aesthetics includes

"storied meaning as well as the structured appearance of place and landscape"
(p. 5).

Included in the field of environmental aesthetics is environmental psychology which focuses on aesthetic response and covers the scenic preferences and visual assessments of the lay public (Sadler and Carlson, 1982). Since the environment is experienced through all human senses, research should examine environmental affect in relation to all the senses. But the visual experience is typically the most important to humans so many studies have relied upon visual perceptions and used slides or photographs as the basis for the outcome ratings.

Kaplan (1978) described the drive to seek out nature as the "green experience". This is not necessarily dependent upon the color green. She wrote

The green experience then, refers to the encounter with natural environment, and especially the unspectacular, everyday natural environment that comes in a variety of colors and guises...The natural environment matters to people...not only in the infrequent escape to far-flung poster places, but in its potential availability and accessibility as a renewable and renewing resource (p. 186).

Miller (1988) suggests that families move to the suburbs in search of nature.

Appendix D reviews literature related to environmental aesthetics. Findings from these studies suggest the "green experience" is strongly preferred among humans. Nature may be an intrinsic need, which is sought out for itself and not acquired to be exchanged for something else. Human preference for nature may be innate. But preferences appear to change with age and experience and there are differences between males and females.

Among urban settings those containing nature are most preferred.

Unmanaged nature is relatively less preferred than landscaped areas. Trees are a highly-valued component of urban nature. Satisfaction with one's immediate environment is increased when trees, grass, shrubs, and flowers are present. The expression of preferences appear to differ with social class. Natural environments, as well as sustaining life, appear to provide inner peace and facilitate improved mental health and recovery from physical illness.

Meaning

Nature is invested with rich and powerful meanings, symbols, values, and beliefs. The meaning of nature is shaped and formed by the ecological conditions under which people live (i.e., rain forests, mountains, plains, or deserts), the historical context of the particular culture, the cultural and social structures, and the values and beliefs systems of the culture.

Brown (1972) argues that to know the world in any significant sense is first and foremost to understand it in terms of what it means. Rapoport (1982) focuses on meaning as central to the various levels of nonverbal communications from the environment to people. Environmental elements organized in space ranging from walls to people, become "indicators of social position, ways of establishing group or social identity, and ways of defining situations within a specific culture which in turn lead to expected behaviors in the settings (p. 181-182). Blumer (1969) suggests that meanings are built up by people "through an interpretation of objects, situations, or the actions of others" in a social context (p. 84).

Meaning of the Lawn

Meinig (1979) writes, "Every mature nation has its symbolic landscapes. They are part of the iconography of nationhood, part of the shared set of ideas and memories and feelings which bind a people together" (p. 164). Houses and their surrounding yards are important elements in these landscapes.

Houses and the grounds that surround them are "warehouses of personal experience" (Lawrence, 1985, p. 118). Houses are part of the language of gestures that individuals use to communicate with each other and to control the amount and type of information that others receive (Sadalla, Vershure, & Burroughs, 1987). Altman and Gauvain (1981) found that in many cultures, houses are situated in accordance with environmental, climatic, cosmological, and religious influences. The siting of American houses does not appear to be influenced by any of these factors. They state:

American middle-class suburban tract homes are usually located in the middle or rear part of a lot, with some separation, in the form of a lawn, between the home and a public street.... Landscaping the front yard is a traditional American vehicle for achieving individuality and uniqueness; enormous amounts of time, energy, and money are invested in the cultivation of grass and shrubbery in a never-ending cycle of fertilizing, watering, and cutting...The fronts of American homes and yards not only express identity, but they also depict the bonds of a family with the community (p. 293).

The American residential lawn is much more than grass. It is viewed by society as a reflection of the attitudes and values of individuals and families making a home together. Cooper (1974) describes one's home as a symbol of self and self-identity. The exterior of the home is seen as a symbol of self which is presented to the outside world. Franck (1974) describes how new homeowners

begin to consider their new residence their home only after they have personalized it with their own belongings.

The lawn and yard reflect the personal tastes of the homeowner. A recent survey found that 33.5% of new homeowners enlist the service of landscape or lawn care companies within the first six months of moving into their new home (New homeowners...1991). Gauvain, Altman, and Fahim (1983) found that expressions of individuality were tempered with the awareness that the front yard also needed to conform to the neighborhood standards of taste and sociability.

Ramsey (1938) wrote in her book, Landscaping the Home Grounds

Naturally, we want our home grounds to appear to the best advantage, for the passer-by judges our homes by the way the grounds are planted and cared for. Few see the interior of our homes but every passer-by sees the exterior" (p. 17). She echoes others in her directive, A man's home may be his castle, but his front yard belongs to the public...The universal practice of establishing building lines and setting the house back from the street has created the typical American front yard. Custom has prescribed the leaving of the front yard open, providing a view of the house and grounds...The homeowner should always keep in mind that it is his duty to do everything in his power to make his street more attractive (p. 54-55).

The front yard is viewed as the more formal "parlor", while the backyard is the place for family activities, the "living room".

The use of the house and its surrounding grounds as a means of self-expression is probably most characteristic of middle- and upper-middle-income families. Becker (1977) writes

It is primarily for the middle class, where it is accepted as a given that the house is a safe place, that more attention is paid to the house as a means of self-expression and self-realization. People concerned about the cold, plumbing, and rats do not have the luxury of worrying about the image of their home (p. 18).

The meaning and symbolism evoked by lawns is very powerful. Individual homeowners who have attempted to plant wildflowers or encourage a "natural" lawn have meet resistance and in some cases lawsuits (Lowen, 1991; Unmowed lawn...1991). Exceptions do exist. The city of Madison, WI has incorporated "natural" lawns into its' city regulations. Subject to review and approval, a homeowner can cultivate natural growth beyond the 8 inch maximum height normally enforced by the city (Russell, 1979).

But as Michael Pollan (1991) writes

To stand in the way of such a powerful current is not easily done. Since we have traditionally eschewed fences and hedges in America, the suburban vista can be marred by the negligence - or dissent - of a single property owner. This is why lawn care is regarded as such an important civic responsibility in the suburbs, and why, as I learned as a child, the majority will not tolerate the laggard...That subtle yet unmistakable frontier, where the crew-cut lawn rubs up against a shaggy one, is a scar on the face of suburbia,..an intolerable hint of trouble in paradise (p. 55-56).

Values, Beliefs, and Attitudes

According to Karl Mannheim (1936) the ideas, values, and attitudes of a given group are embedded in the social conditions under which the group lives.

Persons, bound together into groups

strive in accordance with groups to which they belong to change the surrounding world of nature and society or attempt to maintain it in a given condition. It is the direction of this will to change or maintain, of this collective activity, which produces the guiding thread for the emergence of their problems, their concepts, and their forms of thought (p. 78).

This suggests that people are socialized and, to some degree, pressured to act or behave in accordance with the attitudes and values agreed upon by the social groups to which they belong. The expression of these values, beliefs, and

attitudes through action, or behavior, is an expression of the ideology of the group.

The relationship of humans to nature is complex and paradoxical. In the case of something so broad and omnipresent as "nature" or "natural environment" the values, beliefs, and attitudes associated with it are often taken for granted. Few people are aware of how they are influenced by cultural and physical conditions from the far past that are very different from today.

Values refer to preferred end states (i.e., freedom) and preferred ways of doing thing (i.e., being honest) (Rokeach, 1985). Values represent a link among a person's emotions, motivations, and behavior. Attitudes and behavior are sometimes thought to be caused by values.

Beliefs are the information that a person has about a person, object, or issue. They may be factual or based on personal opinion. Olsen, Lodwick, and Dunlap (1992) argue that when beliefs change, values change; beliefs precede values within mental constructs. People may adopt new values that contradict their current beliefs and go to great efforts to justify their new values in terms of old beliefs. They write

Because beliefs logically precede values and are taken for granted as expressions of reality that are beyond debate, they would appear to be the most fundamental components of cultures...They constitute the foundation that supports all other shared cultural ideas, including values, goals, norms, customs, and rules (p. 180).

They emphasize the need to study belief systems in order to understand public policies and governmental programs.

Prown (1993) proposes that there are two levels of beliefs. The first is comprised of surface beliefs, beliefs of which people are aware and which they express in what they say, do, and make. The second level of belief is hidden.

He states that

a culture's most fundamental beliefs are often so widely understood, so generally shared and accepted, that they never need to be stated...Indeed, there may be beliefs of which the culture itself is not aware, and some of them may be so hard to face that they are repressed (p. 3).

Attitudes and beliefs are closely intertwined and often very difficult to separate. Attitudes are lasting, general evaluations of people, objects, or issues (Petty & Cacioppo, 1985). They have traditionally been defined in terms of cognitive, affective and conative facets (McGuire 1969, 1985, 1989). However, researchers have rarely operationalized attitudes in terms of this definition. As a result there has been an attempt to define attitudes formally to conform to typical research usage. The field of social psychology currently defines attitudes as "an evaluative response toward an object" (Tesser & Shaffer, 1990, p. 512). The conative domain refers to the actions or behavioral tendencies of an individual regarding a person, object, or issue (Borden & Schettino, 1979).

Environmental Attitudes

A basic question in attitudinal studies is the extent to which attitudes are related to actual behavior. Chaiken & Stangor, in their 1987 review of attitudinal research, suggest there are two general conclusions relative to the extent to which attitudes are related to actual behavior. The first is that the specificity of attitudes and behavior must be equated before the relation between

the two will be manifest (Ajzen & Fishbein, 1980). This means general attitudes (in terms of the action, target, context, and time) correlate with general behavioral tendencies, whereas specific attitudes correlate with specific behaviors.

The second conclusion of attitude research is that attitudes influence behavior to the extent to which they are activated or made accessible (Fazio, 1986). When an individual's attitudes are primed and thus processed in a more controlled and intentional fashion, the relation between attitudes and behavior is enhanced.

According to Shetzer and his colleagues (1991) the implications of these findings for environmental attitude research are that (a) attitudes will predict environmental behaviors when both are measured at similar levels of specificity and (b) attitudes that are made salient to individuals are more closely related to behavior. For a review of literature related to environmental attitudes see Appendix E.

Given the nature of most environmental threats, individuals are responding within a social context. Therefore, environmental concerns are socially embedded. Connerly (1986) and de Haven-Smith (1988) found that personal determinants of attitudes seem to be related via belief systems to the social categories the individual occupies and the effects of the resource or hazard in question on group and individual interests. Normative influences can exert a strong force over behavior. Social norms may prevent people from acting the way they would like to based upon their attitude or encourage them to act in a way that contradicts an attitude. For example, it is socially unacceptable to

litter. People may respond positively to a question about littering because littering is viewed as socially irresponsible. In actual practice they may well be "litterbugs".

Lawn Care Attitudes

Two studies are reviewed that have looked at attitudes related to the lawn. Other research was located but were in-house studies done by private companies and were not available for public review. A recent Gallup poll added some additional information about lawn attitudes.

The DowElanco lawn study. In 1993, DowElanco Specialty Products, Indianapolis, IN commissioned a qualitative study to explore benefits and perceptions of homeowner lawn care (DowElanco, 1993). A total of six in-depth focus group interviews were conducted around the United States. The two sessions in both Columbus, OH and Atlanta, GA were made up of (a) homeowners using a lawn service (1st group) and (b) do-it-yourself homeowners (2nd group). The session in Philadelphia, PA included a mix of renters and owners of units without a lawn. The Salt Lake City, UT group was made up of homeowners who only mowed and/or added fertilizer. The study participants included 29 males and 29 females ranging in age from 30-60 years with incomes over \$35,000 who were the primary lawn care decision maker. DowElanco was not identified as the sponsor of the study.

The focus group participant had been identified as the primary lawn care decision maker but when asked who did the actual yard work, it was reported that it was the household member that had the most time available. The gender

of that person was not identified.

Two broad categories of lawn use were identified. The first was labeled the **aesthetic/value category**. Lawns were viewed as a means of increasing the value of the home, contributing to the enhancement of the neighborhood, providing the owner visual pleasure from the surroundings, and a place to watch nature - the change of seasons, things growing. Philadelphia respondents without lawns believed that people with lawns invested time and money in them because a lawn reflected on the homeowner.

The second use category was for physical activities within a private setting. The lawn provided a safe place for children to play, a productive way to keep children less involved with TV and Nintendo, a place for socializing with and entertaining of neighbors and friends, a playing field for sports, an exercise area, and a place for pets to run around.

Homeowners were reported as being very verbal about expressing strong positive feelings regarding their lawns. Emotional benefits derived from lawns included: having one's own space in which to do what one wanted, a sense of control over the immediate surroundings, a place where one could spend quality time with family, a place where one could work outside, a means to "get away" from daily demands and pressures, and a place that provided self-satisfaction, a sense of accomplishment and relaxation. Some respondents expressed the belief that a lawn reflected on them personally.

Environmental benefits of lawns included erosion prevention, oxygen generation, and cooling. When probed on this area, participants acknowledged

that environmental benefits were not "top-of-mind" responses. They were secondary to use and emotional benefits.

Respondents did express some negatives about their lawns. Lawns were characterized as expensive to maintain, time consuming, and a lot of work. However the majority of the respondents felt lawns were worth it. The focus groups expressed the opinion that the standard for an acceptable lawn was high, it should be a "clean, well-manicured, pest-free, lush lawn."

They believed that this desirable condition was most likely to be achieved with the use of chemicals. Respondents expressed uncertainty and unease about the use of chemicals but generally speaking, for this group of homeowners, moderation and proper usage were viewed as the key to safety. The opinion was also expressed that if these products were approved and available for general use they must be safe. At the same time, participants acknowledged that if alternatives to chemicals were available and as effective, they would use them. County extension agents and universities were believed to be the most credible sources for information about lawn chemicals.

The focus group moderator emphasized in the report that the entire issue of lawns was one of high emotion. The written report could not capture the intensity of the comments. Lawns are very important to homeowners.

The PLCAA study. The Professional Lawn Care Association of America (PLCAA) in Marietta, GA commissioned a focus group study during the summer of 1993 to explore homeowner attitudes and practices regarding lawn care and the impact of signs used to notify homeowners of service applications. Three

focus groups were conducted with homeowners in Baltimore, MD and three focus groups with homeowners in Boston, MA. In each city one focus group was made up of homeowners who used a professional lawn care service and two groups with do-it-yourself lawn care homeowners. Twenty seven individuals participated in the Boston groups and twenty six in the Baltimore groups. Each group was made up of a mix of men and women, parents of children under the age of ten, pet owners, and owners of homes with different sized lawns.

Findings from the six focus groups include:

1. The majority of homeowners were interested in the appearance of their lawn. Homeowner interest ranged from moderate to self-described "fanatical". Very few participants were content with just a mowed lawn. There were substantial variations in what people were willing to do and spend in order to achieve the desired appearance. Health concerns were mentioned along with discussion about the cost of lawn care service.

2. Word of mouth appeared to be the single most influential factor in people's selection of a lawn care service.

3. Participants expressed little interest or desire for information about the products used in lawn care.

4. General concern about the safety of lawn care chemicals was greater among homeowners who did not use professional services. Chemicals were often cited a reason for not using a service or for discontinuing a service previously used. Most concerns focused on liquid chemicals and sprays. The general view was that granular products may be safer.

5. Health risks to children and pets and the goal of achieving an attractive lawn were mentioned more often as concerns than concern about risk to the environment.

6. Awareness and understanding about various terms such as integrated pest management, organic pesticides, and other words were very limited. Many

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people said organic pesticides are better but few thought they were worth payment of a higher price.

7. Nearly half of the lawn care customer respondents believed that professional application of pesticides is safer ($n = 9$ of 19 respondents). Almost no noncustomer believed this ($n = 2$ of 37 respondents).

9. Demographic variables such as age and gender did not seem to affect response very much.

1994 Gallup Poll. Respondents to a recent Gallup Poll ($n = 1665$) rated the benefits of a property which had a well-maintained lawn and landscaping (PLCAA, 1994). Results showed that the benefit chosen by 45% of the respondents was that of helping to beautify the neighborhood. Other benefits included providing a place of beauty and relaxation for the family and friends (chosen by 38.6%), enhancing property values (chosen by 38.6%), reflecting positively on it's owners (38.4%), providing safe, high quality play area for children (chosen by 26.7%), and an exercise area for pets (chosen by 12.7%). Environmental benefits such as purifying and cooling the air and filtering water were near the end of the list of benefits. The poll also indicated that people living in rural areas tended to rate the environmental benefits of a lawn higher than their suburban or urban neighbors.

Summary

All cultures have invested nature with rich and powerful meanings, symbols, values, and beliefs. It appears that humans have a deep, perhaps innate, intrinsic need for nature. In American culture, the lawn appears to play a role in meeting this need. Houses and their surrounding landscapes are important

symbols with meaning and value a part of them. Americans' front yards provide a visible picture that represents the family's life and values and make a statement about one's place in the community. Neighborhood norms and society's messages about the lawn are two psychosocial/intangible variables that are part of the immediate environment. Norms and messages are aspects of the human situation that are influenced by beliefs, attitudes, and values.

Studies that have looked at lawn care attitudes and activities report that American homeowners perceive the lawn as a source of pleasure, beauty, and economic benefit. Homeowners experience both mental and physical reactions to the lawn (biopsychic state). Both real life conditions and perceptions are important influences on the biopsychic state.

A growing body of research suggests that American beliefs and attitudes about human interaction with the environment are changing to a "new environmental paradigm" (Appendix E). This paradigm suggests that humans were not created to rule over nature but must live in harmony with the natural world and act with prudence and care in an attempt to prevent permanent damage to the natural ecosystem. Yet for American homeowners, the use of lawn chemicals is deemed necessary and appropriate.

The Evolution of the Ideal American Lawn

American Attitudes Toward Nature

White (1967) argues that North American attitudes toward nature have been dominated by a Christian, white, Western European perspective. Both technology and modern science are distinctly Western in origin and can be traced

to the Judeo-Christian traditions that have shaped the growth of Western civilization. In the Judeo-Christian view humans are special, made in God's image, and set apart from the rest of creation.

And God blessed them and God said to them "Be fruitful and multiply and fill the Earth and subdue it; and have dominion over the fish of the sea and the birds of the air and over every living thing that moves upon the Earth." Genesis 1:28.

The ancient Hebrew social organization was tribal, seminomadic, and patriarchal. Their primary allegiance was to the group rather than to the land or any particular place (Crownfield, 1973). They moved from place to place, raising their sheep, with minimal regard for the long term effects that their passage had made upon the environment. Crownfield argues that this migratory approach to life has permeated thinking about the relationship between nature and humans and it has had a profound impact on Western attitudes toward both nature and our concept of time. He writes, "The present is to be negated, left behind, abandoned with all its problems and defects...the problems of the present are going to be resolved in a dramatic, interventionist future" (p. 59).

Many people today believe that technology or new energy resources will ultimately solve our ecological problems (Ashmore & Tumia, 1975; Borden, 1984/85). Burke (1985) has observed that this view of life inevitably leads to a technology that has as its goal, not stability, but constant change. This view of humanity's relationship with nature (embodied in the Dominant Social Paradigm) makes it incredibly difficult to get people to change environmentally destructive

behavior. They strongly believe that a miraculous divine force will intervene on their behalf and set things right (McAndrew, 1993).

As a result of this orientation, early American settlers worked to bend nature to human will rather than to adapt their lifestyles to the natural surroundings. Tuan (1974) writes that to American settlers, the wilderness was threatening - a place to be "reclaimed and redeemed" (p. 63). The majestic eastern forests were quickly felled to make way for pastures, cattle, fields, and crops. Anglo-American settlers attempted to replicate the more humid eastern environment in the Arizona desert (Saarinen, 1988). In the early 20th century, those who moved to the dry climate in order to alleviate their allergies defeated this purpose by planting and growing the same plants and shrubs to which they were allergic.

This linear, noncyclical view of existence contrasts with many nonWestern traditions, such as those developed in India (Zimmer, 1951) and by North American Indians (Waters, 1963). For North American Indians harmony exists in the world only when the sources of power - humans, animals, places, and spirits - work together (Tuan, 1974). But even American Indians actively altered the environment to suit their needs (Williams, 1993).

Smith (1993) disputes these viewpoints. He argues that while humankind has made mistakes, "attacking our biblical world view to solve environmental problems may well be like the hermit who burned his house down to kill a rat" (p. 15). Smith credits Ralph Waldo Emerson, John Muir, Henry David Thoreau, Lynn White, Jr., and other transcendentalists with founding a "nature religion."

Nature theology sees nature as God, the earth as sacred and endowed with feelings, rejects progress and science, and views human management of nature as a desecration of the sacred.

Smith believes that it is very easy to confuse an appreciation of nature with a worship of nature. He emphasizes that while the Judeo-Christian ethic gives humans the right to use the earth and its creatures for food, clothing, and shelter it also gives humans the responsibility of caring for the earth. He believes that humans can learn from their mistakes and that making use of new knowledge is better than abandoning all attempts to manage nature.

A Brief History

The emergence of the ideal American lawn can be traced to the pleasure gardens of medieval Europe. The climatic conditions of England made the growing of grass very easy and English settlers brought both the seed and the ideal of grass which has grown into today's contemporary lawn. Thomas Jefferson's belief that every man should own property has found ultimate expression in America suburbia. The growth of the suburbs gained momentum after the Civil War. Americans left the dirty, crowded, disease ridden cities created by the Industrial Revolution in order to live closer to nature in rural surroundings. The real and perceived benefits of living in the country were readily embraced by the populace. With the advent of the automobile, American suburbia became the dominant landscape form and the single family home the dwelling of choice.

Zoning laws and 25 foot setbacks from the street became standard in large cities in the late 1800s. These setbacks provided areas that could be landscaped with grass, flowers, trees, and shrubs. By the turn of the century restrictions and covenants were being written into deeds, mandating architectural and landscaping controls.

The lawn became both a barrier and unifier. "A verdant moat separating the household from the threats and temptations of the city. It serves as a transition from the public street to the very private house" (Jackson, 1985). And according to Olmsted also "unified the whole neighborhood, giving a sense of completeness, greenness, and community" (Kelly, 1981).

As the 20th century advanced other societal changes strengthened the importance of the ideal American lawn. The game of golf and the development of grasses for the golf course set a standard for the homeowner to emulate. A population that was living longer with better health and greater discretionary income allowed people more time to work in their yards. Americans began traveling more and visited areas where grass looked better than their own at home. The invention of color television brought pictures of lush, green lawns from other places into the living room.

Men have generally been the person in charge of the lawn and women have taken care of the garden and flowers. The changing role of women decreased the time spent in the family garden and often these unused plots were planted in grass. The increasing pace of modern life resulted in less time to be devoted to the maintenance and care of the lawn. The emergence of the lawn care service

industry paralleled these developments. (See Appendix F for a more complete review of the history of the lawn.)

Summary

A critical component of the biohistorical approach is understanding the historical context of a phenomena. Judeo-Christian teachings have stressed the idea that humans are created in God's image and placed on Earth to rule over nature. This ethic has resulted in a great deal of unintentional destruction of the natural ecosystem.

The evolution of the ideal American lawn has been strongly influenced by the British. The pollution that accompanied the Industrial Revolution hastened the flight of families from the cities. Technological developments that resulted in the automobile, lawn mower, and synthetic chemicals have made is easier to maintain a lawn. Societal changes in terms of better health and greater longevity and changes in family roles and recreation activities have contributed to the growth of the lawn. The emergence of the lawn care service industry provided Americans with an easier way of developing and maintaining a high quality lawn. The use of chemicals, fertilizers and pesticides, on residential lawns continues.

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CHAPTER III

METHODOLOGY

This chapter describes the combination of qualitative and quantitative methods used to explore the research questions. The sampling design, data collection procedures, instrument development, and pretesting are discussed. Development of qualitative coding, analysis procedures, and coding schemes used to handle the data are discussed.

Sampling Design

Twenty suburban couples who owned homes participated in the study. Ten of the couples were from Michigan and ten were from Georgia. Within each group, half the couples currently used a chemical lawn care service and half did not use a service.

Homeowners were recruited from established, middle and upper-middle class, residential subdivisions. "Established" was defined as a subdivision where the majority of homes range in age from 15-25 years. Subdivisions were also matched, as closely as possible, by the value of the homes. Valuations were based on the current average value of homes as estimated by local real estate salespeople. Estimated home values ranged from \$100,000 to \$380,000.

Subdivision directories were used as a source of names for recruiting participants by telephone. Names were chosen in a systematic random pattern. Homeowners were called in the late afternoon and evening. A brief message was left on any answering machines that were encountered. If no contact had been made after two calls no further attempts were made to contact that particular homeowner. A telephone screener was used. (Appendix A-I) Reminder calls were made to respondents the day before the scheduled interview.

Data Collection Procedures

Husbands and wives were personally interviewed in their homes. After giving informed consent (Appendix A-II) and being assured of the confidentiality of the interview, husbands and wives were interviewed separately by professional, experienced interviewers. An attempt was made to interview the couple during the same time frame but this was not possible for six of the twenty couples. If individuals were interviewed at separate times, the first respondent was asked to refrain from talking about the interview to the other spouse. Interview lengths ranged from one hour to three and a half hours. Interviews in Georgia were completed in June, 1994 and Michigan interviews were completed in July, 1994.

Interviews were taped recorded. The tape was turned off for interruptions such as the phone ringing. The interviewer took notes during the interview.

The sequence of the questions was the same for each interview. The first third of the interview consisted of the respondents describing their lawns, activities and experiences with the lawn, and memories of the lawn. The picture sort was presented next, generally about twenty minutes after the interview had

begun. The length of time that respondents took to complete the sort varied widely from person to person. The shortest sort took approximately 20 minutes; the longest sort took over an hour. After the picture sort the Environmental scale and Health scale were presented and the respondent was encouraged to talk about their environmental and health concerns.

This researcher was involved in all aspects of this study: developing and pretesting the questionnaire, analyzing field procedures used during pretesting, conducting interviews, transcribing tapes, entering data into the computer program, and actively participating in all discussion related to the research project. The second interviewer was briefed on the project before beginning the recruiting and interviewing.

Instrument Development

Interview Guide

A key strength of qualitative research is it's ability to develop a deep, full understanding of a phenomenon. Through in-depth one-on-one interviews the investigator hoped to discover what the lawn meant to the respondents, what activities took place on the lawn, what kinds of maintenance practices were involved with the lawn, and the environmental and health concerns related to lawn care chemical use.

An interview guide was developed. (Appendix A-III) Questions 1, 2, 3, 4, 5, and 6 were based upon the review of literature and were designed to act as departure points for discussion.

As a stimulus to discussion participants were asked to respond to short Likert scales: the Health Scale, Q. 9, and the Environmental scale, Q. 7.

(Appendix A-III)

Existing Instruments

Health scale. The Health scale is comprised of four questions pertaining to the likelihood and seriousness of exposure to pesticides. This has been used in previous research as part of a North Central Regional Project in which the researcher participated (Rucker et al, 1988). The items were found to have good reliability and to correlate well with other variables. The goal of using these four items was to promote discussion about health issues related to using lawn care chemicals.

NEP scale. As environmental awareness began to emerge in the 60s and 70s, researchers in the field began looking at ways to measure overall public concern for environmental quality rather than focusing on specific environmental attitudes toward individual problems. The New Environmental Paradigm (NEP) scale was originated in 1978 by Dunlap and Van Liere who believed that a "new environmental paradigm" was emerging in society. The NEP beliefs are associated with anti-anthropocentric views which were challenging the older view of anthropocentric, antiecological order. Subsequent studies have used the NEP scale and are reviewed for information regarding the validity and reliability of the scale in Appendix G.

The decision to use the NEP scale as part of this study was based upon two factors: (a) it has been used extensively and appears to be a parsimonious

instrument for measuring shifts in environmental concern and (b) there have been several variations of the scale used. The purpose for using the scale was to provide a change of pace in the interview and a departure point for discussion about environmental issues. Encouraging individuals to talk about the statements would provide an opportunity to gain an indepth understanding of how the concepts were defined and interpreted by the respondents.

The original NEP (12 questions) was modified for use in this study by the addition of three questions related to lawn care chemicals. The primary use of the modified scale was to stimulate discussion about environmental issues related to lawns.

Clothing/Protective Equipment Pictures

Visual stimuli are often used to enhance clothing research projects.

Photographs, slides, video tapes, pen and ink sketches, and drawings (colored or black and white) have all been used. Few comparative studies have evaluated the effectiveness of different types of visual stimuli. When clothing is the element of interest in a study the stimulus (clothing), model, and setting are all important.

Combinations of clothing and equipment used as stimuli in this study were based upon the EPA's Worker Protection Standards, a brief survey of lawn care industry advertisements, and observations of people mowing their lawns. EPA recommended Personal Protective Equipment (PPE) for handling pesticides may include gloves, boots, coveralls, hoods, respirators, and protective eyewear, depending on the product. New rules allow safety glasses with sideshields and

browguards to be used as a substitute for safety glasses or faceshields (U.S. EPA, 1993).

The outfits represented an array of "protectiveness" ranging from minimal (tennis shoes, shorts, short sleeved shirt) to total (body covered from head to toe with various kinds of protective gear added). Twelve basic clothing combinations were designed. Within each combination various items of protective gear were added. (Appendix A-IV) The intent of this exercise was to explore respondents' reactions to various kinds of outfits and pieces of equipment that might be perceived of as "protective". The more extreme outfits would not be appropriate in most cases for either homeowners or lawn technicians to wear because of potential heat stress. The choice of clothing and protective equipment should be directed by the product label, the toxicity of the product, the method of application, and whether application is taking place outdoors or inside.

Sixty two clothing/equipment combinations were photographed. Color photographs were chosen as the stimuli in order to present a realistic representation of the clothing. Color was the only difference between some of the outfits.

A young, Caucasian male was chosen to pose for the pictures because the overwhelming majority of lawn care technicians are white males in their 20s and 30s. The best stimulus for this specific project was determined to be a full, head to toe frontal pose. While some studies have eliminated the head in their pictures in order to control for facial expressions, this was not possible in this study. Protective face and head gear are an important part of the total outfit.

The model posed with a hand push spreader, similar to what might be used in lawn chemical applications at home. A concentrated attempt was made to standardize the pose, body position, and facial expressions for each picture in order to keep the focus on the clothing and equipment, not on the attractiveness of the model. The model's training as a military cadet was a great help.

The outfits were professionally photographed in a studio against a neutral background using 35mm film. The changability of natural sunlight, wind, and other outdoor conditions were judged to be too difficult to control. The researcher was concerned that an outdoor background might influence perceptions of the outfits. During the pretesting, one respondent commented that she liked the neutral background because she could visualize the "technician" working on her own lawn. Each 4" x 6" photograph was laminated in order to protect the surface from fingerprints during the sorting task.

During pretesting, all 62 pictures were handed to the respondents in one deck. Respondents reported the size of the deck and the similarity of the outfits made sorting difficult and confusing. Further testing showed that dividing the single, large deck into three smaller decks made the task much more manageable.

The 62 pictures were randomly assigned to one of three color coded decks (red, yellow, blue). Within each deck, the pictures were ordered, based on random assignment. The ordering within the decks was the same for each interview. The decks were rotated for each respondent based on a predetermined scheme. Each respondent was given the decks, one at a time, and asked to sort them into piles. No further instructions were given. Respondents were

encouraged to talk about the pictures as they sorted them. At the end of each sort, respondents were asked "Why did you sort them in this way?" After answering, the respondents were asked to pick the outfit they would prefer a lawn care technician to wear. After the three decks had been sorted the respondents were asked which one outfit they would most prefer the lawn care technician wear on their lawn. A record was kept of the groups that were sorted for each deck. The intent of this exercise was to determine what outfit they would prefer a lawn care technician to wear on their lawn, what criteria they used as a basis for the sorting, and what meanings respondents attached to the various types of clothing and protective equipment.

The pile sorting task has been used extensively in field research (Weller & Romney, 1988). The outstanding strength of the pile sort task is that it can accommodate a large number of items. It is easy to administer and respondents do not mind sorting things into piles and talking about them. According to Romney and colleagues (1979) the results of pile sort data collection methods, using medium-size samples between 30 and 40, generally reach reliabilities of about .90.

Pretesting

The entire interview was pretested with three females and one male. Their responses were used in setting up the interviewer's checklist that accompanied each question. The only major change was the one previously noted regarding management of the picture sort.

Data Analysis

Data Processing Procedures

Data processing began with verbatim transcription of the audio tapes, using both a computer word processing program and a computer database program. Three transcribers were involved in interviewer transcription. The use of the computer facilitated the handling of the large amount of interview material and made the retrieval and organizing of the data easier and less time consuming.

Qualitative Analysis

The first task of qualitative analysis is descriptive (Patton, 1990). Qualitative analysis depends on presenting solid descriptive data in such a way that others reading the results can understand and draw their own interpretations. Analysis began with each individual case. Each interview was read and responses were treated as independent for that particular interview.

The author and a second coder independently read transcriptions, case by case, identifying the respondents' descriptions of their lawns, activities, and the environment. They were guided by the research questions. The author and two other independent coders read the transcripts searching to identify and classify common themes of meaning and environment.

The next step was cross-case analysis of the interview questions. The basic design of the study produced eight groups of respondents. Data were examined within and across the basic eight groups: state to state, service to nonservice group, and husband to wife.

Georgia				Michigan			
No Lawn		Use Lawn		No Lawn		Use Lawn	
<u>Service</u>		<u>Service</u>		<u>Service</u>		<u>Service</u>	
Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife

The interview guide provided a descriptive analytical framework for analyzing responses. Responses were grouped by topics from the guide. The decision to report findings for all eight groups was made on a question by question basis. If analysis failed to reveal any meaningful commonalities or differences between any of the particular groups, that comparison was not reported.

Check coding. Check coding aids definitional clarity and is also a good reliability check (Miles & Huberman, 1994). It brought to the analysis a clearer vision of what the codes meant and which blocks of data best fit which code.

Reliability can be measured with the following formula:

$$\text{Reliability} = \frac{\text{number of agreements}}{\text{total number of agreements} + \text{disagreements}}$$

Based on this measure, coder reliability for this study was .95.

Coding was done on the transcript printouts. The codes were kept as simple as possible in order to facilitate this time consuming process. Coders worked independently of each other. Half the interviews was coded twice. Discrepancies in coding were discussed among the coders.

Three coders searched for patterns of lawn meaning that began to emerge from the data in two ways. First this was done by looking for indigenous concepts such as nature, beauty, property value, and green that the respondents expressed when they described their lawns. Second, this was done though

sensitizing concepts which the researchers brought to the data. These concepts usually have their origins in the research literature or particular issues that were identified at the beginning of the study. Sensitizing concepts relevant to this study were derived from the literature about environmental aesthetics, psychology, and the historical development of the lawn. Based upon both indigenous and sensitizing concepts, domains of meaning were derived from the responses of the participants.

A domain may be defined as an organized set of words, concepts, or sentences, all on the same level of contrast, that jointly refer to a single conceptual sphere (Weller & Romney, 1988). The cultural domain is simply the subject matter of interest, a set of related items.

Quantitative Analysis

The small sample size precluded the full scale use of any sophisticated quantitative analysis techniques. Descriptive statistics such as means and relative and cumulative frequencies were used to inspect appropriate data. Inspection of the frequency tables for the Health scale revealed how scores clustered for many of the variables. The income data was judged to meet the minimum criteria for running an ANOVA.

Factor analysis was used for the NEP scale. Based upon the qualitative inspection of the data, all the interviews were treated as being equal and separate. The 40 interviews were considered an adequate number necessary to meet the minimum requirements for running a factor analysis. Previous research has shown that two to three factors have frequently been identified in the scale.

The most distinctive feature of factor analysis is its data reduction capability. A smaller number of clusters of variables can be obtained from a larger set of independent items. The eigenvalue is a measure of the relative importance of the function. The sum of the eigenvalues is a measure of the total variance existing in the discriminating variables. Total variance accounted for by the combination of all common factors is usually referred to as the communality of the variable. The loadings represent regression coefficients of factors to describe a given variable. Three factors were generated in this analysis.

CHAPTER IV

FINDINGS

This chapter reports the findings related to the investigation. The research questions for each of the four objectives are stated at the beginning of each section. The final section of the chapter reports the overall reaction of the respondents to the study. The summary and discussion of the findings are presented in Chapter V.

The data for this study are based upon responses from 20 suburban couples who owned homes in established, middle and upper-middle subdivisions. Ten of the couples were from Georgia and ten were from Michigan. Within each group, half the couples currently used a chemical lawn care service (svc) and half did not use a service (no svc). While the sample size was small, the responses from the indepth interviews provided rich, meaningful information.

Research Question for Objective 1

Are there differences and commonalities between Georgia and Michigan homeowners with regard to (a) demographic characteristics, (b) lawn maintenance activities, (c) family usage activities, and (d) perceived meaning of the lawn?

Demographic Characteristics

Education

Educational attainment was similar between husbands and wives, service and nonservice users, and the two states (Table 1). Overall the group of 40 respondents was highly educated. Thirty five percent had an advanced degree beyond four years of college. Thirty three percent had a four year college degree. Twenty percent had completed some college. Only 12% had ended their formal education upon completion of high school.

Table 1. Highest Educational Level Attained.

Educational Level	Georgia				Michigan				Total
	No Service		Use Service		No Service		Use Service		
	H	W	H	W	H	W	H	W	
High school only	0	1	0	1	2	1	0	0	5
Some college	1	0	2	1	0	2	1	1	8
Completed college	0	3	1	3	1	1	2	2	13
Advanced degree	4	1	2	0	2	1	2	2	14
Total	5	5	5	5	5	5	5	5	40

Age

The average age for the Georgia and Michigan service and nonservice groups are listed, by gender, in Table 2. Georgia respondents ranged in age from 45 years old to 66 years old. Michigan respondents ranged in age from 41 years old to 69 years old. Typically wives were, on the average, 2 to 4 years younger than their husbands.

Table 2. Average Age of Respondents in Years.

Respondents	Georgia		Michigan	
	No Service	Use Service	No Service	Use Service
Husbands	54	60	57	55
Wives	52	56	55	52

Children

Two families in Georgia had children under 18 years of age living at home.

Four Michigan families had children under eighteen still living at home.

Income

Respondents were asked what their total family gross income was for 1993 (Table 3). One Georgia couple and two Michigan couples refused to answer.

Table 3. Comparison of States by Family Income Categories.

Income Categories	Georgia (n = 9)	Michigan (n = 8)
\$25,001 to \$50,000	12.0%	12.5%
\$50,001 to \$75,000	44.0%	12.5%
\$75,001 to \$100,000	22.0%	0
\$100,001 to \$125,000	22.0%	0
\$125,001 to \$150,000	0	12.5%
\$150,001 to \$175,000	0	37.5%
\$175,001 to \$200,000	0	25.0%
Total	100%	100%

ANOVA testing showed a significant difference in income between Georgia and Michigan families ($F = 6.79$; $P < .02$). In reality, the actual amount of disposable income is probably very similar between the two states. Costs of

living (such as property taxes) and salaries are generally lower in the South.

Occupation and Retirement

Table 4 shows the distribution of employment and retirement between the groups. Twenty five percent of the Georgia sample were retired. Forty percent of the Michigan sample were retired. Of the entire sample, 60% were employed outside the home and 32.5% were retired. All of the employed respondents were in managerial and professional positions. Several men owned their own businesses. Only one woman, from Georgia, was employed parttime. She had children at home. Three Michigan women were currently caring for their children full time. Of these three, one was planning to go back to work within the next year or two.

Table 4. Distribution of Employment and Retirement.

Employment Status	Georgia				Michigan				Total
	No		Use		No		Use		
	Service		Service		Service		Service		
	H	W	H	W	H	W	H	W	
Employed	4	4	3	4	4	2	3	0	24
Retired	1	1	2	1	1	3	2	2	13
Home With Children	0	0	0	0	0	0	0	3	3
Total	5	5	5	5	5	5	5	5	40

Environmental Organizations

Respondents were asked if they belonged to any environmental organizations. Six people indicated they belonged to a group that they considered an

environmental organization. These included National Geographic Magazine, the National Rifle Association, Michigan United Conservation Club, Trout Unlimited, Ducks Unlimited, and the garden club. Several people indicated they had contributed to Greenpeace but were not sure if that meant they were a member.

Lawn Maintenance Activities

State Differences

Five Georgia homeowners describe their back yards as "natural". This was defined as being an area with no cultivated grass. Pinestraw and ivy are used as ground cover under the pine trees. All the Michigan homeowners had grass in their front and back yards. Two Michigan homeowners talked about the many trees in their backyards but they still maintained lawns in those areas. While no measurements were made of the actual square footage of the amount of grass that made up the lawns, it was evident by observations that there was less grass surrounding the Georgia homes.

The species of grasses that grow in the two regions of the country are different. Homeowners in Georgia were more likely to name the kinds of grass growing in the area: Bermuda, centipede, fescue, and St. Augustine. Two of the Michigan respondents did not know what species of grass they had growing in their lawn. These differences in grasses, as well as the clay soil, resulted in Georgia respondents talking about the necessity to aerate and reseed on a regular basis. No Michigan respondent considered reseeding a regular, yearly activity.

Georgia's growing season is longer than Michigan's season and as a result more time must be spent in lawn maintenance in the South. But only one

Georgia homeowner mentioned that his lawn was "an eleven month" job.

Three Georgia homeowners had installed in-ground sprinkling systems.

The in-ground systems operated on a timer. No Michigan respondent had an in-ground system. All the homeowners reported that they watered on an "as needed" basis.

Equipment

Respondents were asked what kind of lawn equipment they owned (Table 5).

The types of lawn equipment were very similar for homeowners in both states.

Everyone owned a power operated lawn mower.

Table 5. Lawn Equipment.

Equipment	Georgia (n = 10)	Michigan (n = 10)
Power Operated Mowers	10	10
Blowers	6	3
Edgers	5	5
String Trimmers	4	6
Fertilizer Spreaders	4	2

Other kinds of equipment that were mentioned included pesticide sprayers, a chipper, manual weed digger, spade, trimming shears, and clippers. Even the homeowners who no longer mowed and maintained their own lawns had a full complement of yard equipment.

Chemical Lawn Care Services

Every family had used a chemical lawn service at some time. Two main reasons were given for currently using a service: (a) it's easier to hire a service than do-it-yourself and (b) the lawn is in poor condition and the homeowner

believes the service will help improve it. Several respondents in the no service group stated that they planned to use a lawn service in the future. They looked upon the lawn care company as a back-up to their own efforts. If the homeowner was unable to maintain the lawn at an acceptable level, the lawn service would be called and used until the lawn was back to the acceptable level.

Family Usage Activities

Both husbands and wives were asked what kind of family activities take place on the lawn (Table 6). They were in total agreement in their answers. The majority of respondents said "None" and then elaborated on their response.

Table 6. Family Activities on the Lawn.

Activities	Georgia (n = 10)	Michigan (n = 10)
Front lawn		
None	9	10
Children play	1	0
Back lawn		
None	9	5
Children play	0	5
Dogs live there	1	0

Several mentioned that occasionally a neighborhood child would run across the grass. One Georgia family had a fenced backyard where their two dogs lived. Others with dogs mentioned that the lawn was used as a bathroom. Mowing and maintenance were reported by all respondents as the activity most frequently occurring on the front lawn. Two backyards, one in Georgia and one in Michigan had pools. The owners indicated that very little activity took place outside the immediate pool area.

Perceived Meaning of the Lawn

Respondents were asked to describe their lawns, how they felt about having a lawn, what it meant to them, why they did the things they do with their lawn, and if they enjoyed doing what they did. Six domains that were judged to encompass meaning emerged through reading and interpretation of the interview transcripts. Responses were very similar across gender, states, and service-nonservice groups. Table 7 reports the distribution of responses which emerged in relation to all of the domains.

The domains include aesthetic perceptions, psychological motives, neighborhood norms, reservations, economic concerns, and exercise.

Table 7. Domains of Meaning Related to the Lawn.

Domains	Georgia				Michigan				Total
	No		Use		No		Use		
	<u>Service</u>		<u>Service</u>		<u>Service</u>		<u>Service</u>		
	H	W	H	W	H	W	H	W	
Aesthetic:									
Beauty	3	4	5	5	4	5	5	4	35
Neatness	1	4	5	4	5	5	5	5	34
Utilitarian	3	1	4	3	2	4	1	3	21
Psychological:									
Self	5	5	4	4	3	5	4	3	33
Others	2	2	0	2	1	2	0	3	12
Nature	2	2	0	2	1	1	2	1	11
Neighborhood Norms	4	5	3	4	4	4	3	4	31
Reservations	4	3	1	2	3	3	3	2	21
Economic	2	1	1	3	2	2	3	2	16
Physical Activity	1	0	3	1	4	0	1	0	10

Individuals often described their lawns in several different ways. If this was the case, their comments were counted only once within the appropriate domain, regardless of how many times they made similar statements. Each domain is defined and illustrated with quotations from individual interviews.

Aesthetic Perceptions

Aesthetic perceptions are classified into three categories: beauty, neatness, and utilitarian.

Beauty. A personal, emotional reaction to the perceived beauty of the lawn was the most frequent aesthetic perception. This is reflected in statements that describe the appearance of the lawn in terms such as pretty, pleasant, lush, cool, or clean. The greenness of the grass was mentioned many times.

GA husband, svc: I like a rich, green lawn...lush lawn. Not high but grass is rather thick, a lot of blades to the square foot.

GA husband, no svc: Looking out on a nice looking yard...we like it, we love it...we get a tremendous amount of enjoyment out of seeing things look green, good.

GA wife, svc: It's a lush, rich green, a carpet under your bare feet...It's so pleasant to look out your window early in the morning and see such a beautiful color green greeting you. It's an attractive, peaceful color.

GA wife, no svc: I think it brings beauty and pleasantness to the site.

MI husband, svc: It's green, it's nice. When there's enough moisture, it's very pleasant.

MI husband, no svc: I like the color green...There's something about green that's just a nice calming effect.

MI wife, svc: We want to have a green, a nice green looking yard...we always make sure that our lawn is green.

MI wife, no svc: We have lush grass and it does very well, and I think it's beautiful.

Neatness. In the second aesthetic perception which emerged, emphasis is placed on neatness rather than beauty when evaluating the lawn. The lawn is described as being neat, manicured, tidy, trimmed, or edged.

GA husband, svc: There's something about a well cared for lawn; neat, trim...I just love it.

GA husband, no svc: I don't want it to look seedy...Grass high, uncut, thin, weedy.

GA wife, svc: Like it nice and clean, a newly vacuumed carpet. Don't want to see any footprints out there...neat, managed.

GA wife, no svc: We try to keep it tidy. Try to keep it neat.

MI husband, svc: Like it trimmed and cut. Free of weeds.

MI husband, no svc: Like to see it wonderfully maintained...trimmed up real nice and edged by the sidewalk.

MI wife, svc: Notice whether lawn is maintained, trimmed and neat. Don't like sloppy grass.

MI wife, no svc: Like it trimmed a certain height, no grass laying around, weed free, edged.

The importance of neatness was evident in the responses to the question about wildflowers. Respondents were asked what their reaction would be if their neighbor planted a front yard of wildflowers. Fifteen of the 40 individuals responded negatively; wildflowers would be unacceptable in the front yard. Three people said they would like something like that. The remaining 22 respondents qualified their answers. If the wildflowers were taken care of, kept up, maintained, organized, not messy, not weedy, not shaggy or hodge podge they might be acceptable.

Utilitarian. The third aesthetic category which emerged from the data describes how the lawn contributes to the appearance of the house. The

utilitarianism of the lawn is discussed in terms of what it does for the property.

GA husband, svc: Lawn is an extension of the house. Having an attractive house includes having an attractive lawn.

GA husband, no svc: Lawn gives a sense of presence to the house.

GA wife, svc: Backdrop. It's a frame for my flower gardens. It enhances my flowers and makes the appearance of my home look better against the lawn.

GA wife, no svc: (What if you didn't keep your lawn up?) Ugly. Makes your house look awful.

MI husband, svc: Aesthetically is makes the residence look better. Compliments house and makes it look better.

MI husband, no svc: I want our house to look nice, so keep lawn nice.

MI wife, svc: Enhances the appearance of your property.

MI wife, no svc: Makes the house look nice.

Psychological Motives

Psychological motives are classified into three major categories; those directed toward the self, those directed toward others, and those related to nature.

Self. The largest number of responses reflected motives that are directed toward the self. The lawn is a source of personal pride, provides individuals with a sense of accomplishment, and is a reflection of one's self.

GA husband, svc: There's pride in what you see and how it's developed over the years.

GA husband, no svc: Personal pride...hate to be a sore thumb in neighborhood. It would embarrass me to have an ugly lawn.

GA wife, svc: Makes me feel good, gives me a good feeling because of the well kept beautiful look it provides.

GA wife, no svc: It gives a sense of accomplishment...when we drive up and we like what we see.

MI husband, svc: It's more a pride sort of thing...it's some reflection on your standards of appearance. Sort of an internal pressure.

MI husband, no svc: Sense of pride in it's appearance.

MI wife, svc: A personal pride in the things that you have or being responsible for the things that are in your care for one reason or another. By virtue of having purchased the house and the lawn you make a commitment to take care of it. Personal satisfaction, when it's all done and you step out from the house and it looks nice, you feel good just as if you dress the children up for church and you take a picture.

MI wife, no svc: Love it, taking this raggedy yard and you just mow it and it just looks so beautiful...creating. If I didn't care for it would bother my ego and image...letting your pride go down.

Others. In the second psychological category the meaning of the lawn is influenced by what one believes other people might think or do. Homeowners believe the lawn is one of the first thing others notice about one's home and it is important that these are positive perceptions.

GA husband, no svc: It is the first thing people would see of our home. So I think it is especially important.

GA wife, svc: Somewhere it is written you have to have a front lawn...Your neighbors don't like you if your yard doesn't look decent.

GA wife, no svc: Lends to the style of the neighborhood. We want our neighborhood, I want it, to look nice when people drive through it.

MI husband, no svc: People who care for lawn, take care of their house...take care of what you've got. All my friends take care of their things.

MI wife, svc: I like having a lawn. I think it can be something that invites people to want to come up to our home. If your lawn or area outside the home is untidy, it say that your home inside is untidy. I just think it can set the quality.

MI wife, no svc: We get a lot of compliments, people stop and say, "Oh, your yard is so pretty."

Nature. The third psychological category reflects the feelings that the lawn provides a means for keeping in touch with nature. Part of nature is being outdoors in the sunshine and being around growing things.

GA husband, no svc: I enjoy and respect growing things. I would certainly feel that way about the lawn.

Ga wife, svc: I feel more in tune with nature; like a part of it. You're helping to add to the beautification of nature. You're helping to contribute.

GA wife, no svc: Lawn very important...gives me the feeling that I'm in my own private park.

MI husband, svc: If I didn't have a lawn, I would want access to somewhere green, like a park...couldn't live in a concrete jungle...would get tired of a desert.

MI husband, no svc: I'm an old farmer, like to see things green and growing. An outdoors person.

MI wife, svc: Having a family and children, I think it's important for them to get out and look for bugs, look at the birds, and see the rabbits go through the yard...think it's important for them to have the space.

MI wife, no svc: Enjoy caring for the lawn because I enjoy being outside. Being in fresh air. Great outdoors.

Reservations

The reservations domain reflects the ambiguity people feel about their lawn and the reasons they give for having a lawn. It also encompasses the negative aspects of having a lawn such as the time, work, and cost of maintenance.

GA husband, svc: Lawn means a lot of work and cost but I get visual pleasure from it and enjoy hearing the odd comment about how nice it looks.

GA husband, no svc: I'd probably just as soon not have one. I would like it to be maintenance free. And a better use for the land rather than growing grass. We spend a lot of money on chemicals to try to keep that looking just green and without any weeds in it. You could have plants growing that would be far more lovely than the grass. I guess I think about European lawns where they use every piece of soil to grow something, either for beauty or food....Ultimately the lawn is probably the easiest way because you go over it with the mower. Other than the chemicals that you put on.

GA wife, no svc: I enjoyed cutting it when I did it. Can't deal with it now.

GA wife, svc: I want it small and pretty. Since I have to mow it I don't want it to be very big.

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MI husband, svc: It's stupid to have a back lawn, never use it...why have it when you don't use it...I'm getting to the point where I don't want to be a slave to my lawn.

MI husband, no svc: I do 95% of the lawn work. I'd rather be playing golf. Somebody else's turf. Admire a lot of these homes sitting back with the beautiful front yard but if I had to keep it all up, No.

MI wife, svc: I like having flowers, I like having a garden...in my mind grass is kind of like laundry during the summer, it's kind of like a necessary evil.

MI wife, no svc: In some respects it has been a real pain...It's a joy because it's not a lot to upkeep and it's a pain because we have a real hard time growing grass in the back.

Neighborhood Norms

Neighborhood norms are the written and unwritten rules and expectations about the maintenance and appearance of one's lawn. They may include real or perceived sanctions which would be enforced if one's lawn is not maintained to the community standards.

GA husband, svc: Social pressure...continues us in good stead with our neighbors. Other lawns in our neighborhood tend to look very, very good...If didn't care for lawn, neighbors (would) probably complain. If the yard is junky, unkept, uncut...(you would) prejudge people if their lawn looks like that.

GA husband, no svc: I think that everyone who lives here and everywhere else should take care of their lawn and try to make it an asset. I feel very strongly that you have a responsibility, not only to your neighborhood, but to the area in general.

GA wife, svc: If we didn't care for our lawn it would be over run with weeds, bugs, the grass would die. Probably be an ugly eyesore...Probably get nasty little letters from our neighbors or phone calls.

GA wife, no svc: I don't want it to be an eyesore. Since it is a visible lawn in terms of the neighborhood, I want it to be appropriate in the neighborhood. Feel an obligation, because we live in a nice neighborhood, and everyone keeps up their lawns.

MI husband, svc: In this neighborhood, everyone takes care of their property. That's one of the reason why we moved here.

MI husband, no svc: I think it's important in a neighborhood like this to keep up with the Jones. I think people try to keep their property in pretty good stead...sometimes they might look around at their neighbors and see a guy really putting in some effort and they might do likewise and keep their lawn half way decent...sort of a domino effect there.

MI wife, svc: I think in a suburban setting where you've chosen to purchase a home in this kind of subdivision, that I think implicitly makes a commitment to keep it under control. I guess the lawn ought to fit the area in which you've chosen to live.

MI wife, no svc: I think people in this neighborhood expect people to keep up their property....I know people complain about those who do not kept their yards up and they send a little reminder in the spring clean-up time.

Economic

The economic domain has two components. Of primary importance to the homeowner is the real or perceived dollar value that the lawn adds to one's property. A secondary consideration is the monetary cost of caring for the lawn.

GA husband, svc: If I didn't care for it (my lawn), my property value would decline.

GA husband, no svc: From the appearance point of view...obviously it influences property values. If you were to be selling your home, that's something that would be necessary.

GA wife, svc: Makes the value of your home higher if your lawn looks good.

GA wife, no svc: I think he (husband) would like to do a lot of things differently (with lawn), but that's money, so if you can't do it, I think he sort of has a giving up attitude. He can see what it should be, not interesting to him as it is.

MI husband, svc: From a pure economic or financial point of view, I'd say that a good looking lawn, because it compliments the house, is just going to enhance the value if you're going to consider resale...I think the lawn helps curb appeal, if it's a good looking lawn. And that curb appeal sells houses.

MI husband, no svc: I'm a firm believer the lawn...adds to the property value of the house.

MI wife, svc: I'm sure that the value of the property would decline in terms of resale (If one didn't maintain lawn).

MI wife, no svc: I don't think anybody would put up with that (not maintaining one's lawn), because you have too much money invested in your property. And that's why you buy in a subdivision that has association rules.

Physical Activity

This domain reflects the belief that caring for the lawn provides a means for physical exercise.

GA husband, svc: It's good for me. After my heart attack, I need the exercise.

GA husband, no svc: I enjoy working on it...Gives me physical activity taking care on it.

GA wife, svc: (Why mow lawn?) Because it's good exercise and I need the exercise.

MI husband, svc: Good exercise. Enjoy being outside. Have a desk job. Need exercise and fresh air.

MI husband, no svc: Look upon the lawn as a source of recreation and exercise.

Research Question for Objective 2

Are there differences and commonalities between spouses with respect to (a) lawn maintenance activities and (b) perceived meaning of the lawn?

Responses to the demographic and perceived meaning questions illustrated that there were many more commonalities among the husbands and wives, service and nonservice groups, and states than differences. The decision was made to combine state and service groups for this research question.

Lawn Maintenance Activities

Husbands are primarily responsible for the care and maintenance related to the lawn. Basic activities include mowing, trimming, edging, raking, and fertilizing on a regular basis.

Mowing the Grass

Mowing is the most labor intensive job related to the lawn. Husbands have primary responsibility for mowing the lawn (Table 8). Depending upon the moisture situation and time of year, most lawns are mowed once a week.

In families with older children, the children were supposed to mow but if the children's activities prevented them from doing this chore a parent would do it.

Table 8. Responsibility for Lawn Mowing.

Primary mower	Georgia (n = 10)	Michigan (n = 10)	Total
Husband	8	5	13
Wife	1	0	1
Children	1	3	4
Hire Mowing Service	0	2	2
Total	10	10	20

Several wives indicated they would mow the lawn if their husband was out of town or busy with work, but they did not consider it "their job." The respondents who hired a mowing service did it for (a) health reasons and (b) time considerations.

Using a Lawn Service

There was no definitive answer to "Who hires the service?" It appears that it is a joint family decision based upon either (a) the husband does not have time to care for the lawn or (b) the appearance of the lawn was judged to be inadequate. Those who use a chemical lawn service were usually aware when the service had treated the lawn. Several mentioned the posting sign as a signal that the service had been there. When asked what the service did the two most

common answers were "Spray" and "Put down fertilizer." Respondents seldom knew what chemicals were being used. They viewed the lawn service as the expert and their primary concern was that the lawn look like a service was being used. The homeowner expects to see a green, thick, weedfree lawn. The absence of dandelions in Michigan lawns was very important.

Perceived Meaning of the Lawn

Husbands and wives differed in only one respect when they talked about their lawns. When describing the size of their lawns, women were more likely to say "It's small" or "It's big." Men usually described the size of the lawn in terms of square feet or lot size. While the husband is the person primarily responsible for caring for the lawn, women had no problem in responding to the questions and talking about the lawn. Women take an active part in the care of the yard, they are primarily in charge of the flowers. While they seldom physically mow the lawn, they offer advice regarding the way it looks and how it should be cared for. Husbands and wives were very similar in their responses to the questions about the meaning of their lawn, why they felt the way they did about the lawn, and why they took care of the lawn in the ways that they did. Wives had no difficulty in talking about the meaning of the lawn and the activities associated with maintenance of the lawn.

Research Question for Objective 3

What kinds of environmental and health concerns do homeowners have regarding the use of chemicals on their lawns?

Environmental Concerns Related to Lawn Chemicals

The Environmental Scale (Appendix A-III) was used to stimulate discussion about environmental issues related to the lawn. Respondents were asked to rate a series of environmental statements. After they had completed the exercise they were asked, "What is your reaction to a series of statements like this?"

Environmental Scale Reactions

Reactions to the environmental scale ranged from the Georgia wife (svc) who said, "Just looked at these and said I have to answer the questions" to the Michigan husband (no svc) who said

I don't know if I want to get involved here. Question the purpose of this. Everyone looking for politically correct answers. Not willing to get caught in that trap! Little upset to see this. Thought we were going to talk about the lawn.

Other Michigan husbands expressed similar sentiments.

MI husband, svc: This isn't exactly related to lawn. Not easy. Can I circle in the middle? Someone is trying to get me to think about environment!

MI husband, svc: Don't know what this has to do with lawns.

MI husband, svc: Who's this being done for? Environmentalists? Chemical company?...Do gooders...always around trying to get you to sign petitions.

One GA husband (no svc) echoed these sentiments: Get irritated with Greenpeace. This sounds like a green piece (referring to Greenpeace). They are so sure of themselves...they treat others like none of them are intelligent, all dishonest and we (Greenpeace) are all pure and perfect. Get tired of that.

Only one wife and two husbands responded in a positive manner to the scale.

MI wife, no svc: I think the whole notion of environmental stewardship is, you know, got to be very important.

GA husband, svc: These are questions that need to be brought to our attention. Need to be addressed. Probably wouldn't be in our generation but in future generations. Think this is going to be a problem in the future.

GA husband, no svc: This probably caused me to think about integrating my practice with my lawn. In certain settings it would be easy to live "au Naturele" but when you choose to live in a subdivision you conform. But when you're confronted, you realize everybody's little part is an infringement on nature. It's important to be growing in sensitivity.

The overwhelming majority of the respondents reacted to the scale in terms of the lawn chemical statements which were added to the scale for purposes of this study. Some expressed the belief that chemicals are necessary yet dangerous. Others were more uncertain about their dangers.

GA wife, svc: I think you're probably going to have to use chemicals or you're going to have a big problem. But yes, I think they are dangerous and should be handled less if that is at all possible.

GA wife, svc: Agree we need to protect and not abuse the environment but the problem is that in order to have beautiful yards and lawns we have to use some kind of chemical...If lawn chemicals are dangerous, I don't know anything else to use instead of them.

MI wife, svc: Do I think we should go out and spray everything with DDT? No. Do I think that all lawn chemicals are necessarily abusive to the environment? I don't think so.

GA husband, svc: I don't know if all lawn chemicals are dangerous. If they are used properly, they are not dangerous.

MI husband, no svc: I'm not convinced that lawn chemicals are a huge, terrible problem...dangers of lawn chemicals are not that great. Technology will bring us further along.

MI wife, svc: I don't know about this chemical on the lawn, I, I want lawn care company to do a good job on our lawn, but I'm wondering whether that's what is the best thing to use...but I'm not too happy about having them (weeds) and digging them out.

The Environmental Scale

As a result of the participants' responses, several things were learned about the scale itself. Respondents were unsure about the meaning of some of the terms. "Steady-state" and "spaceship earth" were the two terms most frequently questioned. Steady-state was a particular problem. Definitions included such

things as government control of growth, balanced growth, and no growth.

Because of the wide discrepancy among respondents the statement containing this term was deleted from scale analysis.

Examination of the frequency distribution pattern of the responses showed that answers clustered around the midpoint of the scale. Based upon this finding and comments that respondents made as they did the exercise it was evident that had they been given a choice of "don't know", many would have chosen it.

Responses made to previous questions in the interview had confirmed that this was a very homogenous group. Therefore responses from the various groups were combined and analysis run with the total sample. Although the sample size ($n = 40$) was small, it met the minimum criteria for factor analysis. An exploratory factor analysis was done with the remaining fourteen items of the environmental scale. Two of the three statements dealing with lawn chemicals, added to the original NEP Scale for this study, did not load on any factor. The third statement, lawn chemicals are dangerous and other things should be used in place of them, loaded on Factor 1. When the three lawn chemical statements were deleted from the data set and factor analysis was run again, Factor 1 emerged stronger, explaining more of the variance. The decision was made to use the eleven items from the original NEP scale.

The eleven item correlation matrix was factored by means of the principal components analysis method of factor extraction (Table 9). Factor loadings of .500 or greater were used to identify the items that were assigned to each factor in the final three-factor rotated matrix. Eigenvalues are all greater than one.

Table 9. Factor Loadings for Combined Georgia and Michigan Sample.

Variables	Factor 1	Factor 2	Factor 3
Factor 1			
The balance of nature is very delicate and easily upset.	.81188	.18157	.01010
When humans interfere with nature it often produces disastrous consequences.	.77817	-.10689	-.26567
There are limits to growth beyond which our industrialized society cannot expand.	.76615	-.19236	-.02560
We are approaching the limits of the number of people the earth can support.	.72380	.05816	.00173
Mankind is severely abusing the environment.	.60410	-.40917	-.44951
Factor 2			
Plants and animals exist primarily to be used by humans.	.10642	.85610	.08349
Mankind was created to rule over the rest of nature.	.04530	.78524	.27380
The earth is like a space ship with only limited room and resources.	.36922	-.65458	.07615
Factor 3			
Humans need not adapt to the natural environment because they can remake it to suit their needs.	-.08613	.07119	.81053
Humans must live in harmony with nature in order to survive.	.36558	..06649	-.70816
Humans have the right to modify the natural environment to suit their needs.	.18044	.29668	.65192

	Eigenvalue	% Variation	Cumulative %
Factor 1	3.60483	32.8	32.8
Factor 2	2.21379	20.1	52.9
Factor 3	1.31749	12.0	64.9

Cronback's alpha .82

Factor analysis suggests that there are three dimensions in the NEP scale to be found among individuals in this group of respondents. The major dimension suggests that there is delicate balance in nature, which humans can disturb. Factors 2 and 3 suggest a "man over nature" dimension. Humans were created to rule, there are no limits placed on man's use of the earth's resources, and human's can do as they please on the earth.

Comparison of the factors that emerged in this study with those that emerged in the Albrecht study (Appendix G) reveal that Factor 1 in this analysis is reflected in both Albrecht's Factor 1 and 2: balance of nature and limits to growth. Factor 2 and 3 reflect the same theme as Albrecht's Factor 3: man over nature. It is interesting to note that while the majority of the respondents had many comments to make regarding the lawn chemical statements during the interview, the rating of the statements themselves did not have much effect in the factor analysis.

General Environmental Threat

Respondents were asked if they considered the use of lawn chemicals to be a threat to the environment (Table 10). Respondents who said "Yes, there is a threat" perceived it in terms of being likely to affect water quality, air quality, food, or wildlife. Those who answered "Maybe" expressed uncertainty about the origin of the threat: maybe from the pesticides, but not the fertilizer. Those who said "No" perceived that proper application of the product prevented any harm or that it might take a long time for harm to occur "maybe in 10,000 years."

Table 10. Lawn Chemicals Perceived as a Threat to the Environment.

Responses	Georgia				Michigan				Total
	No		Use		No		Use		
	Service		Service		Service		Service		
	H	W	H	W	H	W	H	W	
Yes	1	2	4	3	1	3	1	3	18
No	1	0	0	1	1	1	1	1	6
Maybe/ Don't Know	3	3	1	1	3	1	3	1	16
Total	5	5	5	5	5	5	5	5	40

Eleven wives and seven husbands expressed the belief that lawn chemicals pose a threat to the environment. Ten husbands and six wives were ambivalent about an overall threat. The trend for more wives to be concerned about a threat is similar to findings from other studies which report that women, especially those with children, are more likely to be concerned about the environment than men. Only six individuals, three wives and three husbands, thought there was no threat.

Local Environmental Difference

Respondents were asked if it would make any difference to their local natural environment if they stopped using lawn chemicals (Table 11). Twenty seven individuals responded that if they stopped using lawn chemicals the appearance and quality of their lawn would deteriorate. Eleven individuals said it would make no difference to the local environment. Three of these eleven stated that it would make no difference as long as they were the only ones who stopped using the lawn chemicals in their neighborhood.

Table 11. Difference to Local Environment If Stop Using Lawn Chemicals.

Responses	Georgia				Michigan				Total
	No		Use		No		Use		
	Service		Service		Service		Service		
	H	W	H	W	H	W	H	W	
Appearance deteriorate	3	5	4	3	5	0	4	3	27
No difference	2	0	0	2	0	4	1	2	11
Beneficial	0	0	1	0	0	1	0	0	2
Total	5	5	5	5	5	5	5	5	40

Two respondents indicated that it might be beneficial to stop using lawn chemicals. One Michigan wife thought it would be beneficial to all the wildlife, especially the worms and crickets. One Georgia husband thought it would improve the air and every little bit that one could do to help the environment helps. But he also expressed reservations about what would happen to the greenness of his lawn. One respondent, a Michigan husband, talked about run-off problems. He stated that he assumed that if lawn chemicals were used in moderation they would not be detrimental.

More husbands (n = 16) than wives (n = 11) indicated that the appearance of the lawn would deteriorate if they were to stop using lawn chemicals. More wives (n = 8) than husbands (n = 3) stated that it would make no difference to their local environment if no lawn chemicals were used.

Global Environmental Difference

Respondents were asked if they thought that it would make a difference to the global environment if they, themselves, stopped using lawn chemicals (Table 12). Thirteen respondents thought it would make no difference. Seven said that as one person, "No difference", but together with others it might make an impact. Nineteen individuals were uncertain. They thought it might help to stop using lawn chemicals but they weren't sure how. They just didn't have enough information upon which to make a judgment.

Table 12. Difference to Global Environment If Stop Using Lawn Chemicals.

Responses	Georgia				Michigan				Total
	No		Use		No		Use		
	Service		Service		Service		Service		
	H	W	H	W	H	W	H	W	
Maybe/Don't know	1	3	2	2	3	1	4	3	19
No	4	2	2	1	0	2	1	1	13
No, not as one person	0	0	1	2	2	1	0	1	7
Yes, make difference	0	0	0	0	0	0	0	1	1
Total	5	5	5	5	5	5	5	5	40

Approximately an equal number of wives and husbands were unsure about the difference it would make to the global environment if they stopped using lawn chemicals. "No" and "No, not as one person" responses reflected the same pattern. Only one wife thought that it would make a difference to the global environment if she stopped using lawn chemicals.

Health Concerns Related to Lawn Chemicals

A second pencil and paper exercise was used to stimulate discussion about health concerns and lawn chemicals. After rating four Likert type questions regarding the susceptibility and seriousness of health risk associated with pesticides respondents were asked if they thought the use of lawn chemicals posed a threat to their health (Table 13).

Comments were diverse. They ranged from husbands who said "I always wash after I apply chemicals", "I only apply pesticides once or twice a year", and "highly unlikely, but serious if it does" to the Michigan wife who said "any kind of pesticide can harm you, breathing it can make you sick, on you skin, it can hurt."

Table 13. Lawn Chemicals a Threat to Personal Health.

Responses	Georgia				Michigan				Total
	No		Use		No		Use		
	<u>Service</u>		<u>Service</u>		<u>Service</u>		<u>Service</u>		
	H	W	H	W	H	W	H	W	
No	2	3	4	3	4	2	2	1	21
Maybe/Don't know	3	2	1	0	1	2	2	2	13
Yes, a threat	0	0	0	2	0	1	2	1	6
Total	5	5	5	5	5	5	5	5	40

Respondents who asserted that there was no threat emphasized that they applied pesticides properly and used them sparingly so there was no danger. Others said that other pollutants such as second hand smoke were a greater threat. Several of those who were uncertain about any threat stated that they relied on

government agencies and the product manufacturer to make sure the lawn chemicals were safe.

Those respondents who indicated they felt there was a threat to their health generally considered it to be something that would be immediate and serious. For example, spilling something on the skin which would need to be washed off immediately was described as a serious, immediate risk but not as a long term health threat.

Several respondents voiced comments similar to those from the Michigan husband who was very adamant that he was sick of hearing about things like this

If we listen to everything - food, water, air giving us cancer - we'll all die of malnutrition. Guess the less pollutants we put in the air and ground, overall is going to be better, but I don't worry about those other thing too long.

While husbands or a service applied the lawn chemicals that were used, wives were more likely to say they thought there was a threat to their health. Five wives but only one husband stated "Yes, there is a threat". Two of the wives expressed concern that the lawn chemicals might affect one's breathing. This concern voiced by the wives is consistent with other research from the health literature that reports wives and mothers to be the person who is responsible for overseeing the health of others in the family.

Research Questions for Objective 4

- 1. Do homeowners view any particular type of clothing or personal protective equipment as a nonverbal clue signaling danger about the products and services being used?**
- 2. What kind of clothing would a homeowner choose for a lawn care technician to wear when applying pesticides?**



Figure 3. Outfit Offering Minimum Protection.

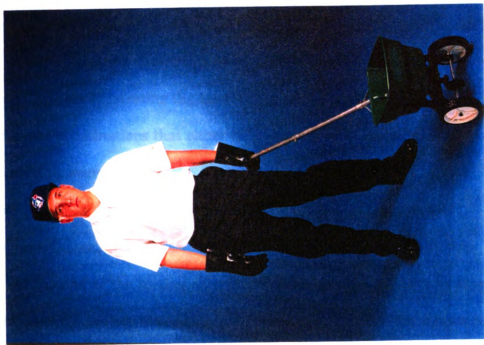


Figure 4. Typical Lawn Care Technician Outfit.

3. Does clothing worn by lawn care applicators influence the overall perception of the lawn care company?

Respondents were asked to sort pictures that represented a variety of outfits that a person could wear when applying pesticides. These outfits were designed to show how clothing and equipment could offer minimum to maximum coverage of the body. Those illustrating the least or the most protection were not necessarily the combinations that either homeowners or lawn technicians would need or want to wear.

Twelve basic outfits, with 62 different combinations of clothing and protective equipment, were presented. (Appendix A-IV) Each picture was unique. At the end of the sorting exercise respondents were asked why they sorted the pictures as they did, which outfit they would choose for a lawn care technician to wear when applying pesticides on the lawn, if they would wear that outfit, and would the outfit influence the hiring decision and their perception of the company. The outfit that was designed to be the least protective consisted of tennis shoes, shorts, and a short sleeved shirt (Figure 3). The outfit that looked most similar to an ordinary lawn care technician is shown in Figure 4.

Clothing/Equipment as a Danger Signal

Based upon the reactions to the outfits, the respirator and the Tyvek® fabrics, were the two major indicators of danger. Responses to the initial glimpse of one of these outfits included comments like "You must be kidding," "Looks like a nuclear cleanup crew," and "My dog would run and hide if that guy came on my yard." Despite this initial reaction, 15 respondents included a

respirator as part of the outfit that they would most prefer to see a lawn care technician wear (Table 14). Protection of the lungs was considered very important when applying pesticides. The most frequently chosen outfit with a respirator was the white Tyvek®. The dark Tyvek® elicited a negative reaction: "Looks scary" and "Don't like that metallic look". The fabric is not shiny under normal wearing circumstances. In photographing the lighting evidently was such that the outfits appeared "shiny, metallic like" to some respondents.

Table 14. Frequency with which Outfits With or Without Respirator Were Chosen.

Outfit	Respirator	No Respirator	Total	%
White Tyvek®	13	5	18	45.0
Blue coverall	3	8	11	27.5
Dark Tyvek®	2	2	4	10.0
Jacket/blue jeans	2	1	3	7.5
Long work pants	1	1	2	5.0
Shorts	1	1	2	5.0
Total	22	18	40	100

Choosing Clothing for Pesticide Application

Twenty eight respondents reported that the amount of skin showing in the pictures was the criteria they used to sort the outfits; they considered those outfits that covered more of the body to be more protective. Other sorting schemes were based on the amount of precaution that the respondent perceived



Figure 5. Outfit Chosen Most Often As Most Preferred.



Figure 6. Dark Tyvek® Outfit Chosen Most Often.

the wearer to be taking as indicated by the clothing and equipment, the wearing of pants in or over the boots. and combinations of the different types of equipment (the boots, gloves, mask) with no consideration of the clothing.

Tyvek® Outfits

White Tyvek® with the hood up, boots, goggles, sunglasses and respirator, was chosen by 8 of the 40 respondents as the most preferred. (Figure 5) Various combinations of the white Tyvek® with protective gear were chosen by 10 other individuals. In total, some variation of the white Tyvek® was chosen by 18 individuals as the outfit they would most prefer to see a lawn care technician wear when applying pesticides on the lawn.

Four people chose some variation of the dark Tyvek® outfit as their first choice. Two of these four outfits included the respirator (Figure 6).

Blue One-Piece Coverall

Eleven respondents chose some variation of the blue, one-piece coverall at their number one choice. Three of the eleven chose the full protective outfit which included the respirator as their first choice.

Jacket and Blue Jeans

Three people chose the jacket and blue jean combination outfit. Two respondents chose pictures with the respirator as part of the outfit.

Shorts and Short Sleeved Shirt

Two people chose the short sleeved shirt, shorts, boots, gloves basic outfit. One of these outfits included the respirator.

Other Outfits

One person chose the work pants, short sleeved shirt, boots, gloves, respirator, no glasses outfit. One person choose the work pants, long sleeved shirt, boots, no gloves, no respirator, no glasses outfit.

Respondent's Protective Clothing

Respondents were asked if they would wear an outfit like the one they chose for the lawn technician. Only three indicated that they would do so. Both men and women were unlikely to wear any special protective clothing. Gloves and boots were the most frequently mentioned kinds of protective gear. Women were more likely to say that they would never apply pesticides as compared to men. Men felt they did not need any special protection, i.e., the respirator, because they seldom applied any pesticides. The application of fertilizers was not viewed as being hazardous so special clothing and equipment need not be worn.

Perception of the Lawn Care Company

Reaction to Fully Protected Technician

Respondents were asked if they would be concerned if they saw a lawn care technician wearing full protective garb, like the pictures, working on their lawn (Table 15). Nineteen respondents reported that they would be concerned if they saw a lawn care technician wearing full protective garb, like the pictures, working on their lawn.

GA female, svc: Yes, anytime I saw one of those guys in the space suit with a mask on I would be very concerned about what he was doing.

GA male, no svc: Yes,...would raise a question in (my) mind, wonder what they are putting on there.

Table 15. Full Protective Garb Cause for Concern.

Responses	Georgia				Michigan				Total
	No		Use		No		Use		
	<u>Service</u>		<u>Service</u>		<u>Service</u>		<u>Service</u>		
	H	W	H	W	H	W	H	W	
Yes	2	0	1	3	1	3	5	4	19
Yes, but...	4	3	1	1	2	2	0	1	14
No	0	1	3	1	2	0	0	0	7
Total	5	5	5	5	5	5	5	5	40

GA male, svc: Sends message that this stuff is dangerous and you maybe shouldn't be spraying it in your yard. Does send the image that this stuff is dangerous.

MI female, no svc: Yea, I would think that if they have to wear that get up and they are telling me it's safe, there's something wrong. They put the sign up that say keep children and pets off the lawn for 24 hrs. It kind of makes me wonder.

MI female, svc: Not the one I selected (outfit), but the ones with the face mask would cause me concern.

MI male, svc: Yea, when the guy's wearing all covered up with the gas mask on, I wonder what in the Sam Hill is going on.

MI male, no svc: Yes, that they're going to kill something other than the grass...given the relative value of my lawn, anyone wearing one of those breathing apparatus, I'd have them stop. I can deal with dirt.

Fourteen respondents said they would be concerned but they qualified their answers. Nine respondents said "No, they would not be concerned." The reoccurring theme for both these groups was that lawn care technicians apply these chemicals for a living, 8 hours a day, 5 to 6 days a week so they should be wearing protective clothing. Respondents stated that the lawn chemicals may not be especially dangerous in a one time application (as when a homeowner uses it) but constant exposure could be harmful.

GA husband, svc: General public is educated enough to know if someone is working with chemicals...need protection.

GA husband, no svc: It scares me when I look at him, with all the things, (but) guess I wouldn't want myself to feel that he could be harmed because I don't want to see him wearing the right stuff.

GA wife, no svc: I think anyone who reads anything at all knows there are possibilities of problems...We'd like to have a lovely lawn and we're going to use chemicals...we certainly wouldn't want anyone to be damaged with it if we could avoid it.

GA wife, no svc: Looks like serious stuff but I understand the constant exposure.

GA wife, svc: With all the TV documentaries on lawn care I think most people are aware of the dangers.

GA wife, svc: If I see a lawn truck I assume there are chemicals on it and I don't think of the consequences. He needs to be protected.

MI husband, no svc: Employer is responsible. If a guy needs it he should wear it.

MI husband, no svc: It's one thing for someone to do that once a year, it's another to do it day after day.

MI wife, no svc: Lawn care wouldn't bother me wearing that stuff, but if tree service would wear that stuff. That would bother me...blowing around in the wind.

MI wife, svc: Yes, (cause me concern) but it's like an x-ray technician. They need protection...do day in and day out.

MI wife, svc: Yes, looks like nuclear power garb, but we're bombarded with that stuff about dangers to the environment. Don't know if it's all bad or not.

Clothing's Influence on Hiring

Respondents were then asked what effect a lawn technician's clothing would have on the decision to hire the company (Table 16). Twenty four people said "None." They reported that they seldom saw a company representative before hiring the service. Those who said "Maybe", "Professional", and "Yes" were more concerned with the general appearance of the company representative, i.e., wearing a uniform that was clean and professional looking and looking clean

Table 16. Outfits Influence on Hiring Decision.

Responses	Georgia				Michigan				Total
	No		Use		No		Use		
	Service		Service		Service		Service		
	H	W	H	W	H	W	H	W	
None	2	3	2	5	4	4	2	2	24
Maybe	2	1	2	0	0	0	2	1	8
Professional	0	1	0	0	1	0	1	1	4
Yes	1	0	1	0	0	0	0	1	3
No Answer	0	0	0	0	1	0	0	0	1
Total	5	5	5	5	5	5	5	5	40

and neat. All respondents believed it was unlikely that a company would send a sales representative to their home dressed in any kind of protective gear. Several stated that they would also be surprised if a technician came to their door in full protective gear. They would expect him to take off a respirator, hood, and gloves if he came to speak to them.

Respondents were then asked if the clothing would influence their decision to rehire the company. The answer was "No." The decision to rehire would be based on the quality of the service and the condition of the lawn. While the wearing of protective gear might cause questions to be raised about the product, the clothing alone would not warrant the canceling of the service.

Respondent Reaction to the Study

A significant finding that emerged from this research was the number of homeowners who had never thought about the lawn in relation to the

"environment". There was a complete disassociation of the lawn from the natural environment and the related environmental issues.

GA wife, no svc: Thought provoking...a lot of things you don't think about...lawn is just there. Easy thing to put a little squirt of poison on that weed. We're working people, don't have time to catch lady bugs. Chemicals are the solution.

GA wife, svc: I've never thought about how the scale of what I did would impact the environment. I've read a lot about the environment but I've never thought about my lawn.

GA wife, svc: There are more significant and long range things to worry about environmentally than the chemicals we use on our lawns. If we can find a nonharmful way to kill weeds, fertilize let's do it...otherwise use common sense.

GA husband, no svc: I think there are people who are looking after me out there so I don't have to worry about it that much. The news media, environmentalists. Keep you aware. I don't think that companies are making products are trying to hurt the environment. I don't worry about it too much.

GA husband, no svc: I don't want to give the appearance that I'm not concerned...but other things (environmentally) are more important the lawn.

MI wife, no svc: Going to have a whole new perspective of my lawn...really gives me a lot of food for thought.

MI wife, svc: If I were to do this interview with you in two weeks would probably be different. After thinking about some of these questions...Makes you think about your home and family.

MI husband, no svc: How is this going to do any good? Why are you doing something like this? What I've gotten from this is that you want me to be more aware of the chemicals we use on our lawn.

MI husband, svc: This has been, unquestionably, the most in depth consideration I've given to a lawn, mine or anyone else's. It was interesting.

MI husband, svc: Fascinating project. Not thought much about lawns and environment before this interview.

Only one respondent, a Georgia wife, said that she had thought about the effect of lawn chemicals on the environment. She stated that she would be willing to use alternatives to lawn chemicals but they would have to work. She echoed others when she said that she didn't believe that people would be willing to give up their green lawns.

CHAPTER V

SUMMARY AND DISCUSSION OF FINDINGS AND IMPLICATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This chapter includes the purpose of the study, the limitations of the study, and a discussion of the findings of the study and their implications for further research and practice.

Summary

The primary purpose of this study was to learn about the contemporary lawn and its care from a group of suburban homeowners through use of both qualitative and quantitative methodologies. Twenty suburban couples who owned homes in established, middle and upper-middle class subdivisions in Georgia and Michigan participated in the study. Half the couples currently used a chemical lawn care service and half did not use a service. Personal interviews were conducted, separately, with husbands and wives during June and July in 1994.

Limitations of the Study

Generalizations of the findings are limited to the population represented by the respondents: white, middle and upper-middle class, older suburban

homeowners in Georgia and Michigan. However, it is reasonable to expect some commonality among residential homeowners living in similar subdivisions across the United States.

Recruitment criteria were (a) being a suburban homeowners couple and (b) use or nonuse of a chemical lawn care service. No effort was made to achieve a balance among families based on presence or absence of children, age, or income.

Personal interview data can be greatly affected by the emotional state of the interviewee at the time of the interview, reactivity of the interviewee to the interviewer and to the content of the interview, and to the length of the interview. Respondents had been told the interview would take approximately an hour, all took longer. Most respondents spent an average of half an hour in the picture sort section of the interview. As a result, for most participants, responses to questions near the end of the interview tended to be very brief. Respondents participated in the study as unpaid volunteers. Interviews took place in respondent homes. Interruptions by the phone and children occurred during some of the interviews.

Discussion of the Findings

Objective 1

The first objective of this study was to identify Georgia and Michigan suburban homeowners' activities related to lawn maintenance and family use and perceived meaning of the lawn. There were very few differences between families in this particular group of suburban homeowners living in Georgia and

Michigan. They shared similar demographic characteristics, activities, and perceived meanings of the lawn.

Demographics

This was a highly educated, middle-aged, affluent, homogenous group of homeowners. Approximately a third of the respondents were retired. A large retired population provides a pool of individuals who have the time and financial resources to spend on the lawn. For most people, owning their own home is the biggest financial investment that they ever make. One does not own a home, with its surrounding grounds, with the expectation that it will be a depreciating investment. The lawn and its care were very important to all the homeowners.

Maintenance

The growing season for grass is longer in Georgia but only one Georgia husband mentioned that fact. There are differences in the kinds of grasses that grow in Georgia and Michigan but that did not appear to be a factor in lawn maintenance. Pinestraw, a groundcover, was used in Georgia. No one in Michigan used it. Michigan homeowners talked about dandelions. Georgia homeowners did not.

All the homeowners owned a wide assortment of lawn equipment. Everyone owned a lawn mower, even the families who were using a mowing service. There were few differences between families who used a chemical lawn service and those who did not use one. All the homeowners had used a chemical service at some time in the past. Several of the no service husbands mentioned that they planned

to use one again when they judged the condition of the lawn to be in need of professional help.

Activities

Activities on the lawn were minimal. Those activities that took place were usually in the back yard. Children and dogs played primarily on the back lawn. Only one family with children extensively used the back yard. Many children spend their days with a child care provider before they begin school and after starting school they are involved in many extracurricular activities. The children in this study did not spend a great amount of time playing on their lawns.

Perceived Meaning of the Lawn

The lawn provides aesthetic and psychological satisfaction. People find pleasure in it both for its beauty and for its place in "manicured" nature. It is also viewed as a part of the self, it tells the world who one is. As Rapaport (1982) has written, environmental elements become indicators of social position, ways of establishing group or social identity, and ways of defining situations within a specific culture which in turn lead to expected behaviors in the settings. The lawn reflects looks, identity, and values of a person, the family, and the neighborhood.

The aesthetic domain tallied the most responses. Within this domain, while beauty ranked the highest, the perception of "neatness" appears to be very strong. This may be very similar to what is seen in the clothing literature; if a garment is soiled, the viewer is unable to see its beauty. The research related to preference has also shown that people prefer a more managed look in nature.

The number of statements made by respondents that were classified under the self component in the psychological domain illustrate how clearly perceptions of the lawn are associated with the sense of self. Individuals easily verbalized multiple meanings of their lawn. The manicured lawn makes one feel good and gives a sense of accomplishment and pride. Although much of the activity fulfills personal goals and needs, the awareness of others' expectations is nearly as strong. Responses to the third component, nature, support the idea that homeowners view their lawns as part of an idealized form of nature. It should be green, lush, weed free and neat.

Respondents were very aware of the neighborhood norms and sanctions. The norms and standards of the neighborhood strongly influence the care and maintenance of the lawn.

The reservation responses reflect uncertainty and some frustration about the necessity of having a lawn. But as several people asked, "What else do you do with the yard? I don't want dirt." In America lawn grass is considered the ideal groundcover for open areas in both the front and back yard. Even though there may be other plants available that would serve the same environmental purposes (control erosion and provide cooling) and would require less maintenance no one in this study questioned the use of grass. It is the plant of choice for lawns.

Responses related to the economic domain illustrate the belief of homeowners that the ideal American lawn adds real dollar value to their property. If a beautiful, manicured lawn adds profit or salability to a home, it is hard to

imagine the homeowner will just "let it go natural". For many, natural means weeds and, for both health and aesthetic reasons, Americans do not like weeds. As the next generation moves up the housing chain, it is difficult to envision a major change in the ideal lawn unless some significant health or environmental event happens to change this perception. Lawns, and related industries, are a multi-billion dollar business in the United States.

Respondents enjoyed working on their lawns for the physical exercise. Those who spoke about exercise often talked about being outdoors, with "nature", at the same time.

But responses from these suburban homeowners suggest that the lawn is not viewed as "natural" environment. Only two individuals talked about the importance of grass in controlling erosion and generating oxygen. This is consistent with the findings from the two focus groups and Gallup poll that were reported in the review of literature. Environmental considerations are not top-of-mind responses for individuals when asked about the suburban lawn. This might be different if one were talking to a homeowner of a newly built home. But even at this point, where controlling the soil from erosion is important, homeowners do not just plant anything that will grow. Landscapers are hired and grass, shrubs, and trees are artistically arranged and planted.

Objective 2

The second objective was to compare spousal lawn activities and perceived meaning of the lawn. Husbands were responsible for caring for the lawn. Wives tended the flowers. The question of who hires a chemical lawn service was not

readily answered. It appears it is a joint decision based upon time considerations and the appearance of the lawn. Generally, neither spouse had a great deal of knowledge about what chemicals were used on the lawn. This was true for both service and nonservice users.

Perceived meanings were very similar for husbands and wives. The idea that the lawn provides as means of physical exercise was mentioned by more husbands than wives. This may be a reflection of the way the study was constructed. The focus of this study was lawn grass. Women are primarily responsible for the flowers and few actively participated in mowing and maintaining the lawn. There may have been more mention of exercise if they had been asked about their gardening activities.

Objective 3

The third objective was to explore homeowners' beliefs about environmental and health concerns related to the use of lawn chemicals. The reaction to the environmental scale was surprising. Respondents did not understand what this environmental scale had to do with their lawn. Several husbands became very upset. Respondents reacted to the lawn chemical statements in the scale, stating that some use of lawn chemicals was necessary.

When asked if these chemicals posed a threat to the environment 18 said "Yes", while the remaining 22 generally felt that they did not. The trend for more wives to believe there was a threat is consistent with other environmental literature dealing with gender.

When asked what difference it would make to the local environment if they stopped using lawn chemicals, the majority of respondents said that the appearance and attractiveness of their lawn would diminish. Approximately a fourth of the sample said it would make no difference. Only two individuals thought it might be beneficial if they stopped using lawn chemicals. When asked if it would make a difference to the global environment if they stopped using lawn chemicals, only one Michigan wife indicated it would. Others thought it might but not as just one person. They did not think that if they stopped using lawn chemicals their neighbors would too. And they did not see a need to stop using lawn chemicals because they did not think that their use was affecting the environment.

The possibility of an immediate health threat was more real. Spills and fumes were viewed as having potential for immediate and serious harm. Again the trend was for more women to be concerned about health than men.

Objective 4

The fourth objective was to investigate the role of clothing as a nonverbal clue in the perception of danger related to the use of lawn chemicals. The use of special clothing and equipment for lawn care technicians received overwhelming acceptance. Although respirators and special protective garments were viewed with initial alarm, when asked which outfit they would prefer to see a lawn technician wear, the majority of the participants chose outfits that provided complete protection for the wearer. A common response was that the lawn technicians worked full time applying chemicals and they should be protected.

Thirty six of the forty respondents chose an outfit that offered full body protection from the neck down. Twenty two respondents included a respirator as part of their preferred outfit. All the outfits included rubber boots. Only two outfits were chosen that did not include gloves. The outfit that had been designed to be the most protective was chosen by the greatest number of respondents (8 of 40). Variations of that outfit category were chosen by 45% of the respondents. Respondents reported that the wearing of protective clothing would have no influence in their decision to hire or rehire a lawn care company.

Individual homeowners judged themselves to be at much less risk than a technician. They did not usually wear protective clothing and did not perceive it necessary to do so in the future. They felt that because of the infrequency of their chemical applications they received little exposure. The use of fertilizer was not viewed as being dangerous.

Implications and Recommendations for Future Research

The negative response to the environmental scale poses questions for conducting research projects and developing educational materials. Respondents questioned what these kinds of statements had to do with their lawn and who was funding the study. No one terminated their interview but, for those who were most upset, the responses from this point onward tended to be very brief. What triggered this reaction? Several respondents mentioned the number of environmental organizations that solicited funds in their neighborhood. Did they think the interview would conclude with a plea for donations? Did respondents unconsciously feel that they could be harming the environment by using lawn

chemicals and so became defensive? Would another topic such as recycling have elicited a similar response? Are there so many conflicting messages about the environment that people feel overwhelmed and just do not want to discuss environmental issues? Or was this response unique to this group of homeowners?

This situation also raises the question of what kind of reactions do people have to materials labeled "environmental"? The researcher believes that the respondents who reacted so strongly would have refused to be interviewed if they had associated "environmental" with the study during the recruitment call. Would this be true for other populations? If it is true for other homeowners who are similar to those in this study, do inferences made in other environmental studies need to be weighted for this kind of negativism? Has the term "environmental" developed a negative connotation? Are there other terms that could be used that would evoke positive reactions?

Homeowners talk about their lawns and nature yet they do not associate their lawns with the larger natural environment. Is this true for other homeowners in American society? Would other groups feel as strongly about their lawns as this group? If lawn chemicals prove to be detrimental to the environment and health, will Americans be willing to accept a less than perfect lawn? Can alternate products and plants be developed that would reduce the need for extensive use of chemicals? Research that includes urban, rural, and city homeowners as well as greater ethnic diversity, different family styles, and wider price ranges of homes would provide more depth and clarity to the meaning of the lawn and answers to these questions. Results of this study, along

with other studies, indicate that the aesthetic and psychological meanings of the lawn are of the greatest importance.

Definitive scientific studies that provide satisfactory answers to the questions regarding the environmental and health effects of lawn chemicals are lacking. A great deal of research is ongoing in many different fields. The questions about the health effect of pesticides on children are especially troubling. How much exposure is there for children from pesticides on the home lawn? How does this compare to other chemically treated grassy areas where children play such as day care centers, school grounds, and parks? How does lawn exposure compare to the exposure from chemicals used inside the home? How does the presence of children influence beliefs and attitudes about the use of lawn chemicals?

The willingness by this group of homeowners to accept a maximum level of protective clothing for a lawn technician needs to be explored with other groups. The outfits that represented the most protective end of the continuum would probably be unnecessary for either homeowners or lawn technicians in the usual lawn chemical application situations. However, these findings, if validated by other studies, could provide assurance to the lawn care industry that, in situations where it was warranted, protective clothing would not drive away customers.

The purpose of this study was to explore the meaning, activities, and concerns related to the American lawn. Boyden's biohistorical approach provided an ecological-historical framework in which to explore the phenomenon of the ideal American lawn. When this study was initially being planned the

researcher and her advisor had difficulty in organizing the research objectives and questions. Understanding and tracing the development of the lawn through history and examining the social, legal, and technological influences were very important in designing a coherent study.

The historical development of the lawn provided important insights into understanding why current attitudes, beliefs, values, and practices associated with the American lawn exist. The English ideal of grass, Thomas Jefferson and his belief in the small landowner, and the advent of the Industrial Revolution with the resulting migration to the city all were powerful influences on the evolution of the ideal lawn. Technological inventions such as the lawn mower, improved grass varieties, and synthetic chemicals have made lawn maintenance much easier. Societal changes including dual income families, the increasing popularity of the game of golf, and a growing retired population are continuing to shape and strengthen the ideal of the lawn.

Many legal and social systems continue to support the ideal lawn. Deed restrictions and neighborhood covenants that mandate a certain standard of appearance, set backs from the street, advertising, and peer pressure from neighbors demand that the homeowners maintain a lawn. This lawn is, at the minimum, to be kept mowed and relatively neat and in its most ideal form - be green, thick, lush, weed free, and manicured.

The attitudes and beliefs that were reflected in responses in this study have major implications for education efforts involving the suburban lawn and lawn chemicals. Respondents disassociate their own lawns from the general

environment. Given the historical importance of the lawn, the current strength of the support systems for the lawn, and the uncertainty about environmental and health effects it appears unlikely that current lawn maintenance practices will change very much in the near future.

The biohistorical approach demands access to and assimilation of an enormous amount of material from many disciplines. Many hours of reading and thinking result in the generation of many pages of writing. Yet if one is to understand the context within which beliefs and values develop and evolve this kind of approach is essential. More studies using this kind of framework and qualitative methodology would add to the depth, richness, and understanding of many research problems.

APPENDICES

APPENDIX A
INTERVIEW MATERIALS USED IN THE STUDY

APPENDIX A-I

TELEPHONE SCREENER

I.D. _____

NAME: _____ PHONE: _____

SPOUSE'S NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

Hello, I'm calling in regard to a study that is being done at Michigan State University, E. Lansing, MI. We are talking to homeowners in Michigan and Georgia about their lawns. We want to find out why lawns are important to people, how individuals care for their lawns, and how they feel about lawn care services.

Q-1. Do you currently use a lawn care service to care for your lawn?

1. _____ YES (Put in lawn service quota. N=5)
2. _____ NO (Put in do-it-yourself quota. N=5)

INVITATION: We would like to talk with you and your spouse, personally, about your lawn and its care. You and your spouse would be interviewed during the same time period but separately. This interview will take approximately an hour. As part of the study we want to take pictures of respondent's front lawns. Would this be okay with you?

(Respondent does not have to agree to pictures to be part of study.)

_____ Agreed to pictures _____ No to pictures

When can we schedule an appointment with you?

DAY _____ TIME _____

DIRECTIONS to interview location:

Thank you for your willingness to participate in the study. We will call you the day before your interview to make sure that the time is still alright.

APPENDIX A-II

Informed Consent

I, the undersigned (respondent), freely consent to participate in a study about my household's use of lawn care products and services. I do so with the understanding that our responses will contribute to the goals of the research project. The purposes of the study have been explained to me. The following understandings are held in common and agreed to by both parties:

- 1) The interview, which will take approximately two hours, will be audio taped by the interviewer.**
- 2) The confidentiality of the interview is guaranteed and absolute. No transcription or analysis or representation of the information collected will ever contain the personal identification of the respondent, or the specific location of the residence where pictures were taken. Audio tapes will be destroyed after transcription is complete.**
- 3) The respondent is assured that no follow-up contact will be made for the purpose of sales, solicitation or other commercial purpose. No record of name, address or other identifying data about the respondent will ever be given, sold or transferred to any other party.**
- 4) I understand that I can terminate the interview at any time.**

If there are any questions, the respondent is invited to call Dr. Ann Slocum, Michigan State University, 1-517-355-3779 or Lois Shern, 1-404-578-8334.

INFORMED CONSENT FOR THE INTERVIEW:

for Michigan State University: Respondent:
(Interviewer)

CONSENT FOR PICTURES:

I agree to allow two pictures of the exterior of my house and front lawn to be taken. I understand that the photographs may be used in educational and research presentations or publications. I understand that my name, street address or city will not be identified in any use of the photographs.

for Michigan State University: Respondent:
(Interviewer)

APPENDIX A-III

INTERVIEW GUIDE

INTRODUCTION

I'm _____ . I'll be talking with you for the next couple hours about your lawn. The purpose of the study is to find out why lawns are important to people, how individuals care for their lawns, and how they feel about lawn care services.

I'd like to tape the interview. I don't take shorthand and the tape will help me remember exactly what you said. Your responses will be grouped with those of others taking part in the study. Your name will never be associated with any statements. The tape will be destroyed after the study is over. Is the taping okay with you?

ASK THE FOLLOWING IF THEY AGREED TO TAKING PICTURES IN SCREENER:

During the initial phone call we asked if pictures could be taken of your front lawn. Is this still alright? You do not have to be home when we come. These pictures would be used for illustration purposes. The only identification would be "A lawn in (state name)". Your address and name would never be associated with the picture.

We have the consent form that needs to be signed. Please read it and see if you have any questions.

CHECKLIST:

_____ Informed Consent Signed

_____ OK to take picture of lawn

Q-1. WE'RE GOING TO BE TALKING ABOUT YOUR LAWN DURING THIS INTERVIEW. I REALIZE THAT YOU ALSO HAVE TREES, SHRUBS, AND FLOWERS IN YOUR YARD BUT I WOULD LIKE YOU TO TRY TO THINK PRIMARILY ABOUT YOUR LAWN. PLEASE DESCRIBE YOUR LAWN.

CHECKLIST FOR INTERVIEW:

- ☐ **Size**
- ☐ **General Appearance**
- ☐ **Am't Work**

**Q-2. WHAT KIND OF ACTIVITIES TAKE PLACE ON YOUR LAWN?
WHAT DO YOU DO ON THE FRONT LAWN? BACKYARD LAWN?**

CHECKLIST FOR INTERVIEWER:

- ☐ **Play/Socialize Area**
- ☐ **Hang Out Clothes**

**Q-2a. HOW DO YOU FEEL ABOUT HAVING A LAWN?
WHAT DOES YOUR LAWN MEAN TO YOU?**

CHECKLIST FOR INTERVIEWER:

- ☐ **Meaning**
- ☐ **Beauty**
- ☐ **Nature**

Q-3. WHAT DO YOU, YOURSELF, DO TO TAKE CARE OF YOUR LAWN?

(If respondent says, "NOTHING", ASK:

WHO DOES THE LAWN WORK? WHAT DO THEY DO?

DO (DID) YOUR CHILDREN HELP?

ARE THERE SOME THINGS THAT NO ONE DOES?

CHECKLIST FOR "SELF":

- ☐ **Aerate lawn. Reseed.**
- ☐ **Clippings? Compost?**
- ☐ **Edging/special trimming.**
- ☐ **Equipment - what used?**
 - ☐ **Clippers Blower Edger**
 - ☐ **Mower Spreader Sprinkler**
- ☐ **Flowers**
- ☐ **Grass/leaf raking.**
- ☐ **Leaf/pine needle blowing.**
- ☐ **Mow - how often? Time?**
- ☐ **Pest Control - what used? How often?**
- ☐ **Questions. Who/Where go for answers.**
- ☐ **Shrubs.**
- ☐ **Thatch.**
- ☐ **Trees.**
- ☐ **Water - how often?**
- ☐ **Weed Control - what used? How often?**

**Q-3a. If use a service, ASK: HOW MANY TIMES/YR IS SERVICE DONE?
HOW MUCH DOES THE SERVICE COST?**

CHECKLIST FOR SERVICE:

- ☐ Aerate lawn. Reseed.
- ☐ Clippings? Compost?
- ☐ Edging/special trimming.
- ☐ Equipment - what used?
Clippers Blower Edger
Mower Spreader Sprinkler
- ☐ Flowers
- ☐ Grass/leaf raking.
- ☐ Leaf/pine needle blowing.
- ☐ Mow - how often? How much Time?
- ☐ Pest Control - what used? How often?
- ☐ Questions. Who/Where go for answers.
- ☐ Shrubs.
- ☐ Thatch.
- ☐ Trees.
- ☐ Water - how often?
- ☐ Weed Control - what used? How often?

Q-4. DOING THESE KINDS OF THINGS TAKES TIME AND MONEY.

WHY DO YOU DO ALL THIS?

DO YOU ENJOY DOING IT, OR IS IT A BURDEN?

**ARE THERE NEIGHBORHOOD COVENANTS OR RULES SAY THAT YOU
HAVE TO DO THESE THINGS?**

IF YES, ASK: WHAT ARE THESE RULES?

CHECKLIST FOR INTERVIEWER:

- ☐ Neighbors' Expectations
- ☐ Adds value to house.
- ☐ Have to! Why?
- ☐ Hire service so don't
have to handle chemicals
- ☐ Exercise
- ☐ Like being out of doors

**Q-5. WHAT DO YOU THINK WOULD HAPPEN IF YOU DIDN'T CARE FOR
YOUR LAWN LIKE YOU DO?**

CHECKLIST FOR INTERVIEWER:

- ☐ Association rules
- ☐ Neighbors sue
- ☐ Association fine me
- ☐ Weeds would grow

Q-5a. WHEN YOU LOOK AROUND YOUR NEIGHBORHOOD, WHAT DO YOU NOTICE ABOUT OTHER PEOPLE'S LAWNS?

CHECKLIST FOR INTERVIEWER:

_____ Weeds

Q-5b. HOW WOULD YOU FEEL IF YOUR NEIGHBOR NEXT DOOR PLANTED A FIELD OF WILDFLOWERS IN THEIR FRONT YARD?

Q-6. NOW I'D LIKE YOU TO TAKE A LITTLE TRIP DOWN MEMORY LANE. WHAT DO YOU REMEMBER ABOUT LAWNS WHEN YOU WERE GROWING UP?

CHECKLIST FOR INTERVIEWER:

_____ Did you have to mow?

_____ 1st time mowed

_____ Age 1st mowed

_____ How much mowed?

_____ Parents do same as you do now?

_____ If no lawn, what about any trees, parks, etc.

Q-7. Clothing Pictures.

A. NOW I'D LIKE YOU TO LOOK AT THIS SET OF PICTURES. THESE ARE PICTURE OF OUTFITS THAT A PERSON COULD WEAR WHEN APPLYING PESTICIDES. WHAT I'D LIKE YOU TO DO IS SORT THEM INTO GROUPS. YOU CAN SORT THEM IN ANY WAY THAT YOU WANT. THE FOOTWEAR IN THE PICTURES ARE EITHER TENNIS SHOES OR BOOTS.

Group Color: _____

TELL ME ABOUT YOUR GROUP(S).

WHY DID YOU SORT THEM IN THIS WAY?

WHICH OUTFIT WOULD YOU PREFER TO SEE A LAWN CARE TECHNICIAN WEAR?

B. HERE'S ANOTHER SET OF PICTURES. HOW WOULD YOU GROUP THESE?

Group Color: _____

WHY DID YOU GROUP THEM LIKE THIS?

WHICH OUTFIT WOULD YOU PREFER TO SEE A LAWN CARE TECHNICIAN WEAR?

C. HERE'S A THIRD SET OF PICTURES. HOW ABOUT THESE?

Group Color: _____

WHY DID YOU GROUP THEM LIKE THIS?

WHICH OUTFIT WOULD YOU PREFER TO SEE A LAWN CARE TECHNICIAN WEAR?

- D. OF THE OUTFITS THAT YOU CHOSE, WHICH ONE IS THE BEST?
WOULD YOU WEAR AN OUTFIT LIKE THIS?
WHAT WOULD YOU WEAR?**
- E. WOULD ANY OF THESE OUTFITS CAUSE YOU TO BE CONCERNED
ABOUT THE PRODUCT BEING APPLIED?**
- F. DO YOU THINK THAT WHAT A LAWN CARE EMPLOYEE WEARS WOULD
INFLUENCE YOUR DECISION TO HIRE THAT PARTICULAR COMPANY?
REHIRE THE COMPANY?**
- G. DO THINK THAT THE CHEMICALS A LAWN CARE COMPANY USES ARE
THE SAME KIND THAT A HOMEOWNER BUYS AND USES? WHY?**

Q-8. Environmental Scale.

**WE'RE GOING TO HAVE A CHANGE OF PACE NOW. I'D LIKE YOU TO
READ THE STATEMENTS ON THIS SHEET AND RATE EACH ONE BY
CIRCLING THE NUMBER WHICH CORRESPONDS WITH YOUR
AGREEMENT OR DISAGREEMENT FOR EACH STATEMENT.**

**WHAT'S YOUR REACTION TO A SERIES OF STATEMENTS LIKE THIS?
WERE THERE ANY STATEMENTS THAT WERE HARD TO UNDERSTAND?
ARE THERE ANY TERMS THAT YOU'RE UNFAMILIAR WITH?
WERE THERE ANY STATEMENTS THAT SEEMED TO MEAN THE SAME
TO YOU? (Be sure to ASK:)**

WHAT DOES THE TERM "STEADY-STATE" MEAN TO YOU?

- Q-9. I HAVE A SECOND SET OF STATEMENTS THAT I WOULD LIKE YOU TO
RATE. THIS IS A LITTLE DIFFERENT THAN THE LAST RATING. THIS
IS A 1 TO 7 SCALE. PLEASE CIRCLE THE NUMBER THAT BEST
DESCRIBES YOUR FEELINGS ABOUT EACH QUESTION.
(After completed ratings take back the completed sheet)
Ask the following Questions:**

- A. DO YOU THINK THAT USING LAWN CHEMICALS (FERTILIZERS,
PESTICIDES, HERBICIDES) POSES ANY KIND OF THREAT?
PERSONALLY FOR HEALTH? TO THE ENVIRONMENT IN GENERAL?**
- B. WHAT DIFFERENCE WOULD IT MAKE TO YOUR LOCAL, NEIGHBORHOOD
NATURAL ENVIRONMENT IF YOU STOPPED USING CHEMICALS ON YOUR
LAWN?**
- C. WHAT DIFFERENCE WOULD IT MAKE TO THE GLOBAL ENVIRONMENT IF
YOU STOPPED USING CHEMICALS ON YOUR LAWN?**
- D. WHAT'S YOUR REACTION TO THE STATEMENT: WHEN YOU COMPARE
ACRE TO ACRE, HOMEOWNERS USE TEN TIMES MORE CHEMICALS THAN
AGRICULTURE DOES?**

ENVIRONMENTAL SCALE

Please circle ONE answer for each of the following items:

	Strongly Agree	Mildly Agree	Mildly Agree	Strongly Agree
1. We are approaching the limit of the number of people the earth can support.	1	2	3	4
2. The balance of nature is very delicate and easily upset.	1	2	3	4
3. Humans have the right to modify the natural environment to suit their needs.	1	2	3	4
4. Chemicals must be used in order to have a nice lawn.	1	2	3	4
5. Mankind was created to rule over the rest of mankind.	1	2	3	4
6. When humans interfere with nature it often produces disastrous consequences.	1	2	3	4
7. Plants and animals exist primarily to be used by humans.	1	2	3	4
8. To maintain a healthy economy we will have to develop a "steady-state" economy where industrial growth is controlled.	1	2	3	4
9. Humans must live in harmony with nature in order to survive.	1	2	3	4
10. Lawn chemicals will not harm the environment if they are properly used.	1	2	3	4
11. The earth is like a spaceship with only limited room and space.	1	2	3	4
12. Humans need not adapt to the natural environment because they can remake it to suit their needs.	1	2	3	4
13. There are limits to growth beyond which industrialized society cannot expand.	1	2	3	4
14. Mankind is severely abusing the environment.	1	2	3	4
15. Lawn chemicals are dangerous and other things should be used in place of them.	1	2	3	4

HEALTH SCALE

Please circle ONE number for each statement.

1. How likely is it that getting pesticide on your skin will cause an immediate health risk?

Very
Likely

Very
Unlikely

1 2 3 4 5 6 7

2. How serious do you think that immediate health risk is apt to be?

Very
Serious

Very
Mild

1 2 3 4 5 6 7

3. How likely is it that getting pesticide on your skin will cause long-term harm?

Very
Likely

Very
Unlikely

1 2 3 4 5 6 7

4. How serious do you think that long-term harm is apt to be?

Very
Serious

Very
Mild

1 2 3 4 5 6 7

Q-10. WE'VE COVERED A LOT OF TOPICS IN THE LAST HOUR OR SO - HOW YOU FEEL ABOUT YOUR LAWN, ACTIVITIES, MEMORIES, LOOKED AT THE CLOTHING PICTURES, TALKED ABOUT THE ENVIRONMENT - ARE THERE ANY OTHER COMMENTS YOU WOULD LIKE TO MAKE ABOUT YOUR LAWN, THE CLOTHING OUTFITS, OR ANYTHING ELSE?

Q-11. Background Information.

ALL WE HAVE LEFT ARE A FEW DEMOGRAPHIC QUESTIONS.

A. Do you have any children living at home?

1. ☐ NO

2. ☐ YES -> 2a. How many? _____

Ages? _____

B. Do you have any pets?

1. ☐ NO

2. ☐ YES -> 2a. What? _____

C. Are you presently employed outside the home?

1. ☐ NO

2. ☐ YES -> 2a. What do you do? _____

D. What is your age? _____
(years)

E. Do you belong to any environmental organizations?

1. ☐ NO

2. ☐ YES -> 2a. Which ones? _____

F. How many years of schooling have you completed? _____
(Highest degree completed)

G. Which of the following categories best describes your total family income for 1993?

(Hand income sheet to respondent. Let them fill it out themselves)

(If Refuse to Answer code as 10)

H. (Observe RACE/ETHNICITY _____)

Which of the following categories best describes your total family income for 1993?

1. ____ **Less than \$25,000**
2. ____ **\$25,001 to \$50,000**
3. ____ **\$50,001 to \$75,000**
4. ____ **\$75,001 to \$100,000**
5. ____ **\$100,001 to \$125,000**
6. ____ **\$125,001 to \$150,000**
7. ____ **\$151,001 to \$175,000**
8. ____ **\$175,001 to \$200,000**
9. ____ **Greater than \$201,000**

APPENDIX A-IV

CLOTHING COMBINATIONS FOR PICTURES

Description of the garments and equipment:

Short sleeved, white shirt of polyester/cotton knit with a placket and pocket.

Long sleeved, white sweatshirt of 100% cotton.

Navy colored shorts of polyester and cotton.

Navy work pants of polyester and cotton.

Navy coveralls of work weight, cotton and polyester.

White and dark Tyvek® are disposable coveralls. Tyvek® is a spunbonded olefin fabric manufactured by Du Pont. Different types are recommended for different kinds of pesticide applications.

The jacket of polyester and cotton.

The jeans of blue denim.

Cotton, rubber soled tennis shoes.

Gloves and boots of rubber.

Sunglasses had the side and top shield.

Respirator.

ALL outfits were photographed with a baseball style cap.

OUTFIT A:

A1. TENNIS SHOES, SHORTS, socks, SHORT sleeved shirt, NO gloves

ADD:

A2. Gloves

A3. Safety Glasses and Gloves

A4. Respirator and Gloves - No Safety glasses

A5. Respirator and Gloves - With Safety glasses

OUTFIT B:

B1. BOOTS, SHORTS, socks, SHORT sleeved shirt, NO gloves

ADD:

B2. Gloves

B3. Safety glasses and Gloves

B4. Respirator and Gloves - No Safety glasses

B5. Respirator and Gloves - With Safety glasses

OUTFIT C:

C1. TENNIS SHOES, SHORTS, socks, LONG sleeved shirt, NO gloves

ADD:

C2. Gloves

C3. Safety glasses and Gloves

C4. Respirator and Gloves - No Safety glasses

C5. Respirator and Gloves - With Safety glasses

OUTFIT D:

D1. TENNIS SHOES, BLUE JEANS, socks, SHORT sleeved shirt, NO gloves

ADD:

D2. Gloves

D3. Safety glasses and Gloves

D4. Respirator and Gloves - No Safety glasses

D5. Respirator and Gloves - With Safety glasses

OUTFIT E:

E1. BOOTS, BLUE JEANS, socks, SHORT sleeved shirt, NO gloves

ADD:

E2. Gloves

E3. Safety glasses and Gloves

E4. Respirator and Gloves - No Safety glasses

E5. Respirator and Gloves - With Safety glasses

OUTFIT F:

F1. BOOTS, BLUE JEANS, socks, LONG sleeved shirt, NO gloves

ADD:

F2. Gloves

F3. Safety glasses and gloves - alone

F4. Respirator and Gloves - No Safety glasses

F5. Respirator and Gloves - With Safety glasses

OUTFIT G:

G1. JACKET (Hood DOWN), GLOVES, BOOTS, socks, BLUE JEANS

ADD:

G2. Safety Glasses

G3. Respirator - No safety glasses

G4. Respirator - With safety glasses

OUTFIT H:

H1. JACKET (Hood UP), GLOVES, BOOTS, socks, BLUE JEANS

ADD:

H2. Safety Glasses

H3. Respirator - No safety glasses

H4. Respirator - With safety glasses

OUTFIT I:

I1. BOOTS, WORK PANTS, socks, SHORT sleeved shirt, NO gloves

ADD:

- I2. Gloves**
- I3. Safety glasses and Gloves**
- I4. Respirator and Gloves - No Safety glasses**
- I5. Respirator and Gloves - With Safety glasses**

OUTFIT J:

J1. BOOTS, WORK PANTS, socks, LONG sleeved shirt, NO gloves

ADD:

- J2. Gloves**
- J3. Safety glasses and Gloves**
- J4. Respirator and Gloves - No Safety glasses**
- J5. Respirator and Gloves - With Safety glasses**

OUTFIT K:

K1. BOOTS, WORK COVERALLS, NO gloves

ADD:

- K2. Gloves**
- K3. Safety glasses and gloves**
- K4. Respirator and Gloves - No Safety glasses**
- K5. Respirator and Gloves - With Safety glasses**

OUTFIT L:

L1. DARK TYVEK® BOOTS, WITH gloves

ADD:

- L2. Safety glasses and Gloves**
- L3. Respirator and Gloves - No Safety glasses**
- L4. Respirator and Gloves - With Safety glasses**

OUTFIT M:

M1.WHITE TYVEK® (Hood DOWN), BOOTS, WITH Gloves

ADD:

- M2.Safety glasses and gloves**
- M3.Respirator and Gloves - No Safety glasses**
- M4.Respirator and Gloves - With Safety glasses**

OUTFIT N:

N1. WHITE TYVEK® (Hood UP), BOOTS, GLOVES, RESPIRATOR, SAFETY GLASSES

APPENDIX B

REVIEW OF LITERATURE RELATED TO

HOMEOWNER'S PESTICIDE USE

APPENDIX B

Homeowner's Pesticide Use

A South Carolina study (Finklea, Keil, Sandifer, & Gadsden, 1969) was among the first to report on pesticide use in the home. They found that 89% of the 121 white families and 75 African American families surveyed used pesticides. Approximately one third of the users applied these chemicals during each week of the year. Most of the users ignored common sense safety precautions, e.g. 88% did not keep pesticides in a locked area, 66% stored them within reach of small children, and 54% placed them near food or medicine.

In a study of three urban areas - Philadelphia, PA; Dallas, TX; and Lansing, MI 92.5% of the 525 respondents reported using pesticides (von Rumker et al., 1974). Home and garden applications accounted for 12% of the total use of the 25 compounds that were considered. Only 8.5% of these respondents indicated that they were concerned with possible side effects from pesticide use.

Other studies have consistently shown that a high proportion of homeowners use pesticides. In 1974, 230 families in 18 Colorado communities were interviewed to determine their pesticide practices. Of these families, 72% used pesticides (Colorado ..., 1974). Lande (1975) in a study of 39 Pennsylvania families reported 85% used pesticides.

In 1976 a study of national scope was undertaken to determine the quantities of pesticides applied in the home environment (Savage, Keefe, & Wheeler, 1979). A total of 8,254 U.S. households in 25 SMSAs participated in the study. Nine out of every ten

households (90.7%) reported using some type of pesticide in their house, garden, or yard. This is consistent with findings from the previous small studies. It was estimated that three times as many householders used pesticides inside their houses as in their yards (83.7% use pesticides in the house, 21.4% in the garden, and 28.7% in the yard). Based upon comparisons among the geographic regions represented in the study, the southeastern region of the United States had the highest use of pesticides in the house (94%), while the California, Arizona, New Mexico region had the highest garden (27.7%) and yard usage (62.2% yard). Over 500 different pesticide formulations were found to be used. Fifteen pesticide formulations accounted for 65.5% of all observed pesticide containers. Many of the householders did not know what they used and less than 50% reported reading labels.

In 1990, a second national study was done for the EPA by Research Triangle Institute in Research Triangle Park, North Carolina (Whitmore et al., 1992). The study was based on a sample from 60 counties located throughout the continental United States. It was designed to provide defensible national inferences, not regional inferences. A response rate of 84.9% resulted in 2,078 households participating in the survey. Based on data from this study it is estimated that 90% of single-family residences have at least one pesticide product in storage, significantly greater than the estimated 70% for multifamily dwellings. About 85% of all households had at least one pesticide product in storage, 63% had one to five products in storage, and 22% had more than five products in storage. Products defined as pesticides included disinfectants, fungicides, insecticides, molluscicides, rodenticides, herbicides, and repellents. During the year prior to the study, approximately 65% of the households had used an insecticide and 59% had used herbicides.

Other important findings included:

- 1. Households with young children (47%) are less likely to have pesticide products stored within their reach than those without children (75%).**
- 2. About one million households have products containing chlordane, 150,000 have products containing DDT, and 70,000 have heptachlor or silvex which they do not know how to dispose of.**
- 3. The two most common household nuisance pests are ants and cockroaches, with mosquitoes and fleas the next more frequent.**
- 4. Approximately 10 million households (15%) had pesticides applied by a professional lawn care company in the previous year.**

Frankie and Levenson's (1978) study reported on attitudes, as well as practices, towards insects and insecticides. Data were collected in two Texas cities from 1974-1976. Interviews were conducted in Bryan-College Station over a period of three years and in the Dallas area over two years. A total of 551 white, middle-aged, married homeowners took part in the study. Findings from the Bryan-College Station sample showed that 55 - 76% of the participants had indoor/outdoor insect problems. Sixty three to 78% used chemicals indoors and 43 - 50% of the same people outdoors. In Dallas 68% had indoor insect problems and 75% outdoor problems. In 1976, a significant decline in indoor (50%) and outdoor (35%) problems was reported. Depending on the year, 47 to 68% and 33 to 58% of the Dallas people used chemicals indoors and outdoors, respectively.

In both cities, most respondents felt that chemicals did some good; relatively few could describe negative aspects. In both groups, the majority of calls to professional pest control services were for indoor problems. People did not know what chemicals the professionals used. Finally, the study reported that the attitude towards the use of chemicals changed in both cities. Respondents reported their attitude changing toward the use of chemicals due to personal experience with negative results, reading, TV, and

the ecology/environment movement. Most stated they used no chemicals or they used them cautiously.

This study was expanded to include Berkeley, CA (n=200), Dallas, TX (n=201) and New Brunswick, NJ (n=200); two socioeconomic groups (upper- and lower-middle class); specific pests (mostly insects), pesticides used, and a professional pest control operator (PCO) sample (Levenson and Frankie, 1983). The average respondent in the study was 44 years old, white, married, and a homeowner living in either an upper-middle class or lower-middle class neighborhood for 17 years. Of the 601 respondents, 539 said they had pest problems. Their most frequent source of pest information was from a PCO. Most people personally used chemicals indoors and out and many had used a PCO. Respondents rarely knew the type of chemical used by the PCOs. People expressed the belief that pesticides do good and rarely thought that they did any harm. Most respondents said that they had changed their attitudes toward being more cautious regarding pesticide use. Women indicated they disliked insects more than men and were more aware of potential harm from chemicals. Few differences were noted between house dwellers and apartment dwellers.

Kamble, Gold, & Vitzthum (1982) found that 73% of the homeowners in Nebraska with pest problems use pesticides. They estimated that 148,551 lbs of pesticides (AI) were used in 1980, with carbaryl, diazinon, and 2,4-D being used in greatest quantities. Methods of application, storage, and disposal were considered to be less than adequate in many cases.

Bennett et al. (1983) in a study of 958 households in North Central Indiana echoed these findings. The majority of the households surveyed (78%) used pesticides. Aerosol-spray formulations were used most often (58.1%). Pesticides were applied most frequently by adult females (55.4%) In this study only 5% of those using pesticides

stored them in a locked area. The kitchen was both the area of most frequent application (27%) and storage (38%).

Grieshop and Stiles (1989) found that 25% of the 415 California residents who responded to their questionnaire reported suffering illness from pesticide exposure. Almost 40% of pesticide users reported they did not always read and/or understand labels, 21% admitted applying stronger-than-recommended mixtures, 53% did not wear any protective clothing or equipment, and of those who did, 12% did not follow any clean-up procedures with exposed attire. Empty containers were most frequently thrown into trash can (88%) and 22% reported placing leftover chemicals in the trash (which is recommended on the label but illegal in California). The authors found an association between how safe or dangerous home users believed pesticides to be and the degree of risk-taking behavior; however there was considerable risk-taking among those who perceived great risk.

It appears that little has changed in homeowner attitudes or actions since researchers began looking at them. American homeowners use a great many pesticides both inside and outside their homes, generally do not follow commonsense safety precautions, and do not wear protective clothing.

APPENDIX C
REVIEW OF LITERATURE RELATED TO
PESTICIDES AND HEALTH

APPENDIX C

Pesticides and Health

The World Health Organization (WHO) considers acute pesticide poisoning a major global health problem (Lang, 1993). WHO estimates that between one and five million cases of acute pesticide poisoning occur, largely in underdeveloped nations. There is no national database in the United States that compiles complete statistics regarding incidence of death and injury from acute pesticide poisoning. The state of California requires that acute pesticide poisoning be reported to state health authorities. In 1987 about 17,000 exposure incidents were reported, of which 30 - 60% were symptomatic (Lang, 1993).

Researchers from the Minnesota Regional Poison Centers reported that, since 1986, pesticides have accounted for approximately 4.3% (2,209) of human exposure calls (Olson et al., 1991). The authors state that this is consistent with the percent of calls associated with pesticides poisonings nationally. Calls originating from a residence accounted for 85% of the calls. Eleven percent were from health care facilities and work place calls accounted for 3%. Twenty two percent of the calls were related to organophosphate insecticide exposure. Herbicide type exposures are very different from other pesticide poison calls. They are typically associated with an adult male experiencing dermal exposure. When comparing the growing use of herbicides in both rural and urban settings with the number of calls, it was judged that potential exposure appeared low.

Redetzke and Applegate (1993) found organochlorine pesticide residues in adipose tissue samples taken from 25 persons in El Paso, TX during the fall of 1983 and spring of 1984. None of the persons involved were known to have experienced occupational exposure to pesticides or pesticide intoxication. These findings suggest that either there is continued use of banned organochlorine pesticides in the United States or there is increasing use in Mexico. A study in Australia found increased levels of organochlorine pesticides in human milk after home treatment for termites (Stacey & Tatum, 1985).

Savage et al.(1988) found a relationship between acute organophosphate poisonings occurring at one point in time and subsequent chronic neurological problems. Buesching and Wollstadt (1984), Burmeister, Everett, Van Lier, & Isacson (1983), Burmeister (1990), Cantor (1982), Hoar et al. (1986), and Weisenburger (1990) have all reported indications of long-term cause-and-effect relationships between agricultural pesticide use and cancer.

Fifty percent of all calls to the Minnesota Regional Poison Centers (Olson et al., 1991) reported pesticide exposure to children under the age of three years. This is an area of great concern because of the lack of knowledge about long term effects. Studies which have explored the long-term effects of such exposures on children include Gold, Gordis, Tonascia, & Szklo (1979), Moses (1989), Davis, Brownson, and Garcia (1992) and Davis et al. (1993). Gold and his colleagues reported that when comparing brain cancer cases to normal controls, an odds ratio (OR) of 2.3 ($p = 0.10$) was found for children exposed to household pest exterminations. A comparison to children with other cancers showed no such relationship. Moses reported that chronic exposure to fungicides poses the greatest risk of cancer as compared to other pesticide types. Davis and his group reported that childhood brain cancer odds ratios varied substantially by pesticide use situation and time period of use. When comparing childhood brain cancer cases

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(n = 45) to friend controls (n = 85), significant positive associations were observed for use of pesticides to control nuisance pests in the home, no-pest-strips in the home, pesticides to control termites, Kwell shampoo, flea collars on pets, diazinon in the garden or orchard, and herbicides to control weeds in the yard. In comparison to cancer controls (n=108), significant positive associations were observed for use of pesticide bombs in the home, pesticides to control termites, flea collars on pets, insecticides in the garden or orchard, carbaryl in the garden or orchard, and herbicides to control weeds in the yard. The authors cautioned that further research is needed to confirm these findings.

Sinks (1985) found significant relationships between childhood brain cancer and maternal use of aerosol pesticides during pregnancy (OR = 1.56, p = 0.04) and after birth (OR = 1.66, p = 0.04). No significant risk was observed in this study for other pesticide exposures.

Fenske et al. (1990) studied the potential for exposure and health risks of infants following indoor residential pesticide applications. Despite the lack of information about exposure/absorption and toxicological interpretations, the dose values measured in this study raised concerns about the possibility of infant health problems resulting from exposure to these pesticides.

Camann (1991) reported that carpet dust in the average American home contains pesticide residues at about one part per million. Toddlers and infants, because of their low body weight, frequent contact with the floor, and hand-to-mouth activities are considered to be most susceptible to adverse effects from this source of pesticide contamination.

The debate continues concerning the exact risks of pesticides for health. A 1990 poll indicated that 75% of the American public shares the perceptions that pesticides pose

a serious hazard to man and the environment (Trends...1992). It is generally agreed among scientists that the public perceives a greater risk from pesticides than the scientific community. However if research identifies dangers from these substances the public will have to weigh the very real benefits against human health costs.

APPENDIX D

REVIEW OF LITERATURE RELATED TO

ENVIRONMENTAL AESTHETICS

Appendix D

Environmental Aesthetics

Innate Preferences

Stephen Kaplan (1988a) defines preferences "as the outcome of a complex process that includes perceiving things and spaces and reacting to them in terms of their potential usefulness and supportiveness" (p. 46). Preferences may be an indicator of aesthetic judgment or involve decision making and choice (Kaplan, 1988b, p. 56). When viewed in an evolutionary perspective, preference guides behavior and learning and fosters the building and use of cognitive maps. Environmental preference is "the outcome of what must be an incredibly rapid set of cognitive processes that integrate such considerations as safety, access, and the opportunity to learn into a single affective judgment" (p. 63).

Kaplan (1979, 1987, 1988a, 1988b) suggests that aesthetic judgment is the product of two processes related to survival; one involves capturing the viewer's attention (involvement) and the other enhancing comprehension (making sense). Making sense is seen in terms of coherence (perceptual organization of patterns) and legibility (the ability to create a cognitive map and know an environment well enough to act in it). Involvement is related to complexity (the amount of information there is to perceive and to mystery (the promise of, or inducement to obtain new information by acting in the environment). In Kaplan's approach landscape preference is an expression of adaptational suitability and stresses the role of information gathering and organizing.

Appleton (1975, 1988) believes that the human experience of landscape is most closely connected to human's evolutionary heritage. His habitat theory suggests that both animals and premodern man appreciate landscape largely in terms of survival functions. He reasons that prospect (open views) and refuge (protection or opportunity for protection) have aesthetic value because such preferences would have enhanced human survival. His essential argument is that aesthetic reactions to landscape are in part inborn, and "if he is to experience landscape aesthetically, an observer must seek to recreate something of that primitive relationship which links a creature to its habitat" (1975, p. viii).

Balling and Falk (1982) reported that savanna and open forest scenes were highly preferred over thick forest, jungle or desert slides by people, regardless of age and nationality. Subjects for this study included 105 third-grade children, 77 sixth-grade children, 96 ninth-grade children, 100 college students from two Maryland colleges, 30 undergraduates from the University of Arizona, 14 retired senior citizens, 50 professional foresters, 34 people attending a meeting of biology teachers, and 42 adults from Maryland. Twenty slides, representing five different biomes - tropical rain forest, desert, savanna, temperate deciduous forest, and coniferous forest were viewed twice by the participants. Respondents were asked to rate each slide on where they would prefer to live permanently and where they would like to visit. The strongest preference for the savanna biome was found among the two youngest age groups in their study. By mid-adolescence and continuing throughout adulthood, the mean preferences for savanna, deciduous forest, and coniferous forest were statistically indistinguishable. These findings were interpreted to provide limited support for the hypothesis that people have some innate preference for savanna-like environments. Since humans evolved in the grassy, tree-sprinkled savannas of Africa, our modern preference for lawns and trees

may be an innate expression of our origins. But this underlying preference can be modified through experiences across the life span.

The Green Experience

Kaplan's description of "green experience" is based on a series of studies done with the same group of slides (Kaplan, 1975). The first study was done with a group of female college freshmen. A set of fifty-six slides were presented to the women. The ones that were categorized as "nature" were vastly preferred by the 88 participants. The subset of slides depicting urban settings were rated significantly lower. The various residential scenes were liked least of all.

Three years later 35 women from the original group were shown the same slides and asked to rate their preference for each. The results indicated that the mean-rated preference for nature scenes showed a significant increase; for the urban scenes, the ratings declined; for the residential setting, they remained low.

The same slides were used in a study in which respondents viewed scenes as one would glimpse them when driving in a car. The differences in rated preference between viewing durations of 10, 40, and 200 milliseconds were minor, but the relative preference for the nature pictures as compared to the urban scenes was even greater than in the other studies. Wohlwill (1976) replicated these studies and found similar preferences for nature over urban scenes.

Kaplan, Kaplan, and Wendt (1972) in a study using color slides to represent a continuum ranging from nature to a predominance of man-made aspects to urban scenes, found a clear preference for nature scenes over urban scenes. The participants were undergraduate students who were not familiar with the specific scenes that they were asked to rate on a five-point preference scale. Analysis of the ratings yielded two clear groupings: one of urban scenes and one of "nature" scenes. The nature cluster included

all the scenes selected to represent the nature end of the continuum including scenes in which nature predominated but where human influence was visible. The least preferred nature scenes consisted of a flat, open, relatively parched field with a forest in the very distant background and a scene dominated by coarse-textured, disordered foliage with a telephone pole surrounded by high weeds at one edge.

The urban grouping included all but two of the scenes selected to represent that end of the continuum. The scenes that reflected various residential settings did not form a unique grouping, suggesting that the participants did not perceive these as a distinct content domain. The nature grouping included a far broader range of nature content than had been expected. The presence of human influence did not detract from the perceptual categorization, and the preference for the nature scenes was not a function of the presence or absence of human influence.

The presence of vegetation emerged as the strongest predictor of preference in the 1982 study done by Herzog, Kaplan, and Kaplan. One hundred forty colored slides of a wide variety of urban setting were rated by students unfamiliar with the particular scenes. The overwhelming preference for any urban scene with vegetation suggests that nature in the city is highly valued.

Ulrich (1977) developed a model of visual landscape preference based upon an analysis of the informational qualities of various settings. Five variables thought to affect the informational properties of an environment were identified: complexity, focality, ground surface texture, depth, and mystery. This study showed that people prefer natural landscape scenes with a relatively high degree of complexity, a clear focal point, even ground texture, a good depth of field, and a sense that new predictable information will become available by moving through the landscape.

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Specific landscape features have been identified that regularly increase the attractiveness of landscapes. There is a preference for smooth, even surface texture in the landscape. Several studies of forest landscapes have found positive relationships between aesthetic preference and comparatively even-length grass ground covers and negative preference effects of rough ground covers (Daniel & Boster, 1976; Rabinowitz and Coughlin, 1970; Ulrich, 1983).

A variety of other factors have been studied that can influence one's preference for nature. Zube (1973b) suggested that landscape designers and managers in the environmental field valued natural landscapes more highly than did nonprofessionals in environmental fields and lay control groups. Lay groups and nonprofessionals tend to be less negatively disposed to man-made forms (towns) in relation to regional scenic beauty.

Gallagher's (1977) dissertation on "visual preference for alternative natural landscapes" was concerned with identifying the processes that operate in preference for natural settings. Scenes for his photoquestionnaire included both natural areas (prairie/woodland sites characterized by low levels of management) and ornamental areas. Respondents rated each of the scenes. Two unexpected findings emerged from this study. First, "naturalness" when depicted as prairie grasses (rough, scruffy, unmanaged looking) was the least preferred. Second, the lack of trees had a bearing on judgments. The number and size of trees and their dominance in the scene accounted for 45% of the preference variance. Respondents preferred scenes that contained trees.

The importance of trees should come as no surprise. Gold (1977) had asserted that "the tree is the most dominant natural element in the urban landscape." Alexander, Ishikawa, and Silverstein (1977) declared that "trees have a very deep and crucial meaning to human beings" (p. 798). Zube (1973a) suggests that trees in the city reduce its perceptual scale. This may make the city seem smaller and more comprehensible to

people. Trees, especially deciduous forests, combined with open meadows, abundant grass cover, and minimal underbrush are generally preferred (Daniel & Bolster, 1976; Patey & Evans, 1979; Schroeder, 1991; Zube, 1976; Zube, Pitt, & Anderson, 1975). Simply labeling a slide as a "wilderness area" elevated an area's scenic-quality rating, while labels such as "commercial timber stand" reduced it (Anderson, 1981).

Preference by Gender and Age

Sebba (1991) found that Israeli children's environmental preferences were connected with the gender of the child. Boys showed a preference for outdoor sites and girls for indoor locations. Children's preferences (both gender) were found to be connected with the type of settlement in which they grew up. "Indoors only" was preferred by more urban than rural children. This study also compared children's actual experiences with adults' recollections. There was no connection between the children's actual preferences and those remembered by adults. In total, 46% of the children preferred the outdoors as compared with 96.5% of the adults. The discrepancy between recall of adults and actual activities of the children may be due to the emotional qualities of memories from childhood or differences in the culture of yesterday and today. Adults of today did not have the technological games and activities that children now play with indoors. Similar findings were reported by Marcus (1978) who found that 86% of the environments recalled by American college students were outdoors.

Zube, Pitt, and Evans (1983) found that age influenced an individual's response to the landscape. Young children rated landscapes differently from adults, and older adults differ slightly from young and middle-aged adults. Young children's preferences were less affected by the presence of human influences in landscapes than were young and middle-aged adults, who greatly disliked them. Elderly adults were not as disturbed by human intrusions as younger adults were, but they disliked them more than children did.

Young and middle-aged adults were most sensitive to complexity in landscapes, while children exhibited a strong attraction to water in landscapes. Lyons (1983) also reported that preferences changed through the life cycle.

Preference by Social Class

Duncan (1973) and Hecht (1975) found that patterns of landscape taste correlated with social class. Duncan discovered that two distinct social groups in Bedford, New York lived in totally different natural environments. The landscape he classified as alpha was the oldest residential landscape in the area; homes were versions of traditional colonial residences, roads were crooked, overhung with trees and unpaved, gardens and landscaping reflected the preference for "natural" and studied "English seediness," and wealthy owners valued their privacy. Beta landscape included homes built within the previous 20 years, paved streets, gardens with open expanses of grass and symmetrically arranged shrubs and trees, few fences or trees obscured the views of the houses, children played in the streets, and owners were of a slightly lower socioeconomic class than alphas. Alphas and betas rarely mingled in church or social and civic organizations. Hecht reported streets with a high percentage of grass lawns were in middle- and lower-middle-income Mexican residential areas of Tucson, Arizona. Non-grass lawns were more numerous in upper- and middle-income Anglo subdivisions.

Environmental Satisfaction

A study of childless, relatively nonaffluent adults ($n = 268$) living in urban housing developments found that not only do people prefer to see the natural world, but having such views and facilities nearby strongly affects their satisfaction with their physical and social environment (Kaplan, 1981). People described their large, multiple-family housing to be friendlier, more supportive, and much more attractive when there were trees and

woods to be seen. Acres of large mowed areas did not contribute to this overall satisfaction.

Findings from this study also suggested that the natural environment is not a simple unidimensional construct. People differentiated their immediate residential environment in terms of various features of the natural setting. These seem to be based on a variety of factors, both visual and functional. Viewing parked cars and other apartments unscreened by trees was rated unfavorably.

Sheets and Manzer (1991) explored cognitive and affective reaction to vegetation in an urban setting that was familiar to the respondents. Using line drawings in one study and slides in a second study, they found that the addition of vegetation (trees and shrubs) generated positive affect and positive evaluations of the quality of life in the area. Subjects reported more positive feelings when viewing tree-lined streets; they felt friendlier, more cooperative, less sad, and less depressed. Scenes with vegetation were rated as better, safer, and cleaner places in which to live and as easier places in which to make a living.

Physical and Mental Restoration

The notion that experiences with the natural environment can be physically and psychologically healthful has been widely held since the 1800's. Since 1815, the Friends Hospital, Philadelphia, PA has used horticultural therapy to treat the mentally ill. Plant therapy, under professional supervision, is currently used in nearly 300 hospitals across the country, according to the American Horticultural Therapy Association in Gaithersburg, MD (Boal, 1994). In a recent survey, conducted by the Arthritis Foundation, 62% of the people with the disease enjoyed gardening more than any other activity (Boal, 1994).

Hartig, Mang, and Evans (1991) used a quasi-experimental field study and a true experiment to assess the restorative experiences of wilderness backpacking, nonwilderness vacations, and a control condition of daily routines. They reported that greater restorative effects arise from experiences in nature. A prolonged wilderness experience has restorative effects although immediate emotional response to returning to one's usual setting may be negative. Long-term follow-up suggested that some of the initially depressed reactions at the end of the trip not only dissipated but reversed over time. Participants who spent time in a park reported greater restoration than those who went for a walk through a lovely urban area or relaxed in a comfortably furnished room.

Ulrich (1979) addressed the idea that stressed or anxious individuals tend to feel better after exposure to natural rather than urban views. University students, experiencing anxiety because of a course examination, viewed color-slide presentations of either (a) everyday natural scenes dominated by green vegetation or (b) unblighted urban views lacking vegetation or water. Individuals' feelings were measured both immediately before and after the slide exposures using the Zuckerman Inventory of Personal Reactions. Results showed a clear pattern of restoration for natural scenes. Urban views actually tended to be detrimental to emotional well-being on some dimensions. The two categories of environment produced quite different changes in emotional states despite the fact that the complexity levels of the slide samples were equivalent. The results suggested that the importance of visual contacts with nature extends beyond aesthetic benefits, and include a range of benefits in terms of psychological well-being.

In a subsequent study Ulrich (1981) employed physiological measures of alpha wave amplitude and heart rate after exposure to different types of landscape scenes as well as paper and pencil ratings. Alpha is a valid indicator of cortical arousal and is associated with feelings of wakeful relaxation. This study tested whether visual exposure to nature

environments, i.e., nature with water and nature dominated by green vegetation, was more beneficial in a psychophysiological sense than exposure to environments lacking nature, i.e., urban without water and vegetation. Exposures to the two nature categories, especially water, had more beneficial influences on psychological states than the urban slides. The alpha amplitudes and heart rate findings were consistent with the self-ratings. The most positive influences on well-being were produced by the nature scenes. Gender differences were noted. Females exhibited stronger feelings of attentiveness and positive effect for vegetation scenes than the males.

The accord between the findings of these two studies is noteworthy because the investigations were performed in different countries, America (1979) and Sweden (1981). Based on findings from the two studies Ulrich proposed that people benefit most from visual contact with nature, as opposed to urban environments lacking nature (no vegetation), when they are in states of high arousal and anxiety. The benefits of visual exposure to nature, compared to urban content, may be less for unstressed people in normal arousal states. However, as the second study suggested, effects of nature exposures even on unstressed individuals can be significantly more positive than the influence of urban views. Further work continues to support the idea that natural environments facilitate recovery from stress (Ulrich, Simons, Losito, & Florito 1991).

Studies of hospital patients indicate that views of natural environments facilitate physical recovery and satisfy psychological needs (Heerwagen & Orians, 1986; Parsons, 1991; Talbott, and others, 1978; Ulrich 1984; Ulrich & Simons 1986; Ulrich & Verderber 1986; Verderber & Reuman 1987).

A wide range of values concerning nature exist throughout the population. These values range from little interest in nature to great interest. Many people are only a generation or two removed from families who depended on their own gardens to provide

most of the food they ate. There appears to exist in most people a basic need for nature in some form. One of the reasons for the exodus to the suburbs is the desire to be close to nature in some form. At a time when there are great technological advances there is also a growing realization that humans are not apart from nature and there may be many benefits from nature that individuals are unaware of and only now beginning to understand.

APPENDIX E

REVIEW OF LITERATURE RELATED TO

ENVIRONMENTAL ATTITUDES AND BEHAVIOR

APPENDIX E

Environmental Attitudes and Behavior

The meta-analytic review of 187 studies looking at environmental behavior by Hines, Hungerford, & Tomera (1986/87) indicated a positive correlation between environmental attitudes and behavior. This meta-review included 51 studies of the environmental attitude-behavior relationship. Analysis of this relationship found a corrected correlation coefficient of .374, indicating that individuals expressing more proenvironmental attitudes were more likely to have reported engaging in responsible environmental behaviors, such as recycling, petitioning, and conserving energy. Higher attitude-behavior correlations were obtained in situations in which actual behaviors were assessed ($r = .427$) than where behaviors were determined by self-report ($r = .334$). Consistent with the notion of attitude accessibility, studies that sample populations comprised of individuals with ties to environmental organizations resulted in a higher average correlation ($r = .593$) than did studies that sampled the general population. This review suggests that the prediction of environmental behavior is based upon a multitude of actions, including locus of control, knowledge, ability, and such situational factors as economic constraints, social pressures, and opportunities.

Many studies have looked at sociodemographic variables in relation to environmental behavior. Findings from these studies are inconsistent. A number of studies suggest that individuals who express the most concern for the environment tend to be young and well educated (Althoff & Greig, 1977; Buttel, 1987; Buttel & Flinn,

1974, 1978; Dillman & Christensen, 1972; Hamilton, 1985; Honnold, 1984; McEvoy III, 1972; Mohai & Twight, 1987; Tognacci, Weigel, Wideen, & Vernon, 1972) and reside in urban areas (Althoff & Greg, 1977; Buttel, 1987; Buttel & Finn, 1978; Dunlap & Catton, 1979; Lowe & Pinhey, 1982; Mohai & Twight, 1986; Samdahl & Robertson, 1989; Tremblay & Dunlap, 1978; Van Liere & Dunlap, 1980). Income, education, gender (being male), and environmental attitudes have been found to have positive associations with environmental knowledge (Arcury, 1990; Arcury & Christianson, 1993; Arcury & Johnson, 1987; Arcury, Johnson, & Scollay, 1986; Arcury, Scollay, & Johnson, 1987; Lovrich, Pierce, Tsurutani, & Abe, 1986; Maloney & Ward, 1973).

Other studies have reported conflicting findings. Honnold (1981) suggests that sociobiological cohorts may be more effective than age in predicting environmental concern. Neuman (1986) found that demographic attributes (gender, age, educational level, income, political stance) were unrelated to behavioral commitment to conservation practices.

Early studies on the effects of gender were inconclusive (Van Liere & Dunlap, 1980), but a recent review of studies on gender and environmental concern suggests that women express more concern than men in local environmental issues (Mohai, 1992). The difference is smaller for national issues, and women are less likely than men to take political action to protect the environment.

Van Liere and Dunlap (1980) reviewed a wide range of studies reporting the sociodemographic correlates of environmental concern and concluded that this line of research has had limited success in explaining environmental attitudes. The relationship between sociodemographic characteristics and environmental concern is still poorly understood.

Arcury and Christianson (1993) found no consistent differences by residence in regard to an individual's environmental world view, concern, knowledge, and action. They did find differences by education and income.

Samdahl and Robertson (1989) reexamined, through LISREL techniques, many of the sociodemographics and political ideologies that have been previously reported as determinants of environmental concern. The study tested the causal model that was developed using data from a general population survey in the state of Illinois (N = 2,131). Their analysis indicated that sociodemographic characteristics, residence, and political ideology were ineffective in explaining any of the three types of environmental concern (perceptions of problems, support for regulations and ecological behavior) identified. Pro-liberal ideology was a strong predictor of support for environmental regulation. The authors suggest that "further research might benefit most by exploring underlying belief structures rather than demographic characteristics of the population" (p. 57).

Baldassare & Katz (1992) found that personal environmental threat is a better predictor of overall environmental practices than are demographic variables and political factors. Perceived environmental threat was found to be highest among younger residents, women, liberals, and Democrats.

Current environmental literature suggests that there is a growing awareness of two major problems in research dealing with environmental attitudes. The first is the way in which attitudes are measured and conceptualized. Single-item scales, poor in validity and reliability, have frequently been used (McStay & Dunlap, 1983). A review of existing literature and results of a Washington State study (N = 806) by Van Liere and Dunlap (1981) found that there is little support for the assumption that all environmental concern measures are equivalent.

The second problem is the lack of theory. Environmental studies are often issue-oriented, which is important, but there is no underlying theoretical framework to tie all the findings together (Arcury & Christianson, 1993; Buttel, 1987; Stern, Dietz, & Kalof, 1993; Stern & Oskamp, 1987).

The New Environmental paradigm (NEP) developed by Catton and Dunlap (1978, 1980) and Dunlap (1980) is a major development in constructing a social theory of environmentalism. The basic proposition of the NEP is that every society has a dominant social paradigm based on experience, embedded in values, and related to actual behavior. Dunlap and Van Liere (1978) furthered the process of operationalizing the NEP by developing an NEP scale to measure the environmental world view. Studies using the NEP have looked at the emergence of a new worldview, or paradigm, associated with environmentalism. (See Appendix G for a review of NEP scale studies.)

Another approach to theory building has been to adapt Schwartz's (1977) norm-activation model of altruism to explain actions intended to ameliorate environmental problems. Schwartz's theory of altruism underlies the idea that proenvironmental behavior becomes more probable when an individual is aware of harmful consequences (AC) to others from a state of the environment and when that person ascribes responsibility (AR) to herself or himself for changing the offending environmental condition. Under conditions of AC and AR, individuals experience a sense of moral obligation to prevent or mitigate the harmful consequences. This so-called personal norm motivates action is being studied by a growing number of researchers (Black, Stern, & Elworth, 1985; Heberlein & Black, 1976; Hooper & Nielsen, 1991; Stern, Dietz, & Black, 1986; Stern, Dietz, & Kalop, 1993; Van Liere & Dunlap, 1978).

Stern and his colleagues (1993) expanded the Schwartz model by identifying three value orientations that may underlie environmental attitudes and behavior. These

include a social or altruistic orientation (concern for others), an egoistic value orientation (concern for me), and a biospheric value orientation (concern for Nature). There may be other value orientations that are culturally specific but the researcher's review of literature suggested that these three were the most frequently noted in Western environmental literature.

Findings from an initial study of college students ($n = 349$) suggest that because the three value orientation coexist in people and may all influence behavior, individual action may depend on the belief or value set that receives attention in a given context. This response has been identified as a "focus effect". Different sets of environmental attitude or preference questions draw attention to different value frames and result in differing degrees of measured environmental concern. It may be that the orientations represent points on a dimension of moral scope or breadth of moral concern or that the orientations compete within a person (p. 340).

This model also provides a vehicle for understanding gender differences that have been reported in other research. Findings from this study are consistent with feminist theory that argues that women tend to see a world of inherent interconnections, whereas men tend to see a world of clearly separate subjects and objects, with events abstracted from their contexts (p. 340). Women appear to be more accepting of messages that link environmental conditions to potential harm to themselves, others, and other species or the biosphere.

The mother/father effect, reported in previous research, may be explained by "differential awareness". Becoming a parent increases attention to information about things that may affect one's children's well-being; gender socialization may lead women to focus on children's health, and men on children's economic well-being, with opposite effects on environmental concern (p. 341).

The model also provides a basis for understanding age, period, and cohort differences reported in environmental research. The authors hypothesize that differences in beliefs about the consequences of environmental conditions may be largely based on media reports while differences in value orientations are more likely to reflect cohort effects. Beliefs about the effects of environmental impacting oneself, others and the biosphere, based on secondhand information, are more amendable to change while the values that can turn the beliefs into action are much less mutable.

This study did not address how individual concerns about the environment are shaped by social movements and political-economic forces. The authors suggest that these are processes which both influence environmental beliefs and focus attention on certain values would be amendable to study using this model.

The environmental attitudinal research field continues to produce studies like this one that are broadening the understandings of the relationship between attitudes and behavior.

The research related to environment and attitudes, values, and beliefs is ongoing. Improved measurement tools and study designs, and integration of findings into broader theory are needed.

APPENDIX F
REVIEW OF LITERATURE RELATED TO
ORIGIN OF THE AMERICAN LAWN

APPENDIX F

Origins of the Ideal American Lawn

Historians have written about the lawns which appeared in Persian, Greek and Roman gardens before the birth of Christ but the evidence for their existence is extremely scanty. The first detailed information about lawns was recorded between 1300 and 1500 (Hessayon, 1982).

The story of contemporary lawns probably began in medieval castles and monastery cloisters which provided safety for growing food, herbs, fruits and flowers. The small, enclosed, protected areas where fruit and flowers grew became known as pleasure gardens. The pleasure garden provided both food and a psychological sanctuary for human activity. People meditated, rested, danced, and courted in these orchardlike settings. The ground was covered with meadow grasses, which were kept short by beating and trampling them underfoot. Wild flowers crept in among the meadow grasses and gave rise to the name "flowery meads" (Harvey, 1981).

The modern lawn evolved from the pleasure gardens of the French and English. Pleasure gardens are not to be mistaken for the practical garden where one grew food and herbs. "Because it is the product of a leisure class and a mature culture, the pleasure garden...is never found among primitive peoples or upon the frontier" (Tatum, 1978, p. 65).

The formal Renaissance style pleasure garden dominated Europe for nearly three centuries. This landscape style continued the geometric lines of the building, especially its

central axis, into the surrounding site. The effect of these "architectural gardens" depended upon the viewer being able to experience the symmetry of the design. Elevated points, such as windows and terraces, provided spectators with a platform from which to view the garden to its' best advantage. These formal gardens reflected the belief that nature worked with clocklike precision and could be controlled by human hands and intelligence (Adams, 1979).

In the mid 1700s Englishmen returning from the Grand Tour sought to remake their own parks and gardens into something resembling the landscape pictures of Claude Lorrain (1600-1682) and Gaspar Poussin (1615-1675). This practice of designing gardens to resemble paintings explains such familiar terms as "landscape gardener" and "picturesque".

The English garden was a romanticized version of nature, full of copses and winding streams, wandering paths, thickets, and often a carefully manufactured ruin. Sweeping vistas of turf were an essential component of these creations (Crockett, 1971). These landscapes represented the philosophical belief that there was once a simpler, pastoral way of life where humans and nature lived in harmony (Watkin, 1982).

Landscape artists such as William Kent (1685-1748) contributed to the establishment of the lawn as an essential component of English landscape. Sir Francis Bacon wrote, "...nothing is more pleasing to the eye than green grass kept finely shorn..." It was the English landscape gardener, Lancelot "Capability" Brown (1715-1783), who truly brought the grass lawn into prominence. Brown destroyed existing gardens, cut down mature trees, and moved entire villages and people in his efforts to shape the ground into a concave or convex surface in order to focus an observer's view in a particular direction. Brown's landscapes, dominated by the lawn, became the icon of late eighteenth-century English society (Turner, 1985). It is very important to note that the British climate, mild winters, moderate temperatures, and high humidity played a major role in the success of Brown's use of grass. These high maintenance lawns appeared during the Victorian period in Europe

and only the wealthy could afford the gardeners and workmen needed to establish and maintain them.

British colonists brought their cattle, sheep, and seeds along with their cultural ideals to America. The forests of the New World were quickly cleared to create pasture for the cattle and sheep which played a central role in English agriculture. Seed brought from the Old World, such as bluegrass and white clover, were adapted to flourish in their new environment. The village commons, covered with a mixture of grasses, legumes, and other plants became a common landscape feature in the villages and towns of nineteenth century America (Cronon, 1983). For the average nineteenth century American grass growing near the house was usually sparse and scraggly. Growing grass was difficult and required special care and equipment. Lawns were generally kept to a minimum and cut by hand scythes or kept short by grazing animals until the mid-1800s. Many people did not allow grass to grow around their buildings. It was not unusual to see the "swept yard", bare soil, in the Southern United States. George Washington "mowed" his expanses of grass with deer.

Thomas Jefferson was one of the most influential of American travelers who brought the English landscape ideal back to the United States. He incorporated the pastoral image of a classical building set in a field of green into the design of his Monticello estate. Jefferson was also influential in crystallizing the philosophy of individual land ownership. He believed that an agrarian society made up of small landowners would furnish the most stable foundation for building the nation (Thistlewaite, 1955). Today there are millions of landowners of imperiled natural resources that do not believe "my yard is part of the problem" (Moncrief, 1970).

The ideal of rural nature had been articulated by Rousseau (1712-1778). His call to "return to nature" had earlier motivated Marie Antoinette's fondness for her make-believe

hamlet at Versailles. But this eighteenth century aristocratic pastime became the serious pursuit of middle class Americans in the nineteenth century. The Industrial Revolution created a new middle class striving to leave the dirty, crowded cities seeking beauty and cleanliness in the rural countryside.

Americans of the mid-nineteenth century were generally committed to the view that environment to a large extent determines human behavior and personality: to improve the character of a man, it was only necessary to improve his surroundings. This concept of the beneficial effects of environment was applicable to both the well and the ill.

Andrew Jackson Downing, considered the first American nurseryman and horticulture writer to significantly influence American life wrote that rural nature was the most beneficial and beautiful of environments, especially when it had been improved by a competent landscape gardener. Downing created acres of lawns for wealthy clients and suggested that those of more modest means could grow grass and trees on even a half an acre of ground. Downing's protege Frank Scott compared a lawn "where shrubs and flowers mingle in confusion with tall grass with the home of a slattern" (Lowen, 1991, p. 50).

Contact with nature was considered beneficial for everyone and working in one's garden was a socially valuable act if not actually a public duty and moral obligation (Griswold & Weller, 1991). To be able to live with nature, the refuge from the rigors of the city, was the purpose for working in the city in order to accumulate sufficient wealth to retire someday to the country (Huth, 1957; Nash, 1973; Tatum, 1978). Another powerful impetus for escaping the crowded city was epidemic disease. During the warm, summer months city residents fled outbreaks of smallpox, yellow fever, and cholera. Flight from the corruption associated with city-dwelling migrant populations provided additional motivation to escape to the country (Wright, 1981).

Since most people could not afford a home in the country and a home in town, a solution was sought in the "romantic suburb" (Jackson, 1985) which attempted to combine the nearness to an industrial city with the rural surroundings of the country. The first suburb is usually considered to be Llewellyn Park at West Orange, NJ, created during the mid 1850s for the drug importer Llewellyn S. Harkell (Jackson, 1985; Kastner, 1981). In the years following the Civil War, horse-drawn trolleys, electric street cars and the railroad allowed people to work in the city and live in the country. By the 1870s single family homes, landscaped with grass, shrubs, and flowers, had emerged as the housing of choice (Jackson, 1985). The invention of the lawn mower in 1830 by an Englishman, Edward Budding, and the creation of the American suburb made the lawn available to everyone (Jackson, 1985).

According to Meinig (1979) the modern American suburb became a dominant landscape form with the advent of the automobile. Southern California Suburbia spawned

the low, wide-spreading, single-story houses standing on broad lots fronted by open, perfect green lawns; the most prominent feature of the house is the two-car garage opening onto a broad driveway, connecting the broad curving street (with no sidewalks, for pedestrians are unknown and unwanted) which leads to the great freeways on which these affluent nuclear families can be carried swiftly and effortlessly in air-conditioned comfort to surfing or skiing, golfing, boating, or country-clubbing, as well as to the great shopping plazas and to drive-in facilities catering to every need and whim (p. 169).

Frederick Law Olmsted's (1822-1903) influence upon the American residential landscape cannot be underestimated. He was a famous American landscape architect and designed public parks in Boston and New York. Olmsted laid out a genuine American suburban landscape in his 1868 plan for the community of Riverside, Illinois (Tatum, 1973). His design included a minimum 30 foot setback from the sidewalk and numerous trees along the street to create a parklike setting. He believed that the immediate house surroundings were to be designed to allow people "to carry on daily life in the outdoors."

He created "outdoor apartments" by means of terraces, lawns, hedged enclosures, and walled gardens (Griswold & Weller, 1991).

Contemporary Developments

The game of golf and the popularity of lawns appear to have spread together throughout American society. Golf began as a game of the wealthy but by the 1920s had spread to middle class America (Jenkins, 1994). The suburban golf course provided an example of landscape design to the middle-class that had been previously available only to the rich or to city residents with access to Olmstead's urban parks (Fishman, 1987). Many service men, wounded in World War II, came to appreciate "good turf" as they played golf as part their rehabilitation at military hospitals (Jenkins, 1994).

The United States Department of Agriculture, agricultural experiment stations, and the United States Golf Association have worked closely over the years to meet the demands of golf courses and homeowners for better grasses to grow throughout the United States. In 1901 the U.S. Congress allotted \$17,000 to study the "best native and foreign grass species..for turfing lawns and pleasure grounds" (Goldin, 1977, p. 143). In 1920, the Greens Section of the United States Golf Association received support from the U.S. Department of Agriculture for a program researching grass species suitable for greens and fairways. Today grass research centers are found throughout the United States and turf management is offered as a course of study in many universities. However, golf playing homeowners have found the manicured golf course green is often very difficult to emulate in their front yard.

Women have traditionally taken care of both the practical and pleasure gardens of the family. The necessity of the practical garden declined as the Industrial Revolution produced a growing middle-class and a new wealthy class. Production of food and goods

moved from the home to the factory, leaving the middle and upper class women with more leisure time.

The pleasure garden offered a socially acceptable pursuit for women. The first American women's garden club may have been the club founded in Athens, GA in 1890 (Ballard, 1978; Speller, 1931). While many clubs are still active today, the number of members has decreased. They helped spread the ideal of the American lawn through home and school programs.

As women have entered the paid workplace, they no longer have the leisure to work in the garden. A minimum amount of time is required to tend the lawn "if kept uncluttered with flower beds and shrubs and planted to a grass or a mixture that does not require special care...", (Rockwell & Grayson, 1956, p. 28). It is reasonable to assume that grass has replaced some or all of the previous garden areas.

"Mowing the lawn" has historically been a male responsibility. In the eighteenth century, a

good man could manage about a quarter of an acre before 10 a.m. when the grass got too dry for the scythe to bite. For a really good job you would also have to figure on two or three hours for a team of women to sweep up the cuttings (Elliott, 1993, p. 31).

The first lawn mowing machines were heavy and clumsy. Many were drawn by horses or mules. Brute strength was required to use a mower. Women, in their corsets and long skirts, would have had a difficult time handling these machines even if it would have been socially acceptable for them to work in their yard.

In 1902 the first gasoline powered mower was introduced. The riding lawn mower appeared in the 50s, the electric mower in the 1960s and a robotic, self directed, solar mower in the 1990s. Lowen (1991) states that from the beginning of the suburbs, lawn care has primarily been a male preserve, while gardening was a female pastime.

Contemporary studies in family roles and divisions of family labor often have a general category of gardening, yard work, or exterior home maintenance. Typical of these studies is a study reported by Shaw (1988). In this study, dealing with the definitions and perception of household labor, respondents were asked to define specific household tasks as work, mixed work and leisure, or leisure. For the task of gardening, no females (n = 17) defined gardening as "work", 29.4% defined it as mixed work/leisure and 70.6% defined it as leisure. Of the males (n = 56) responding, 32.1% defined gardening as work, 19.6% defined it as mixed leisure/work and 48.2% defined it as leisure. There was no information regarding what tasks were included in "gardening" or whether the couples lived in houses or apartments.

No American studies were located that specifically reported who "mows the lawn" and who applies the chemicals. Advertising about lawn care services is generally directed at the male of the household. Jenkins (1994), in her comprehensive content analysis of popular literature related to the lawn, clearly found that advertising related to the lawn is always, either directly or indirectly, targeted to the man of the house. Hessayon (1982) reported that in Great Britain one in every three lawns is cut by the woman of the house. No comparable statistic was found for American households.

In the 1950s and 1960s more and more working class men were retiring in good health and, thanks to Social Security, financial security. The trend continues today with current census figures showing that 77.4% of Americans age 65 and over own their own homes (Bureau of Census, 1994). Many of these retirees have the money, time, and health to work on their lawns and in their gardens. Lawn care is a perfect hobby for older men who are used to being physically active and now are faced with long periods of free time.

After World War II the American dream of a house in the suburbs, a strong cultural ideal of lawn, the example of the golf course, the increasing cost of labor, and an emerging chemical industry contributed to the birth of a new service industry, professional lawn care. The increasing number of two income families resulting from women entering the workforce and a new marketing tool, the telephone, heralded the advent of the modern lawn care industry.

In 1969 an Ohio-based company called ChemLawn began providing professional applications of fertilizers and pesticides for home lawns. The lawn care industry has grown at a steady rate of 25 to 30% per year from the mid 1960s to the mid 1980s (Schultz, 1989). In 1993 total lawn care industry sales were estimated at \$2.5 billion, serving more than 10 million customers (Rocke, 1993). Of this total, chemical lawn care sales totaled about \$1.7 billion and mowing and allied services (primarily mowing) \$800 million. It was estimated that in 1992 lawn and landscape contractors maintained nearly 4.3 million acres of lawn of which 1.4 million acres were single-family properties (Code, 1993). Mowing services are currently the fastest growing portion of the lawn care industry (Roche, 1993).

The deep rooted ideal of the lawn and the strength of the economic, legal, and social systems supporting it make it unlikely that at this time in American history homeowners will accept another kind of groundcover to plant around their homes. Unless there is overwhelming evidence of serious environment and health risks associated with the chemicals needed to maintain the grass lawn in its present form, it is unlikely there will be a major reduction in the use of lawn chemicals.

APPENDIX G
REVIEW OF LITERATURE RELATED TO
NEP SCALE

APPENDIX G

Review of the Studies Related to the NEP Scale

Washington State Study

Dunlap and Van Liere's 1978 Washington state study introduced and tested the 12-item NEP scale as part of a wide range of items related to the environment. Two groups of Washington state adults, the general public sample (GPS) consisting of 806 individuals and 407 members of a state-wide environmental organization (ESO) comprised the sample.

Several methods were used to determine if the scale was internally consistent and unidimensional. A basic assumption made was that the 12 items reflected aspects of the emerging environmental paradigm and could be combined into the NEP scale.

The first step in testing the scale was to form a summated rating scale, with the resultant scores ranging from a low of 12 to a high of 48. Next the item analysis approach suggested by Nunnally (1967) was applied. All correlations were reported as positive and of substantial magnitude. The corrected item-total correlations for the GPS ranged from .394 to .567 with an average of .459, and .328 to .479 with an average .388 for the EOS. The authors accepted these results as reflecting a "considerable amount of internal consistency, and that it is not necessary to delete any of the individual items" (p. 14).

The internal consistency of the scale was further confirmed by two additional measures. Cronbach's alpha was .813 for the GPS and .758 for the EOS. Omega is

.849 for the GPS and .802 for the EOS. Results from both tests were accepted as confirmatory of the scale.

The unidimensionality of the scale was tested with factor analysis. The first unrotated principal factor accounted for 69.2% of the variance in the GPS and 63.3% for the EOS.

After determining that it appeared legitimate to treat the NEP as a single scale, they assessed its predictive, content, and construct validity. Predictive validity was confirmed by comparing the acceptance of the NEP between the general public and the environmentalist group. As predicted, the environmentalists were stronger proponents than the general public. In addition, the relationship between the scores of the NEP for the general public and other measures of environmentalism were also examined. They found that members of the general public who endorsed the NEP were more likely to favor other environmental programs, regulations, and actions.

Content validity depends primarily upon intersubjective agreement that the scale items adequately represent the "content" of the concept being measured. The authors attempted to develop what they considered a representative set of items based on an extensive literature search and personal experience. They left it to the readers to determine the content validity of the NEP scale.

Construct validity was determined by looking at three of the most consistent predictors of environmentalism: age, education, and political ideology. Based on previous research it was expected that younger individuals, better educated individuals, and individuals with a liberal ideological orientation would be more favorable toward the NEP. Although coefficients were modest, .22 ($P < .001$) for ideology, .11 ($P < .001$) for education, and .09 ($P < .001$) for age they were accepted as confirming construct validity.

Iowa State Study

A second replicative study of the NEP scale was performed by Albrecht, Bultena, Hoiberg, and Nowak in 1982. Statewide samples of two Iowa populations, farm operators and city residents, were sent questionnaires and 441 farmers and 468 city residents responded.

The authors reported that previous research has shown that farmers are less environmentally aware and concerned than are nonfarm populations. Based on this, the claimed validity of the NEP scale would be reinforced if farmers scored appreciably lower than did the urban sample. Acceptance of the NEP was surprisingly high for both the farm and urban respondents but the anticipated residential difference was confirmed in that the average item score for urbanites (3.2) was significantly larger than that for farm operators (2.9). The NEP scale validity was accepted.

The original Washington state study had concluded that the NEP scale was unidimensional. In this study when the 12 items were submitted to factor analysis, three sets of items emerged for both farm and urban populations. Examination of the items suggested that the NEP scale was measuring three orientations toward: a) the balance of nature, b) limited to growth, and c) man over nature. Each of the three subscales (although only consisting of 4 items) had acceptable levels of reliability. The Cronbach alpha's ranged from a low of .54 for farmers on "limits of growth" to a high of .71 for urbanites on "balance of nature". Further testing of the interrelationships between the three derived subscales found only modest relationships between the subscale scores. It seems that the NEP scale may tap several discrete, and not necessarily orthogonal, attitudinal domains. This finding suggests that collapsing the three subscales into the one 12-item scale may mask important environmental differences between respondents.

Dimensionality Study

Geller and Lasley (1985) specifically addressed the question of the dimensionality of the NEP scale. The data utilized in the study were from two separate surveys. The first data set was that reported in the Albrecht et al. Iowa study and the second a 1980 survey of Missouri farmers (Lasley & Nolan, 1981).

The data were analyzed by using confirmatory factor analysis techniques developed by Joreskog (1969) rather than the principal factor analysis used in the Washington and Iowa studies. The results did NOT confirm either the unidimensionality or the three factor scales. Further testing resulted in confirmation of the dimensionality of a three-factor model using nine of the items from the original scales. The extracted factor pattern of this model closely resembled the findings reported by Albrecht et al. Geller and Lasley "cautiously" accepted the Albrecht et al. interpretation of three factors as consisting of a) balance of nature, b) limits to growth, and c) man over nature.

Ecological Worldview Study

Arcury, Johnson, and Scollary (1986) used the NEP scale to test the relationship of the NEP to knowledge of environmentally relevant issues. The data for this study (n=441) was gathered as part of a statewide telephone survey of Kentucky residents in September, 1984. A short, six-item version of the NEP scale was used. It had a range of 6 to 24 and achieved an alpha of .69. The NEP score was found to have a significant relationship with knowledge of environmentally related issues. Using path analysis, the NEP score was found to have an independent relationship to the knowledge score with the effects of the other independent variables controlled. The factors of age and education had the strongest independent effects on NEP. The authors suggest that this study "shows that a basic worldview or values about how humanity fits within the physical world has a direct relationship to the level of environmental knowledge" (p. 39).

Japanese/United States Study

Pierce, Lovrich, Tsurutain, and Abe (1987) examined the link between postmaterial values and the NEP among Japanese and American populace. The Shizuoka, Japan citizen sample (n=524) and the Spokane, Washington citizen sample (n=524) represented a cross section of the local suburban populations. Environmental activist samples (n=588 Shizuoka and n=235 Spokane) included members of environmental, good government, and social organizations. The political elites (n=436 in Shizuoka and n=139 in Spokane) included public officials and corporate and public-sector experts in environmental policy.

A subset of six of the original twelve NEP items were used in the study. The authors stated that these six items were substantively representative of the original twelve-item scale. Responses to the six items combined to form scales of acceptable reliability (Cronbach's alpha ranging from .62 to .71). The Likert-type format used a five-point response continuum.

Pierce and his fellow researchers report that

findings from this study indicate that the meaning of support for the NEP is culturally based and differs from country to country, even if those countries appear to share the postindustrial developmental status thought to have produced the NEP. The cultural difference is a function of the extent to which the "New" paradigm really constitutes a departure from the traditional paradigm...In Japan, the New Environmental Paradigm, is not all that new (p. 77).

Understanding the cultural foundations of a nation is essential to understanding its environmental attitudes.

Canadian Study

Data for this study were collected in two studies, two years apart, in the cities of Edmonton and Calgary, Alberta (Kuhn and Jackson, 1989). The first mail survey was conducted in July 1984 resulting in a total of 662 usable questionnaires from both cities.

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The second study was sent to a different group of households. Four hundred and three respondents completed the questionnaire. The attitude scale used in both studies consisted of 21 items. It was developed by combining and modifying the "new environmental paradigm" and "dominant social paradigm" scales.

Four factors emerged from factor analysis which collectively accounted for 44.4% of the total variance in the data matrix. Cronbach's alpha coefficient was 0.82 for the entire scale and scores for Factors 1 through 4 were 0.78, 0.68, 0.62, and 0.58, respectively.

Factor analysis of the data from the second study resulted in similar findings. The same four factors accounted for 49.6 percent of the total variance. Cronbach's alpha coefficients for the entire scale were 0.84 and for each of the four factors closely approximated finding from the 1984 study.

The four factors which emerged from the data focused on the consequences of growth and technology, the quality of life, relationships between mankind and the natural environment, and limits to the biosphere.

1990 Kentucky Study

Arcury and Christianson collected data for this study as part of statewide telephone surveys of Kentucky residents in 1984 and 1988. Using random-digit dialing, 441 adults were interviewed in 1984 and 653 adults in the 1988 study.

This study used a scale composed of five of the twelve items which composed the original NEP scale. The reliability for the five item NEP scale, based on the 1988 survey was .62. The scale scoring ranged from 0 to 20 based on the five items. Those scoring 0 had the most Human Exemptionalism paradigm worldview, or the weakest environmentalism attitudes. Those scoring 20 had the most New Environmental paradigm world view, or have the strongest environmentalism attitudes.

Hispanic Study

Noe and Snow (1990a) applied the NEP scale to determine whether differences in ethnic background influenced preferences toward the environment. A field intercept study (n=906) and mail survey (n=431) of greater Miami boaters and a general population telephone survey (n=805) comprised two distinct, independent studies done in southern Florida in 1986. The original 12-item NEP scale was used with the boaters. Only ten items were used in the general population study. Based upon findings from a pretest, the statements dealing with humans interfering with nature and steady-state economy were eliminated. A five point Likert scale, +2 to -2, was used. Factor analysis and Cronbach alpha scalability tests were run to determine possible pattern of environmental beliefs.

Factor analysis of the field survey that sampled boaters and park users showed that the Hispanic respondents had a two-dimensional ecological orientation to nature. The Hispanic respondents in the general survey displayed a three-dimensional ecological orientation to nature. This factor analysis suggest that there is more than one dimension to the NEP scale. At a minimum, there are two dimensions and probably three for some respondents. These findings are also in accord with Pierce et al. (1987) who found that support for the New Environmental Paradigm is culturally based and differs from country to country. Noe and Snow raise the question of whether the influences for the Hispanic respondents may be more social than cultural, resulting from interactions with non-Hispanics.

National Park Study

In this study Noe and Snow (1990b) reported findings from the National Park Service use of the NEP scale to measure environmental concern among park visitors. The NEP was added to five visitor surveys in southeastern parks to determine how

national park visitors would respond to the scale items. Of particular interest to the investigators was the question about the NEP scale's unidimensionality.

The study based findings on results from surveys in five parks: Cape Hatteras National Seashore in North Carolina (N=598), Chattahoochee River National Recreation Area in Georgia (N=872), Blue Ridge Parkway extending through Virginia and North Carolina (N=600), Biscayne National Park in Florida (N=880), and Cascade Heights in Atlanta (N=600). The last park added an important ethnic dimension. It was a study of middle-class blacks.

Kendall coefficient of concordance was applied to test the level of agreement between the responses of all five samples to the 12 items constituting the NEP scale. Eight of the twelve items were found to elicit high levels of agreement across the five sample populations. However, the four items that focus on the anthropocentric viewpoint of subjugating nature to man's designs were poorly interrelated across the samples. This lack of agreement indicated to the researchers that there is an attitudinally ambivalent state among the respondents. They reported that "although respondents generally agree that nature is easily upset by mankind, some respondents were not yet ready to yield control to nature and suppress their self-perceived superior role in the scheme of life" (p. 24).

Factor analysis and Cronbach alpha scalability tests were run. The analysis was compared with Geller et al.'s 1985 study and while there were differences, the responses were similar. The factor missing among the park populations was the one dealing with more abstract ideas about economic and ecological concepts. Respondents may define "steady state" or "spaceship earth" in the different ways. The most important finding was that the NEP scale was once again found to be multidimensional. The article briefly referred to a recent 1990 telephone survey where the NEP was modified by deleting the

steady-state and humans interfering with environment items. However, the final recommendation was for continued use and testing of the original 12-item scale.

Business Study

The NEP scale was used as part of a study by Shetzer, Stackman, and Moore (1991) to examine attitudes of 237 business students about business and the environment. The relationship between business-environment attitudes and NEP orientations provides further support for the predictive validity of the NEP Scale. A strong proenvironmental position regarding business was related to a NEP orientation ($r = .48$). Analysis in this study supports the existence of the three subscales: Balance of Nature, Limits to Growth, and Man over Nature.

1993 Kentucky Study

Published in 1993, Arcury and Christianson conducted this study in 1989. Data were collected via telephone survey from 624 Kentucky residents. In this study the full 12-item NEP scale was used, which has a range of 0 to 48. Three other measures of environmental world view were derived from the full NEP scale based upon their previous work and that of Albrecht et al. (1982). Each included four different items. The three subscales measure respondent views toward (a) human influence on the balance of nature; (b) limits to growth; and (c) reign of humans over nature. Each subscale has a range of 0 to 16.

Results showed that education, income, age, and gender accounted for much of the variation in environmental world view and global environmental knowledge irrespective of residence. However, environmental knowledge is quite limited for the entire sample. Fewer than 25% of the respondents correctly answered any of the questions on global environmental issues.

APPENDIX H
UCRIHS APPROVAL LETTER

UCRIHS APPROVAL LETTER

MICHIGAN STATE UNIVERSITY

May 19, 1994

TO: LOIS C SHERN
204 HUMAN ECOLOGY BLDG.

RE: IRB#: 94-208
TITLE: ATTITUDES, PREFERENCES AND PRACTICES OF
RESIDENTIAL HOMEOWNERS WITH REGARD TO LAWNS AND
LAWN CARE CHEMICALS
REVISION REQUESTED: N/A
CATEGORY: 1-C
APPROVAL DATE: 05/18 94

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project including any revision listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/ CHANGES:

Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)336-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:pjm

cc: ANN C SLOCUM



OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

University Committee on
Research Involving
Human Subjects
(UCRIHS)

Michigan State University
Administration Building
East Lansing, Michigan
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