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## Individual differences in the aesthetic evaluation of natural landscapes

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## Chapter 1

### Introduction

*Henk is a farmer from a family that has lived in the northern part of The Netherlands for many generations. After a long day of taking care of his crops and his animals, Henk likes to stroll along the borders of his lands. Like most of his neighbors, Henk voted for the Christian Democrats during the last elections.*

*Daniel lives in the same area as Henk, although he grew up in another region in The Netherlands. Daniel is highly concerned about the environment, and regularly donates money to Greenpeace and other environmental organizations. He is active in local politics as a member of an ecological party. Daniel is proud that he can distinguish many species of birds by their singing.*

*The area in which Henk and Daniel live has been designated by the authorities as a 'nature development area'. Recently, several alternative plans for ecological restoration have been made public by the local land-use committee. Henk has stated a strong preference for a plan to develop flowery grasslands. Daniel has stated a strong preference for a plan to turn part of the area into marshes.*

The example above, although fictional, illustrates that people may differ in their preferences for different types of natural landscapes. While such individual differences can be commonly observed, it is still unclear why different people prefer different types of nature. At least three different explanations may account for the occurrence of individual differences in landscape preferences.

One popular account holds that individual differences in landscape preferences result from differences in the way that people cognitively represent natural landscapes (e.g., Lyons, 1983; Natuurbeschermingsraad, 1993). According to this explanation, people develop different cognitive images of nature through direct and indirect encounters with natural landscapes. These cognitive images subsequently modify or 'color' individual perceptions and evaluations. Another influential account holds that the way people perceive and evaluate landscapes is in large part a function of their basic needs and motives (e.g., Zube, 1987). According to this explanation, individual differences in landscape preferences may arise because people seek out fundamentally different experiences in nature. Finally, it is often suggested that individual differences in preferences for natural landscapes are caused by contextual factors, such as the introduction of plans for ecological restoration in an area (cf.

Willis & Garrod, 1992). According to this explanation, merely the fact that a natural landscape represents a planned change from an existing landscape may negatively influence people's preference for this landscape. Individual differences may arise because people may be more or less influenced by the context of planned change depending on their personal economic or political interests.

The three aforementioned explanations of individual differences in landscape evaluations each carry different implications for the understanding of people's relationships with natural landscapes. The cognitive account seems to suggest that humans are relatively passive receptacles of landscape information. Alternatively, the motivational account seems to imply a more active conception of humans as interactors with the landscape. Finally, the contextual account implies that humans are generally rather biased and self-interested when it comes to their relationships with natural landscapes. If the latter explanation possesses some validity, authorities may decide not to be influenced by individual differences in landscape preferences in their policy decisions aimed at enhancing visual quality. Thus, more insight into the causes and functions of these individual differences may be a useful aid to nature policy makers.

In order to explain individual differences in landscape preferences, it is first important to get a better view of *which* landscapes are preferred by *whom* in *what kind of* situations. Therefore, a first aim of the research described in this thesis was to describe individual differences in preferences for natural landscapes in terms of landscape characteristics, personal characteristics, and contextual characteristics. A further aim of the present thesis was to shed more light on possible cognitive and motivational mechanisms underlying individual differences in preferences for natural landscapes. In order to achieve these aims, a recently developed statistical method, called 'multilevel analysis' (cf. Bryk & Raudenbush, 1992; Kreft & De Leeuw, 1998) was applied to the study of landscape evaluation. Testing the usefulness of this method in describing and explaining individual differences in landscape preferences was an important secondary aim of the present thesis.

The research described in this thesis was carried out against the backdrop of the introduction and first implementations of plans to establish a national ecological network in The Netherlands. Therefore, the remainder of this chapter will begin by providing an introductory overview of recent nature conservation policy in The Netherlands. This overview will be followed by

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definitions of key concepts in the thesis. Next, empirical findings concerning the roles of landscape characteristics, personal characteristics, and contextual characteristics in individual differences in landscape preferences will be discussed. In addition, theoretical insights concerning these differences and their underlying psychological mechanisms will be elaborated. The chapter will conclude by providing an overview of the other chapters of this thesis.

### **Nature Conservation Policy in The Netherlands**

The Netherlands are one of the world's most densely populated countries, with a population of over 15 million people living in an area of 40.000 km<sup>2</sup>. The country is characterized by a high level of economic activities, and most of the land is reserved for agriculture, urbanization, industry, and infrastructure. Nature areas, apart from forests and country estates, have fallen from 540.000 ha in 1920 to 120.600 ha in 1988 (source: Ministry of Agriculture, Nature Management, and Fisheries, 1996). Thus, The Netherlands have experienced a steady decline in plant and animal diversity. Many plant and animal populations, isolated by infrastructure, agriculture, and urbanization, are threatened by extinction.

In recent years, alarming signals about the loss of plant and animal species have fueled a widespread public concern, and nature conservation has become one of the central policy issues of the Dutch government. A national plan for nature protection was set out in the '1990 Nature Policy Plan' issued by the Ministry of Agriculture, Nature Management, and Fisheries. In this policy plan, the main objective of Dutch nature policy was stated as 'a sustainable conservation, rehabilitation, and development of nature and landscape'. The criteria for assessing ecological values were defined as 'biological diversity' and 'naturalness'. The Nature Policy Plan focuses on the establishment of a National Ecological Network consisting of existing nature reserves and still-to-be-developed natural areas. The Dutch Nature Policy Plan is highly ambitious. It stipulates that within a period of 20-30 years the protected nature areas within the Ecological Network should be increased to 700.000 ha, including forests and country estates.

The plans to create a National Ecological Network represent a significant transition from a defensive policy strategy aimed primarily at protecting existing natural areas, to a more offensive policy strategy aimed at actively creating new natural areas (see Van der Windt, 1995, for a historical analysis of Dutch conservation practices). In the Netherlands, the latter strategy

is commonly referred to as *nature development*. The Dutch nature development policy can be understood as part of a recent, international, movement that has set forth ecological restoration as the new standard in nature management practice (for discussions, see Higgs, 1997; Wyant, Meganck, & Ham, 1995). In general, ecological restoration may be defined as human intervention intended to recover or enhance natural values of existing nature reserves, industrial sites, or agricultural production areas (Swart, Van der Wind, & Keulartz, 1998). A distinctive characteristic of the Dutch plans for ecological restoration is that the interventions will be carried out mainly in agricultural production areas. Establishment of the National Ecological Network will lead to the transformation of more than 50.000 ha of farmland into new wilderness areas.

Nature development policy will have significant consequences for the quality of the Dutch landscape as it is experienced by those who live, work, or recreate in it. The large-scale development of 'new wilderness' in predominantly rural areas will drastically change the appearance of these areas. Thus, the scenic consequences of nature development plans appear to be an important element of land-use planning procedures. Unfortunately, although the landscape's scenic quality was included in the '1990 Dutch Nature Policy Plan' as an additional criterion for the protection of the quality of nature and landscape next to the 'biodiversity' and 'naturalness' criteria, details on how this criterion should be applied in practical nature development situations have not yet been specified.

In short, the '1990 Nature Policy Plan' marks a turning point in the history of Dutch nature conservation policy. It comprises ambitious plans to turn agrarian landscapes into new wilderness areas. The implementation of these plans will bring tremendous changes in vast areas in the Netherlands. As these changes will affect people's experience of the landscape, the '1990 Nature Policy Plan' and its implementation provide a strong impetus for the systematic investigation of the scenic quality of natural landscapes, in particular how people experience the transition from agrarian landscapes to natural landscapes.

### **Definitions and Scope of the Present Thesis**

In order to investigate the scenic quality of natural landscapes, it is necessary to provide clear definitions of the concepts of 'scenic quality' and 'natural landscapes'. According to Wohlwill (1983), a *natural landscape* may be defined as a landscape that is not predominantly influenced by discriminable human activities or interventions. In most cases, this criterion provides a clear

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guideline on which landscapes should or should not be classified as natural. For example, a man-made wilderness area certainly qualifies as a natural landscape by this criterion, because the human interventions by which the wilderness was created are not visible in the landscape. Similarly, an agrarian landscape, even in the absence of any concrete artifacts such as houses, barns, silos, fences, and machinery, would not classify as a natural landscape by this criterion, because regularities such as the spacing of rows of trees or corn make the imprint of human activity very noticeable.

In some cases, however, Wohlwill's predominance criterion is difficult to apply. In particular, the increasing number of so-called 'agricultural nature conservation landscapes', where under some conditions farmers get paid for enhancing the natural values of their lands, are difficult to classify. On the one hand, this type of landscape may be qualified as 'natural' because the enhancement of natural values creates irregularities in the landscape that disguise the imprint of human activity. On the other hand, agricultural nature conservation landscapes are often still recognizable as farmlands, which makes it easy for the observer to infer that the landscape was made through human intervention. Since the transition from agrarian landscapes to more natural landscapes constitutes an important topic of interest in the present thesis, agricultural nature conservation landscapes will be classified as natural landscapes to preserve the distinction between this type of landscapes and 'ordinary' agrarian landscapes.

With respect to the concept of 'scenic quality' it has already been pointed out that the '1990 Nature Policy Plan' does not provide clear guidelines on how this concept should be defined or assessed. The Nature Policy Plan and related policy documents generally define scenic quality as including a wide array of psychological, sociocultural, and environmental factors, such as aesthetic values, cultural/historical values, opportunities for tourism and recreation, nature values, and a large array of thoughts, feelings, emotions, and experiences. While each of these factors is undoubtedly important to the quality of the environment, it is generally not feasible to simultaneously assess or monitor such a wide variety of factors.

In order to circumvent the problems attached to an overinclusive definition of scenic quality, the present thesis will focus on *aesthetic response* as a central measure of this criterion. A characterization of scenic quality in terms of aesthetic response remains close to the Nature Policy Plan, in which the terms 'scenic quality' and 'aesthetic quality' are used interchangeably. Furthermore,

scenic/aesthetic qualities are described in this policy plan as being closely connected to the visual aspects of landscapes.

Aesthetic response may be defined as preference or like-dislike response elicited by visual encounters with real or simulated natural settings (cf. Ulrich, 1983). Although aesthetic response and preference may be measured separately, these concepts are typically assumed to be manifestations of the same underlying dimension reflecting feelings of pleasantness. This assumption is justified by empirical studies (e.g., Buhyoff, Arndt, & Probst, 1981; Daniel & Boster, 1976; Zube, Pitt & Anderson, 1975), which have generally found a strong convergence between aesthetic responses ('how beautiful do you find this landscape'), and general preferential responses ('how much do you like this landscape'). However, as Purcell, Lamb, Mainardi Peron, and Falchero (1994) have demonstrated, it may be useful to make a conceptual distinction between general preferential responses and activity-oriented preferential responses aimed at a specific function of landscapes, such as living or visiting on a holiday.

Aesthetic response, or (general) preference, is a fundamental concept in theories and research on human evaluations of natural landscapes (for reviews, see Daniel & Vining, 1983; Kaplan & Kaplan, 1989; Ulrich, 1986, 1993; Zube, Sell, & Taylor, 1982). Aesthetic responses have been used to make inferences about a number of important issues, such as the salience of physical attributes of natural landscapes (e.g., Kaplan, 1985), the potential adaptive functions of natural landscapes (e.g., Kaplan, 1987), and the visual impact of changing natural landscapes (e.g. Brush & Shafer, 1975; Dearden, 1980). In recent years, several studies have demonstrated relationships between aesthetic response and important outcomes, such as recreational behavior (DeLucio & Mugica, 1994), health and well-being (Hartig, Mang, & Evans, 1998), and willingness to pay for recreational facilities (Daniel et al., 1989). Thus there is increasing support for the external validity of aesthetic response as a key concept of landscape experience.

The vast majority of landscape evaluation studies have exposed people to simulations of natural landscapes, usually color slides or photographs, rather than to real natural landscapes. Some doubts have been expressed as to the usefulness of such simulations as substitutes for real landscapes (e.g., Coeterier, 1983; Hull & Stewart, 1992; Knopf, 1987). However, as pointed out by Zube, Simcox, & Law (1987), there is a substantial documentation of the validity of this medium for both agrarian and natural

landscapes. Several studies have reported high correlations between on-site aesthetic responses to landscapes and responses to photographic representations of the same landscapes (see, for example, Craik & Feimer, 1987; Zube & Pitt, 1981).

Because the research in the present thesis is concerned not only with existing natural landscapes but also with still-to-be developed natural landscapes, computer-made photomontages of alternative management plans are employed in combination with color photographs and slides. Given that computer software for making photomontages has only recently become available, the reality and validity of this new medium is as yet not very well documented. Nevertheless, there is some evidence that photomontages, if realistically made, elicit more valid and reliable aesthetic responses than traditional drawings, maps, and scale-models (cf. Zube et al., 1987). Thus, computer-made photographic simulations as well as photographs and slides appear to constitute useful and valid tools for studying the aesthetic quality of natural landscapes.

In the preceding paragraphs, aesthetic response, or preference, has been identified as a reliable and theoretically relevant operationalization of scenic quality. Furthermore, (computer-made) photographic simulations appeared as a useful and reliable medium for assessing people's preferences for natural landscapes. Together, aesthetic response and photographic simulations provide the tools to study the scenic quality of natural landscapes. The next step is to see, at a conceptual level, which factors make people differ in their preferences for natural landscapes. In the introduction, landscape characteristics, personal characteristics and contextual characteristics were identified as potentially relevant determinants of individual differences in preferences for natural landscapes. Each of these three classes of characteristics will be commented upon in the following three sections.

### **Landscape Characteristics**

An important requirement for any systematic analysis of individual differences in landscape preferences is that these differences should be related to landscape characteristics. For example, in order to understand why one person, say Henk, displays a low preference for marsh landscapes, while another person, say Daniel, displays a high preference for marsh landscapes, one needs to know which characteristics of marsh landscapes are causing these differences in preferences. Is it their wetness? Or maybe their openness? Before

discussing research that bears on these questions, the next section will first provide some general background information about the salient dimensions of natural landscapes as they are generally perceived by individuals who have no professional training in environmental fields.

### **Salient Perceptual Dimensions**

Because lay people are generally not very accurate in verbalizing their experiences with natural landscapes (cf. Kaplan, 1985), salient perceptual dimensions have mostly been investigated in an indirect manner, by means of statistical techniques that identify common patterns in people's similarity or preference judgments. Results of these studies suggest that landscape characteristics underlying environmental perceptions and categorizations may be classified into two major types: (a) spatial configuration characteristics, and (b) content-based characteristics (cf. Kaplan & Kaplan, 1989; Ulrich, 1983). Spatial configuration characteristics refer to the way elements are arranged in the implied space of a scene, such as a scene's depth, or its coherence. These characteristics are assumed to reflect the observer's automatic inferences about the possibilities for moving around in the scene. Content-based characteristics refer to specific objects or elements in the landscape, such as the presence (or absence) of water or man-made objects. Importantly, landscape characteristics may only be interpreted as content-based if they cannot be translated into more general spatial categorization characteristics. For example, the presence of small groups of trees, a frequently observed theme in landscape categorizations, is usually not interpreted as a content-based characteristic, because it appears to reflect the working of more general spatial configuration characteristics such as depth or focality rather than the presence of trees per se.

Theoretically, Kaplan & Kaplan (1989) have described and interpreted spatial configuration characteristics in terms of two basic informational needs: (a) 'understanding' (comprehending or making sense of a landscape), and (b) 'exploration' (being attracted to additional sources of information). Landscape characteristics that bear on people's needs to understand a landscape include the degree of coherence of a landscape, and the degree to which a landscape is legible, i.e., easy to survey and remember. Landscape characteristics that bear on people's needs to explore a landscape include the degree of complexity of a landscape, and 'mystery', or the degree to which a landscape offers a promise of more information if one could enter further into the scene.

From a nature management point of view, an important objection to

the spatial configuration characteristics as specified by Kaplan & Kaplan (1989) is that these characteristics appear to reflect psychological meanings of natural landscapes rather than concrete physical characteristics. Although some preliminary attempts have been made to break down these characteristics into more concrete, mappable components, such as slope smoothness of ground texture, the presence of curving sightlines, or relief contrast (e.g., Brown, Keane, & Kaplan, 1986; Staats, 1991; Ulrich, 1983, 1986; Van den Berg, 1998), much more work on this issue is needed.

With respect to content-based characteristics, there is abundant evidence that the distinction between nature and human influence constitutes a central organizational device in environmental perception and evaluation. When people are asked to judge the similarity of different natural settings, some form of natural to human-influenced distinction is typically found to underlie their categorizations (e.g., Fenton, 1985; Strumse, 1994; Ullrich & Ullrich, 1976). In addition, the presence of water has also been consistently identified as an important dimension underlying environmental perception and categorization (Fenton, 1985; Hammit, Patterson, & Noe, 1994; Zube et al., 1975). Despite the fact that there exist many other potentially important content-based characteristics, such as roads, or specific vegetation types, the fact that these characteristics have rarely emerged as important dimensions in environmental categorization studies suggests that they are not perceived as particularly salient.

In sum, the available evidence suggests that people perceive and categorize natural landscapes in terms of their spatial configuration as well as in terms of their specific content. Spatial configuration characteristics may be broadly divided into two categories: (a) characteristics that meet people's needs to understand natural landscapes, such as coherence and legibility, and (b) characteristics that meet people's needs to explore natural landscapes, such as complexity and mystery. Degree of human influence and presence of water appear to be the most important content-based landscape characteristics.

### **Relating Landscape Characteristics to Individual Differences**

The discussion of landscape characteristics up to this point has shed more light on the characteristics that appear to underlie people's perception and categorizations of natural landscapes. The next step is to identify the role of these characteristics in individual differences in landscape preferences. Unfortunately, empirical investigations of the relationships between landscape

characteristics and preferences have focused on interindividual agreement rather than on interindividual differences (cf. Dearden, 1984, 1987). One factor that may account for this focus on interindividual agreement is the lack of reliable and easily applicable methods to study the role of landscape characteristics in individual differences in landscape preferences. Standard statistical techniques, such as aggregate ordinary regression analysis, do not allow for the estimation of individual variation in effects of landscape characteristics on landscape preferences. Thus, researchers interested in individual differences have had to rely either on their own interpretations, or on highly sophisticated techniques such as multidimensional scaling techniques in combination with property-fitting methods. These methodological difficulties appear to constitute an important, but often overlooked, factor in the neglect of individual differences in empirical investigations of the relationship between landscape characteristics and landscape preferences. By applying multilevel statistical analysis, the research presented in the present thesis attempted to overcome these difficulties (see Chapter 2 for a more detailed discussion of methodological aspects of assessing individual differences in landscape preferences).

An examination of the scarce and indirect evidence that is available suggests that degree of human influence may be an important source of individual differences in landscape preferences. First, in historical and cross-cultural analyses, individual differences are typically discussed in terms of people's relative preferences for rural versus wilderness landscapes (e.g., Huth, 1957; Lowenthal & Price, 1965; Nash, 1982; Thomas, 1983; Tuan, 1974). As the most important difference between these two types of landscapes concerns their degree of human influence, this suggests that people may differ in their evaluation of human-influenced processes in natural landscapes. Furthermore, results of empirical investigations of individual differences in preferences for different categories of natural landscapes indicate that categories reflecting either low or high degrees of human influence elicit the most divergent landscape preferences (e.g., Dearden, 1984; Gallagher, 1977; Orland, 1988; Strumse, 1996). For example, Gallagher (1977) has found that people diverged most with respect to their preferences for unmanaged prairie landscapes. In a related vein, Strumse (1996), in a study of demographic differences in preferences for agrarian landscapes, found the highest occurrence of individual differences for a category of strongly human-influenced scenes depicting farming activities.

The hypothesis that degree of human influence is the most important landscape dimension underlying individual differences in preferences is supported by results from a research program carried out in Spain (for reviews see Abello & Bernaldez, 1986; González Bernaldez & Parra, 1979). Investigators working in this program have suggested that interindividual variation in preferred balances between nature and human influences may be explained in terms of individual differences in sensitivities to the risk-evoking properties of wild, unmanaged natural landscapes. This explanation is consistent with the observation by Ulrich (1983, 1986, 1993) that interindividual agreement in preferences may be found only with respect to unspectacular, unthreatening natural landscapes. Responses to more spectacular, wild landscapes may vary because people differ in whether they interpret the risks implied in these landscapes as challenging or threatening.

To summarize, empirical studies on relationships between landscape preferences and landscape characteristics have focused on interindividual agreement rather than on interindividual differences. The limited amount of empirical evidence suggests that most individual differences in preferences reflect differences in the preferred balance between natural and human influences in a landscape. However, because methods for analyzing individual differences in landscape preferences allow for different interpretations of the landscape characteristics underlying these differences, it is also possible that individual differences in landscape preferences reflect differences in preferred balances among spatial configuration characteristics.

### **Personal Characteristics**

Now that individual differences have been related to landscape characteristics, this section will provide an overview of personal characteristics that may underlie individual differences in landscape preferences. The description of Henk and Daniel at the beginning of this chapter suggests at least three kinds of characteristics of these persons that may account for their differences in landscape preferences: (a) differences in familiarity with rural landscapes, (b) differences in environmental concern and expertise, and (c) cultural and sociodemographic differences. These different kinds of personal characteristics correspond to the three main classes of personal characteristics as they are typically distinguished in discussions of individual differences in landscape preferences (cf. Dearden, 1984; Kaplan & Kaplan, 1989). Each class of personal characteristics will be commented upon in the following three

subsections.

### **Familiarity**

Familiarity with natural landscapes may be described and investigated at different levels of generality. At a highly specific level, people may be more or less familiar with certain *locations* in their home- or recreational environment. This type of familiarity has generally been found to be positively related to preferences for slides or photographs depicting the locations, especially if people appear to have developed emotional ties with the location (e.g., Jackson, Hudman, & England, 1978; Sonnenfeld, 1967; Staats & Van de Wardt, 1990). These findings may be interpreted in terms of a 'mere ownership effect', i.e., the phenomenon that people rate objects more favorably merely because they own them (Heider, 1958; Nuttin, 1987; see also Willis & Garrod, 1992). This phenomenon is generally explained by people's desire to see themselves, and the objects they associate with themselves, in a positive light.

At a more general level, people may differ in their familiarity with certain geographical *regions*. Although it has often been suggested that differences in regional familiarity may affect landscape preferences, evidence to date provides little support for the existence of a regional familiarity effect (Daniel & Boster, 1976; Kaplan & Herbert, 1988; Wellman & Buyhoffs, 1980). For example, Wellman & Buyhoffs (1980) have found that respondents from two different mountainous regions who evaluated mountainous scenes from these regions did not exhibit a bias toward the scenes from their own region. Finally, people may differ in their familiarity with generic *landscape types* that may be found in many different geographical regions, such as rural versus wilderness landscapes, or forests versus deserts. A number of studies have suggested positive relationships between people's degree of familiarity with generic landscape types and preferences for these landscape types (e.g., Dearden, 1984; Lyons, 1983; Orland, 1988; Yu, 1995). However, the specific way in which familiarity and preferences were measured in some of these studies urges for some caution in interpreting the results. For example, Dearden (1984) found that familiarity with wilderness areas led to higher preferences for wilderness areas. However, because Dearden measured familiarity in terms of respondents' self-determined recreational visits, this finding may just as well reflect influences of other pre-existing sociodemographic differences as it may reflect influences of familiarity. In a related vein, findings by Lyons (1983) that respondents from areas dominated by deciduous forest vegetation displayed

significantly higher preferences for this vegetation type than respondents from other biomes, may be explained by the fact that Lyons measured preferences as a place to live rather than general aesthetic preferences. Compared to aesthetic preferences, preferences for landscapes as a place to live probably involve more deliberate cognition, and accordingly, may be expected to be more influenced by personal experience (cf. Ulrich, 1993). In sum, familiarity with specific locations appears to be positively related to preferences for these locations, but evidence for more general familiarity effects remains inconclusive.

### **Environmental Concern and Expertise**

Results of several studies suggest that landscape preferences may vary as a function of environmental concern. First, members of environmental organizations have been found to display relatively strong preferences for wilderness landscapes as compared to more human-influenced natural landscapes (Dearden, 1984; Kaplan & Herbert, 1987). Furthermore, Strumse (1996) has found relationships between environmental concern as measured by the NEP scale (Dunlap & Van Liere, 1978) and preferences for agrarian landscapes. Scores on the NEP scale were positively related to preferences for traditional and nature-dominated agrarian landscapes, while these were negatively related to preferences for modern agrarian landscapes with dominating human influence.

Given their greater knowledge about natural landscapes, environmental experts, like members of environmental organizations, may be expected to differ from lay groups in their preferences for natural landscapes. However, findings of studies in which landscape preferences of experts, such as landscape architects, professional planners, and biologists, were compared with lay preferences suggest that differences between experts and lay groups may not be as pervasive as is often thought. Although some studies have reported close to zero correlations between expert and lay preferences (e.g., Buyhoff, Wellman, Harvey, & Fraser, 1978), most studies have reported generally high agreement between groups of experts and lay groups (Dearden, 1984; Yu, 1995; Zube, 1974). With respect to the latter findings it should be noted that there may still be interesting differences between groups even if correlations between the groups' mean preferences are generally high (cf. Kaplan & Kaplan, 1989). For example, Yu (1995), citing research by himself and others, describes how landscape architects, despite the fact that their preference

rankings were highly similar to those of lay groups, displayed relatively high preferences for scenes in 'cold tones' and scenes of wild groves of trees, and relatively weak preferences for scenes with colorful sunsets and bright shorelines. Thus, formal expertise may influence landscape preferences, but experts appear to be less different from the general public than members of environmental organizations.

### **Cultural and Sociodemographic Differences**

Cross-cultural comparisons of landscape preferences among groups of respondents from diverse European, North American, Australian, and Asian countries have indicated high levels of agreement when respondents have matching socioeconomic backgrounds (see, for example, Hull & Revell, 1989; Kaplan & Herbert, 1987, 1988; Shafer & Tooby, 1973; Ulrich, 1983; Yu, 1995; Zube & Pitt, 1981). In line with the previously discussed studies on regional differences (e.g., Wellman & Buhhoff, 1980), these findings suggest that where one lives is in itself not a significant determinant of landscape preferences. Within a country or a region, however, membership of sociodemographic groups has consistently been found to be an important source of individual differences in landscape preferences. Again, the balance between nature and human influences appears to be a key issue underlying these differences. In particular, farmers, teens, elderly people, and people with a low socioeconomic status have been found to display relatively strong preferences for managed natural landscapes, while young adults and people with a high socioeconomic status have been found to display relatively strong preferences for unmanaged natural landscapes (Balling & Falk, 1982; Daniel & Boster, 1976; Dearden, 1984; González Bernaldez & Parra, 1979; Yu, 1995). Thus, farming background, age, and socioeconomic status appear to be important correlates of individual differences in landscape preferences.

### **Relative Importance of Personal Characteristics**

Taken together, the available evidence suggests that individual differences in landscape preferences are systematically related to personal characteristics. This implies that these differences are not, as is often thought, completely random, but to a large extent measurable and predictable. Unfortunately, it is difficult to substantiate the independent contributions of the various personal characteristic to individual differences in landscape preferences, because most studied have included only a limited number of

personal characteristics which, on top of that, have mostly been confounded. For example, members of environmental organizations, which have been included in several studies, are generally characterized not only by their high environmental concern, but also by their greater knowledge of nature, their high familiarity with natural areas, and their membership of a subculture. Nevertheless, the findings suggest that familiarity with specific locations and with generic landscape types, environmental concern, and sociodemographic characteristics, including age, farming background and socioeconomic status, are relatively strong determinants of landscape preferences, while regional familiarity and professional knowledge are relatively weak determinants of landscape preferences. A recent study by Yu (1995), in which landscape preferences were compared with respect to a wide range of cross-cultural and sub-cultural factors, provides some support for these assumptions concerning the relative importance of different personal characteristics. The results of this study show that influences of macro-cultural differences between countries and professional training on landscape preferences were relatively weak, while influences of subcultural factors, in particular rural residence and farming background, were relatively strong.

### **Contextual Characteristics**

In addition to landscape characteristics and personal characteristics, it is important to consider possible contextual determinants of individual differences in landscape preferences. For example, it is conceivable that Henk and Daniel, the farmer and environmentalist described at the beginning of this chapter, differ in their preferences for natural landscapes merely because these landscapes represent planned changes for their own residential area. In a more neutral context, say a museum or a university room, Henk and Daniel may display very similar preferences for flowery grasslands and marshes. In general, contextual characteristics may be defined as all variations among judgmental contexts that influence people's perceptions and evaluations. They include not only variations in background information, such as information about the planned-change status of landscapes, but also variations in measurement techniques, such as the different techniques to simulate natural landscapes as discussed in the beginning of this chapter.

Most systematic investigations of contextual influences on landscape preferences have focused on influences of measurement techniques, such as the order in which scenes are presented, response scale formats, viewing time, and

the presentation media used (e.g., Brown & Daniel, 1987; Eiser, Reicher, & Popadec, 1993; Orland, 1988; Wade, 1982). Only few studies have systematically investigated the influences of background information, such as persuasive messages and verbal labels, on preferences for natural landscapes (e.g., Anderson, 1981; Hodgson & Thayer, 1980; Simpson, Rosenthal, Daniel, & White, 1976). Results of these studies have shown that background information can have substantial effects on landscape preferences. Moreover, effects of background information have been found to vary across different groups of respondents (Hodgson & Thayer, 1980).

Despite the obvious relevance of planned-change context to the study of landscape evaluation, there have been no systematic investigations of influences of this factor on people's perceptions or evaluations. A few studies have explicitly focused on people's preferences for natural landscapes representing planned changes (e.g., Sell & Zube, 1986; Staats & Van de Wardt, 1990; Willis & Garrod, 1992), but these studies have all suffered from methodological confounds between the context of planned change and other relevant variables such as familiarity or expertise. Thus, although background information about natural landscapes may generally have substantial effects on landscape preferences, influences of information about the planned-change status of landscapes have not been systematically studied. Therefore, it is not known whether and how people's preferences for landscapes that represent planned changes differ from their preferences for the same landscapes in a more neutral context.

### **Theoretical Issues**

The analysis thus far has made it clear that human responses to natural landscapes cannot be predicted from landscape characteristics alone. Personal characteristics and contextual information may significantly alter the way people perceive and evaluate natural landscapes. Consequently, landscape preferences may vary across individuals. The issue of interindividual variation in landscape preferences is generally considered to be of crucial importance to many theoretical questions, such as the 'consensus debate', the relative importance of cognitive and motivational mechanisms, and the validity of biological and cultural theories of landscape preferences (e.g., Bourassa, 1990; Dearden, 1987; Jacques, 1980; Shuttleworth, 1984; Wohlwill, 1983; Zube, 1984). These questions will now be discussed in turn.

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**The Consensus Debate**

The relative contribution of people and places to variations in landscape preferences has been a recurrent theme in theoretical discussions in the field of landscape aesthetics. This 'consensus debate' may be traced back to the old philosophical controversy about the location of beauty. Is beauty in the eye of the beholder, or is it inherent in objects? Despite the fact that the nature of these questions appears to be empirical rather than theoretical, empirical investigations have not yet led to a settlement of this debate due to a lack of unbiased methodologies (Dearden, 1987). Depending on their a-priori assumptions, researchers have employed either techniques that assume that individual differences do not exist, or techniques that assume that there is no consensus. Since neither techniques provide unbiased estimates of the relative importance of people and places to landscape preferences, the consensus debate has remained largely at a theoretical level.

As Stamps (1996) has pointed out, recent advances in statistical methods have now opened the possibility to put the consensus debate to empirical tests. Using random samples of both people and places, Stamps (1996) performed a variance components analysis to find out how much variance in preference ratings could be attributed to people and places, respectively. Results of this study indicate that people accounted for about 30% of the total variance in preferences for nature scenes, while places accounted for about 7% of this variance. These findings suggest that individual differences may, after all, be more important than they have often been claimed to be during the last three decades of empirical research on landscape preferences. However, much additional research is needed to further validate the results of this study.

**Cognition versus Motivation**

With respect to the psychological mechanisms underlying individual differences in landscape preferences, theoretical notions have remained largely intuitive and, for the most part, untested. Many of these notions have started from the observation that direct and indirect encounters with natural landscapes may change people's cognitive images of nature (e.g., Balling & Falk, 1982; Kaplan & Kaplan, 1989; Lyons, 1983; Ulrich, 1983; Wohlwill, 1983). In general, encounters with rural landscapes are thought to stimulate the development of anthropocentric images that depict nature as subordinate to humans, while encounters with wilderness landscapes are thought to stimulate

the development of more ecocentric images that depict humans as subordinate to nature. These differences in cognitive images are assumed to function as a cognitive layer through which aesthetic responses to natural landscapes are filtered or strengthened (cf. Wohlwill, 1983).

While individual differences in landscape preferences may be due in part to purely cognitive processes, it seems plausible that landscape preferences are also affected by motivational factors. As several authors have pointed out, people are more than just passive observers and processors of landscape information (Canter, 1983; Hartig, 1993; Ittelson, 1973; Zube, 1987). Rather, people's relationship with natural landscapes may be characterized as an active interchange in which people not only receive information from observation, but also from participation. An important implication of this transactional perspective is that personal circumstances and experiences with natural landscapes may not only change people's perceptions and images of natural landscapes, but also their needs and desires to use it. To the extent that different landscapes represent different values and utilities, individual differences in needs and desires may lead to individual differences in landscape preferences.

Discussions of cognitive and motivational bases of individual differences in landscape preferences typically provide few details on precisely how cognitions and motivations may lead to individual differences in landscape preferences. In general, however, there are two ways in which cognitions and motivations may affect landscape preferences: (a) by altering people's perceptions of landscapes, or (b) by altering their relative weighting of landscape characteristics (cf. Brown & Daniel, 1987; Daniel & Boster, 1976). These two routes to individual differences in landscape preferences carry important implications for the feasibility of developing practically applicable models of landscape preferences that are sensitive to individual differences. Models of landscape preferences are only of practical value to land managers and planners if they consist of objectively measurable landscape characteristics (cf. Brown et al., 1986; Miller, 1984). If individual differences reflect purely perceptual differences, then it would appear to be impossible to build models which both consist of objective landscape characteristics and take into account individual differences. Thus, from a practical perspective, it is very important to gain more insight into the exact mechanisms by which cognitions and motivations lead to individual differences in landscape preferences.

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**Biological versus Cultural Theories**

Among landscape researchers, the questions discussed in the two previous sections concerning the degree of interindividual variation in landscape preferences and cognitive versus motivational explanations of this variation, are often considered of crucial importance to the tenability of general biological or cultural theories of landscape evaluation. High degrees of consensus and cognitive mechanisms are typically interpreted as evidence for biological theories of landscape evaluation, while low degrees of consensus and motivational mechanisms are typically interpreted as evidence for cultural theories. However, individual differences in landscape preferences may generally be explained equally well in terms of biological tendencies as in terms of cultural learning processes, regardless of their scope or underlying cognitive or motivational mechanisms (cf. Bourassa, 1990; Lyons, 1983). Thus, for example, the mere detection of low degrees of consensus or motivational mechanisms is in itself not a sufficient basis to adopt cultural theories, or reject biological theories. In fact, as Bourassa (1990) has pointed out, it is always possible to reduce individual differences in landscape preferences to manifestations of biologically adaptive mechanisms, or to explain consensus in terms of cultural learning processes. Thus, while the degree of interindividual variation in landscape preferences and the cognitive or motivational mechanisms underlying this variation may be empirically investigated, interpretations of this variation in terms of biological or cultural learning theories are difficult to validate empirically.

**The Present Thesis**

In the present thesis, research is described that begins to unravel the various determinants and underlying mechanisms of individual differences in preferences for natural landscapes. It examines how people perceive and evaluate natural landscapes among various samples of respondents, including residents and visitors of nature development areas. Aiming for a diversity of methods to enhance validity, this thesis includes quasi-experimental field and laboratory studies, one experimental study, and a national survey. Each chapter comprises a published or submitted journal article that can be read independently.

*Chapter 2* addresses methodological issues in the study of individual differences in landscape preferences and their theoretical and practical implications. A field study examines differences in preferences for natural

landscapes representing plans for nature development from an agrarian area among farmers, rural residents, and visiting cyclists. Group differences in perceptions of landscape characteristics, as well as group differences in the relationship between perceived landscape characteristics and landscape characteristics are investigated using multilevel statistical analysis.

In *Chapter 3* the influences of planned-change context on landscape preferences are examined in an experimental setting. Photographs of natural landscapes are presented in two ways: as existing landscapes, or as plans for nature development from an agrarian landscape. It is hypothesized that effects of planned-change will be moderated by respondents' judgmental perspective and by the landscapes' degree of human influence. The findings are discussed from a perceived risk perspective.

In *Chapter 4* group differences in preferences for natural landscapes with varying degrees of human influence are examined outside a planned-change context. Possible cognitive bases of group differences in landscape preferences are investigated by assessing nature images and environmental beliefs.

*Chapter 5* describes a survey among residents from six nature development areas in The Netherlands. This study goes beyond the mere determination of group differences by examining a broad variety of personal correlates of individual differences in landscape preferences. In addition, possible motivational bases of these individual differences are examined by assessing basic nature experience needs.

Finally, *Chapter 6* includes a summary and discussion of the main conclusions, contributions to theory and research, directions for future research, and practical implications.

