Human Habitat Preferences: A Generative Territory for Evolutionary Aesthetics Research

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Human evolutionary aesthetics is in many ways the study of humble everyday life – preferences and feelings evoked by a stimulus without self-conscious thought, and yet prevalent on an almost daily basis. While a recent trend in this line of research has been to focus on preferences related to sexual selection – mate selection, body composition, facial symmetry, and body movement analysis, quietly sitting in the shadows awaits an equally important area for the understanding of evolved aesthetic preferences – our (natural selection mediated) response to our physical environment. The current paper argues that a large part of the everyday aesthetic experience for humans involves a behavioral and emotional response to landscape. Since the selection of habitat was crucial in our evolutionary history, research on human habitat preference and perception is a vital area for the further understanding of evolved aesthetic tastes. A review of the major evolutionary theories and empirical evidence underlying habitat preference theory is given, ending with a discussion on the current status of habitat preference research and suggestions for future research directions.

Habitat Selection: The Evolution of Affect

An important principle in psycho-evolutionary theory is the recognition that the function and adaptedness of any particular aspect of human activity cannot be understood based on the activity's current role, but rather on its former function during the Pleistocene, the epoch in which modern humans evolved (Lorenz 1973; Cosmides and Tooby 1987; Symons 1989, 1990). Although selection of a habitat is not a priority for current human survival, habitat selection was a vital part of everyday survival for our ancestors. During the lengthy hunter-gatherer stage of evolution, frequent moves throughout a landscape were necessary in order to attain reliable resources for the long periods of generation and offspring dependency. Those individuals who were able to detect and seek a habitat that offered protection from predators and weather, food, water, and other resources were more successful than those who were not able to seek and perceive these qualities about a location.

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Since the selection of a habitat decisively influenced the survival and reproductive success of the organism, the relevant psychological mechanisms underlying habitat selection were subject to strong selection pressure. A Darwinian approach to habitat selection proposes that one consequence of selection pressures on habitat selection mechanisms was the development of emotional responses to species-specific features of the environment. This is based upon the consideration that emotional reactions act as motivators for human behavior (Orians 1980). Preferred environments have an adaptive significance in that they effectively elicit like – dislike feelings which in turn motivate approach–avoidance behaviors appropriate to ongoing well-being (Ulrich 1986). Said simply: a large portion of our current feelings and behavioral responses toward environmental forms may be considered as evolutionary remnants that helped us to originally seek good habitat locations.

Habitat Preference: Evolutionary Theories

The idea that there is a link between human evolution and current aesthetic preferences is not new. Over the past 20 years, several theories have provided a sturdy framework for the empirical testing of environmental aesthetics (e.g., Appleton 1975; Orians 1980; Woodcock 1984; Kaplan and Kaplan 1989). Among these works, two of the most discussed theories are the prospect–refuge theory by Appleton and the framework of prediction of preference by Kaplan and Kaplan (Kaplan and Kaplan 1982; Kaplan 1987, 1992).

Appleton's approach to environmental aesthetics began in 1975 with what he called "habitat theory". Appleton hypothesized that humans prefer landscapes which promise to satisfy our basic biological needs, i.e., that signal vital resources and invite further exploration. From habitat theory, Orians developed the well-known "savanna theory" of biotope preference. Savanna theory postulates that modern humans show an innate preference specifically for savanna biotopes, the environment in which our ancestors did most of their evolutionary flourishing. Implicit to the theory is the assumption that biotope imprinting must have taken place phylogenetically, as humans should develop mechanisms that allow them to recognize habitats that have previously promoted survival throughout our evolutionary history. Savanna theory has remained in the spotlight of habitat preference research for many years and has provided a superb background for much empirical testing. Ungratefully, not all findings supported the theory which had initiated it. The preference for a moderate level of maintenance and traces of human life, like houses or fields cannot easily be explained by the savanna theory (Coeterier 1996; Hagerhall 2000). Moreover, why would such complex mechanisms for the preference of habitat – a problem

for all members of our evolutionary lineage – have evolved solely within one epoch? When it comes to environmental preferences, it must be likely that choice mechanisms were put under selective pressure long before (and after) the Pleistocene era.

Additions to environmental aesthetics theory were made in 1984 by Eibl-Eibesfeldt. Eibl-Eibesfeldt described the human aesthetic condition globally, as being "phytophilic", having a strong psychological and behavioral attraction to green plants, and "hydrophilic", having a strong psychological and behavioral attraction to water. Regarding landscape preferences, he stated that structures that provide an easy-to-survey vegetation were useful features to evaluate the varying quality of landscapes, and that habitat selection should be based largely on a need for security. A synthesis of the aforementioned theories into an overarching framework is provided by Appleton's "Prospect Refuge" theory (1975, 1984), a theory which assumes that natural selection favored the survival of those individuals who preferentially settled in areas providing prospect, the ability to survey the landscape, and refuge, the ability to hide when in danger. The presence of environmental structures that allow prospect views would have increased the likelihood of spotting resources such as water and food, and of recognizing approaching threats such as predators, hostile conspecifics, or changing weather, so that decisions could be made about the opportune time to move on and to set priorities for activities. Since both prospect and refuge were crucial for survival, it is hypothesized that our ancestors developed positive response patterns – emotions as motivators – to areas that exhibited these qualities and negative response patterns to environments that did not.

The other major theory of environmental aesthetics comes from Stephen and Rachel Kaplan (Kaplan and Kaplan 1982; Kaplan 1987, 1992). The Kaplans point out that successfully negotiating terrain requires skill and knowledge of the environment. Accordingly, landscapes that signal to the observer an opportunity to explore without losing orientation should be preferred over those that fail to satisfy or even hinder this need. Kaplan's preference matrix contains four predictors that describe these exploration and orientation possibilities: complexity (the number of independently perceived elements in a scene), coherence (unity), legibility (identifiability and patterning), and mystery (the promise of future information). In a spontaneous decision, visual complexity helps determine the exploration quality, while coherence aids in rapid understanding. If more time is available for decision-making, then legibility helps in reading the landscape and mystery helps to properly evaluate the exploration possibilities. An extension of Kaplan's 'complexity' factor has branched into what is called the biodiversity theory (Erlich and Erlich 1992). The biodiversity theory claims that moderate to high biodiversity within an area (i.e., moderate to high complexity) is a signal that a landscape is ecologically stable, and therefore predictive of future resources. Moderate to high biodiversity

should then evoke ratings of high aesthetic preference within humans. It is likely, however that although high complexity wakes our interest, those factors that help maintain orientation (coherence and legibility) are also important in preference ratings, as orientation is essential to survival. Biodiversity cues alone will not be enough to evoke positive aesthetic preference in humans.

Despite differences in the focus, the aforementioned theories maintain one common ground: it is evident that behavioral reactions to different structural or qualitative components of an environment have developed within humans, and that these reactions are related to our basic biological needs. An important discussion that then follows regards the ability of the human perceptual system to detect such environments.

Perception

Environmental aesthetics research distinguishes two realms of aesthetic variables: (1) the structure of features, the so-called formal aesthetics, and (2) the content of the features, the so-called symbolic aesthetics (Lang 1988). The distinguishing characteristics of formal aesthetics are form, proportion, rhythm, complexity, spatial arrangement, incongruence and novelty. The distinguishing characteristics of symbolic aesthetics are style, material, resources, degree of naturalness, and the actual content items, for example, water and trees. (Lang 1988; Groat and Despres 1990). From an evolutionary perspective, the term "symbolic aesthetics" could be criticized as being inaccurate. We expect that individuals should prefer such things as trees and water for what they actually are, rather than for any symbolic meaning they might have. The term "content aesthetics" might be more appropriate.

In both formal aesthetics and symbolic/content aesthetic areas, an important base for research relies on information about what the human perceptual system is more capable of. From an evolutionary perspective, perception should be closely tied to evaluation, where identification of criterion attributes will most likely implicate values and valuation. The objective of perception is to present our brain with a coherent and meaningful picture of the outside world and to give each object its place in the organized whole (Coeterier 1996). When we interact with the world, it is impossible to register and process all incoming information. Instead, we must select, order and condense the information. Which elements of our environment – both formal and symbolic/content oriented – are important enough to be selected by us as the prominent, organizing features of a habitat? These elements are likely to be the ones which influence our emotional, affective responses.

Research has found that despite differences in the background of participants and differences in type of landscape stimuli used, the criteria

used to evaluate landscapes tend to be similar (e.g., Coeterier 1996). The most prominently perceived components of an environment are the unity of the landscape as a whole, its function (use), maintenance level, naturalness, spaciousness, development in time, soil and water, and its sensory qualities such as color and smell. Further, landscape features tend to be perceived and assessed within a context of all other visible features, rather than assessed lexically, feature per feature. The physical element of water, for example, is often a preferred content item. Within a schemata, however, the attribute that water confers depends on the context. A winding and twisting river might enhance the naturalness of a landscape, while a straight canal might enhance the perceived spaciousness. Thus, the actual content item 'water' is perceived simultaneously as a content item and as an abstract, formal attribute (e.g., spaciousness), derived from the overall gestalt of the landscape.

Water and vegetation tend to have further perceptual qualities of their own. Using color slides of natural waterscapes, Herzog (1985) found that the most predominant evaluation criteria for a scene that contains water are unity (coherence), spaciousness, identifiability, complexity, mystery and texture – terms which overlap Kaplan's preference matrix and Coeterier's (1996) eight perceptual attributes (listed in the previous paragraph). For vegetation, perception research has found that individuals tend to distinguish between different vegetation forms based predominantly on vegetation density, height, and leaf color. Plant form, spatial arrangement, and texture are less important preference assessment (Misgav 2000).

Much theoretical and empirical work on the connection between perception and preferences repeats the following finding: the emotional responses that we have to a landscape are rapidly made, without much need for cognitive processing. These rapid responses are typically made to general, rather than specific, schematic features of the environment (Blum and Barbour 1979; Zajonc 1980). Zajonc (1980) has given the term 'preferenda' to such features. The structural properties of an environment combine with biases in the human perceptual system to convey quickly, and with very little processing, salient general characteristics of a setting. Gross depth cues, coherence, complexity, development in time, and certain classes of content such as water and vegetation are perceived very quickly as they provide useful information about the location's ability to meet human biological needs. These preferenda are still active in our modern aesthetic evaluation system. Modern technology can provide valuable insights about the ways in which current preferenda are perceived. Syneck (1998), for example, has found that computer analysis of fractal dimension replicates the way in which humans perceive complexity in a landscape. Such findings can greatly increase our understanding of the perceptual foundations of aesthetic preferences.

Landscape: A Consensus on Aesthetic Preferences?

As predicted by evolutionary theory, landscape choice studies have confirmed that modern humans exhibit a preference for savanna-like habitats (Orians 1980; Balling and Falk 1982; Ulrich 1983, 1986). Orians (1980) lists eight variables that exert a positive influence on landscape selection and that are likely to have stemmed from phylogenetic adaptations to savannas: a preference for water, large trees, focal points, semi-open spaces, changes in elevations, unobstructed view of the horizon, plant growth and moderate complexity. Ulrich's (1981) review of landscape preference literature provided similar results, including the following positive preference points: (1) complexity that is moderate to high; (2) the complexity has structural components that establish a focal point and other order and patterning is also present; (3) there is a moderate level of depth that can be perceived unambiguously; (4) the ground surface texture is even and homogeneous, conducive to movement; and (5) a deflected vista is present (prospect). Although some components are missing, for example, development in time, mystery and function of a landscape, this summary integrates much of the formal aesthetics components on landscape preferences.

Symbolic/content variables, on the other hand, are also important for aesthetic evaluation. Studies have revealed, for example that the presence of artificial contents such as poles, cables, signs and vehicles within a landscape tend to lower the aesthetic preference ratings of that landscape (Herzog et al. 1976; Appleyard 1981; Anderson et al. 1983; Nasar 1990, 1994). We have an overall preference for natural environments over artificial environments (Nasar 1983, 1984; Kaplan and Kaplan 1989); so much that the addition of natural material to urban environments tends to dramatically increase the area's aesthetic appeal (Taylor and Atwood 1978). This is complicated, however, because we also tend to prefer that nature has some indicators of human control and intervention. Slides showing well-maintained pastures with short grass, for example, receive higher ratings than wild nature scenes with a high complexity level and rough ground texture (Hagerhall 2000; see also Misgav 2000). Perceived landscape management is related to a feeling of safety (Hagerhall 2000), and a positive correlation between perceived safety and preference exists. This relationship has also been shown by Kuo et al. (1998). Residents of urban public housing facilities rated photographs of their own neighborhoods with manipulated tree densities, tree placements and grass maintenance. Although tree placement had little effect on preference, both tree density and grass maintenance had strong effects on preference. Higher tree density and higher grass maintenance resulted in increased feelings of safety and aesthetic pleasure.

Finally, one of the content variables that continuously emerges in findings is water. There is considerable evidence to support the claim of many

researchers that water is a landscape property which nearly always enhances scenic quality (see Ulrich 1981). Although negative affective reactions can be elicited by some water phenomenon (e.g., a stormy sea), a consistent empirical finding is that water evokes interest, aesthetic pleasantness and positive feelings such as tranquility (e.g., Hubbard and Kimball 1967; Civco et al. 1978; Palmer 1978). The universal appeal of water is likely to be biologically based, therefore largely independent of cultural or learned associations.

Behavioural and Physiological Outcomes

If our environment can evoke specific feelings (e.g., safety or tranquility), and differential affective states in general (e.g., like, dislike), then it is likely that environmental stimuli will also affect other aspects of our behavioral outcomes and biological functioning. Habitat preference researchers have provided substantial evidence that the assessment of our environment and the emotional response has a strong impact on our physiological and psychological health. The addition of natural materials to an urban environment not only increases subjective feelings of 'refreshment' and 'relaxation', but can also actually speed recovery in stressful situations. Ulrich (1984) observed that patients recovered faster in a nature-like environment than otherwise. It was sufficient to have a view of a small stand of deciduous trees to reduce patients' post-operative hospital stays and to increase their well-being. Hospital stays were shortened an average of 8.5 days and consumption of analgesic drugs was curbed.

Access to nature also has an impact on physical development. Kindergarten children who played in more natural playgrounds showed considerable improvements in motor fitness, balance and co-ordination skills compared with children who played in less natural playgrounds (Fjortoft and Sageie 2000). Grahn's (1996) comparison of nursery schools found similar effects. Children who played at an outdoor, nature-like playground had better health records, concentration, social skills and increased creativity compared to children who played at an indoor playground. Studies show that children play in barren playgrounds half as much as they do in relatively green playground. Moreover, children's access to social interactions with adults significantly reduced when playgrounds have less vegetation (Taylor et al. 1998). Adults prefer to be in green spaces, too.

If learning in children is improved by plant-rich environment, it might also be expected that adult cognitive processes also become more efficient when in plant-rich areas. Oberzaucher and Grammer (2000) investigated this idea by documenting the effect that indoor plants had on test-takers in a driver's license examination room. Individuals who took tests when the examination room was equipped with plants achieved significantly

more points per time-unit than individuals who took tests when the room was void of plants.

Not only learning is affected by the presence or absence of nature; human social behavior is also influenced. Access to nature and natural views is known to yield more positive relations and decrease aggression among residents in a neighborhood (Kuo et al. 1998), to decrease domestic violence in families (see Kuo et al. 1998), and to decrease the amount of graffiti and vandalism (Brunson et al. 2001). Ruso and Atzwanger (2001) utilized a small fountain within a shopping mall to measure the affect of water on social interaction (frequency of body contacts) and tactile exploration in commercial settings. Both rate of interaction and rate of exploration significantly increased when the fountain was filled with water compared to when the fountain was dry. The effect was even stronger when the water was in motion. Similar observations about the relationship between water presence and increased human sociality were also made by Pitt (1989), who found that group size and affiliation among river recreationists is higher compared to other outdoor recreationists. The authors suggest that water, like other natural components, is not only important for the assessment of environment quality, but also has an immediate impact on human behavior.

Since environment and environmental components still have an influence on our modern-day psychology, health, development, cognitive ability, and social behavior, it makes sense that strong aesthetic preferences still exist regarding habitat components and/or any items that contain symbolic references to outdoor habitats. As habitat has been so closely tied to survival throughout our evolutionary history, aesthetic preference and physiological outcome will also be inextricably tied to one another. Because of the directness of this connection, we argue that the study of habitat preferences, perhaps more than any other preference area, is one of the most potent areas in which to learn about fundamental foundations of human aesthetic preferences.

Habitat Preference: Individual Differences

If aesthetic preferences, affect, and behavioral outcomes toward physical environments are considered to be outgrowths of evolutionary adaptations, it should make sense that these aspects are displayed relatively universally, regardless of cultural or experiential differences. Is there evidence that individual differences exist in preferences and responses to environmental variables?

Criticism can be made that the apparent consensus on preference for habitat may actually be a sampling artifact, as samples tend to be taken from people of similar background and experiences. Indeed, Lyons (1983)

found that landscape preferences differed according to age and gender, with older people expressing lower preference ratings in all categories compared to younger people, and females preferring more vegetation than males. However, no theories were offered as to why or how this might occur. Differences in landscape perception and preference according to age have been found in several other studies. Gibson (1979) and Heft (1988) found that there is a perceptual difference that varies with age, with children interpreting the landscape and terrain in terms of functions, and adults tending to interpret the landscape terrain in terms of forms. We might also expect that perceptual differences will occur especially within the feature of complexity or biodiversity, as the perception of this feature is not fixed, but will be modified by category learning as one gets older.

The fact that differences occur in the strength of preferences for savanna environments over the lifespan is well documented, a finding that is offered as evidence that innate predisposition/phenotypical imprinting occurs in humans. At age 8, children select the savanna landscape as their preferred place to live in and to visit. By age 15, this changes such that savanna landscape, deciduous forest, and coniferous forest are liked equally well (Balling and Falk 1982). Because none of the participants in this study had ever been in tropical savanna, the authors postulate that a developmental pattern occurs, where innately programmed responses may be later modified by experience in particular settings (in this case, the deciduous forests of eastern US). This line of thinking can be pushed further: clearly, the savanna habitat is not available across the world. If all humans followed the impulse to stay in savanna-like environments, resource competition would result. It would be more adaptive to remain flexible and to maintain a preference for the environment that one has grown up in. If an individual and an individual's parents were able to survive and reproduce in a certain environment, then that individual is also likely to have similar success. Syneck's (1998) work also supports this hypothesis. Analysis of virtual landscape pictures found that before puberty children tend to prefer low complexity landscapes, while after puberty they prefer the high complexity, mountain-like landscapes which they had been surrounded by during maturation. Experience with an environment can change one's aesthetic preferences.

As might be expected, landscape evaluation has also been found to vary according to one's occupation. Brush et al. (2000) tested six groups of individuals, three of whom earned their living from the land (farmers, loggers, and foresters). Three types of landscape were assessed, forest, farmland and the urban edge. All groups, except the farmer group, choose the forest landscape to be most enjoyable, followed by farmland and the urban edge. The farmers, however, preferred farmland above all others. Although Brush's research took place in western USA, similar results were also found for farmers in the Iberian Peninsula (Gomez-Limon and Fernandez 1999). Livestock farmers preferred more open landscapes, while the other

groups (recreationists and managers) preferred landscapes with denser vegetation. Buhyoff et al. (1982) also found that experience with an environment can influence preferences. Tree damage from insects was shown to decrease preference among observers who were knowledgeable about forestry, but not always decrease preference within unknowledgeable individuals. From such research, we can conclude that occupational bias, experience with and knowledge of a respective landscape can have an impact on how a landscape is perceived.

If occupation and amount of experience in an environment can influence preference, what about culture? Cultural aspects of landscape preferences were measured by Yang and Brown (1992). Cross-cultural comparison showed that Korean groups and the Western groups preferred the other's landscape styles, with Koreans preferring Western style and the Westerners preferring the Korean style. Regardless of cultural background, however, ratings of the importance of four landscape elements were universal, with the presence of water as the most important, followed by vegetation, rock, and the layout of the landscape. It seems that the assessment of cultural elements of landscape style is influenced by the cultural background, but the assessment of the basic landscape elements is not influenced by cultural factors. While several researchers have stressed culture as the pre-eminent determinant of preference (e.g., Lowenthal 1968; Tuan 1974), the majority of researchers have provided support for strong cross-cultural similarity in aesthetic judgments of landscapes ranging from interior landscapes, to urban landscapes, to natural landscapes (e.g., Shafer and Tooby 1973; Kwok 1979; Zube and Pitt 1981; Ulrich et al. 1991).

Habitat Preference Research: Conclusion

Many of the factors that affect habitat preferences and perception have now been identified. Fairly consistent for positive aesthetic evaluation of landscapes within most studies is the main theme, naturalness. Commonly valued content items across most studies are water, plants, and focal points such as landmarks, mountains, lakes or large trees. Color, density and distribution of the these items are used to evaluate the important landscape attributes of spaciousness, complexity, development in time, and maintenance. Within habitat preference research we see that many of the findings support each other. It is the case, however that not all findings are consistent. There are areas in which habitat preference research can be improved.

One complication in habitat preference research is an ambiguity and overlap in terminology. One researcher talks about coherence while the other talks about unity, one talks about exploring potential and legibility

while the other talks about mystery and identifiability. Further, it may often be the case that the findings are confounded within variables. The finding that maintained grass areas are more preferred than wild fields, for example, may have something more to do with legibility and complexity than the variable 'human intervention/maintenance' per se. Important for future development in the field will be following a set terminology and more standardized methodology. This is also important for maintaining consistency in interpretations. When, for example, Kuo et al. (1998) report that high tree densities have the highest preference ratings and provide the greatest sense of safety, it has to be taken into account that even the highest tree density shown in this study is considerably lower than the forest densities used in other studies, in which 'high' tree densities are typically not the most preferred. Standardization in operational definitions of what 'low', 'moderate' and 'high' means in attributes, as well as standardized use of the attributes themselves, would add clarity to collective research efforts within the field.

Criticism has also been expressed about the quintessential 'lumper' rather than 'splitter' focus in landscape preference research. Researchers have tended to homogamize findings rather than look for differences among and within groups, a tendency which stems chiefly from funding complications. The funding for most habitat preference research comes from federal agencies seeking an empirical basis for establishing standards of aesthetic quality for landscapes. This pressures researchers to average group differences, rather than seek to understand the basis for possible differences in preferences (Brush et al. 2000). Although overall preferences may look similar across groups or cultures, hidden within the presumed similarity may be large differences in the way in which environmental components are actually perceived and processed. A fundamental argument of this chapter is to propose that habitat preference research is not only a research area for environmental planners and environmental psychologists, but also a crucial area for further understanding of human aesthetic preferences in general, a lucrative 'research landscape' for all aspects of evolutionary aesthetics research. We hope to see habitat preference research is not only published in landscape and urban planning journals, but also more and more in evolutionary-focused journals.

Future Research Directions

Now that many elements that lead to positive assessment of habitat have been identified (e.g., content items such as water and formal attributes such as spaciousness), the next direction for habitat research to focus on is to look more closely at the context of the viewer. Relph (1981), in his analysis of the psychological experience of space, explained that "all places

and landscapes are individually experienced, for we alone see them through the lens of our attitudes, experiences, and intentions, and from our own unique circumstances (p. 36)". While evolutionary theory acknowledges that the 'lens' of human experience is set within a framework of evolutionary developments and species-specific perceptual constraints, the idea that individual differences and unique contextual circumstances might influence habitat tastes is certainly not precluded. Even more to the contrary, theory and research in the area of group differences is fully essential, as it is an important way to learn about the subtleties of aesthetics and evolved strategies. Understanding the basis for individual and group differences in landscape preferences may lead us to further understand subtle differences in evolved survival strategies that influence aesthetic preferences, much the same way that social aesthetic researchers have discovered that long- vs. short-term mating strategies may influence the manner in which an observer determines physical attractiveness ratings of other individuals (e.g., Johnston et al. 2001).

Because a suitable habitat must provide resources for carrying out many different activities over varying time frames, evaluation of habitats is a complex process for organisms (Orians 1980). The current status of a landscape is important, but the organism must also evaluate future states. Being sensitive to predictive mechanisms and learned information about an environment that relate to one's current and future goals would be advantageous. It might be hypothesized, for example that aesthetic preferences will differ between men and women due to sexual differences in habitat use over evolutionary time (sexual dinichism). Differences in evolved psychologies should cause differences in drive state, thereby influencing the response to landscapes. Do females prefer a different vegetation density type than males? Do males, due to differential evolutionary roles, place more value in having focal points and prospect views? With age, do people tend more toward refuge-oriented attributes rather than prospect-oriented attributes? Does marital status affect aesthetic tastes, for example that individuals raising families orient more towards refuge-oriented attributes, where singles orient more towards mystery and prospect attributes? Does short- vs. long-term mating strategy have an effect on landscape preferences? Do female landscape preferences change according to menstrual cycle stages? Is there a correlation between testosterone levels and interest in prospect-oriented attributes? Such questions tie together the expression of aesthetic preferences with ontogeny and phylogeny behind them.

Findings from habitat preference research can also be extended into other areas of aesthetic preference. To what extent do habitat preferences carry over into artistic preferences, for example, the use of natural or artificial colors in paintings, shape choice, the layout of a building or various architectural shapes? Can we identify 'prospect'- or 'refuge'-oriented variables in interior decoration styles, with focal points, complexity, legibility

and mystery elements? If aesthetics can be broken into two components, social (mate choice, baby schema) and environmental (habitat choice, eating preferences), to what extent can evolutionary variables account for the overlap in each, for example, in the design of an automobile? To what extent is habitat preference multi-sensory? Are some groups or types of individuals more inclined to utilize specific multi-modal attributes? How does music tie into habitat preference attributes? In which ways can a song create an ambience of prospect, refuge, spaciousness? Environmental terms and thinking can be utilized as a basis to help us understand the human aesthetic condition throughout many domains.

Evolutionary theory provides a rich variety of ideas for the testing of aesthetic preferences. In general, evolutionary aesthetics can greatly benefit from further emphasis on habitat preference research. For our evolutionary ancestors, the emotional response to landscapes was one of the most fundamental determinants of survival. Today, we carry these evolutionary remnants with us. The development of such research is, then, an invaluable resource for our further understanding of how human aesthetic tastes evolve. Because of the previous extremely close connection between habitat selection and everyday survival for our ancestors, the study of habitat preferences, perhaps more than any other preference area, is one of the most potent areas in which to learn about fundamental foundations of modern-day aesthetic preferences. Research is just beginning.

Summary

The current paper argues that a large part of the everyday aesthetic experience for humans involves a behavioral and emotional response to landscape. Since the selection of habitat was crucial in our evolutionary history, research on human habitat preference and perception is a vital area for the further understanding of evolved aesthetic tastes. The authors focus on landscape perception as a feature of evolutionary aesthetics and strengthen the point that human aesthetic values are rooted on both social and environmental components. They discuss evolutionary theories of habitat preference and compare them with empirical data of studies which were conducted in the last 20 years, with a strong emphasis on the most recent studies. The discussed papers cover the fields of perception, landscape preference, behavioral and physiological reaction to the perceived environment and individual differences in habitat preference. The authors examine the gap between the empirical data and the underlying theories which initiated the studies in the first place and argue that not all findings are consistent when compared on a bigger scale. However, they try to mediate between theory and empirical data and conclude with thoughts and future research directions to close the gap in our understanding of landscape perception.

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