

Original Contribution

The Role of Historical Persian Gardens on the Health Status of Contemporary Urban Residents

Gardens and Health Status of Contemporary Urban Residents

Raheleh Rostami,¹ Hasanuddin Lamit,¹ Seyed Meysam Khoshnava,² and Rasoul Rostami³

¹Faculty of Built Environment (FAB), Universiti Teknologi of Malaysia (UTM), 81310 Johor Bahru, Malaysia

²Faculty of Civil Engineering (FKA), Universiti Teknologi of Malaysia, Johor Bahru, Malaysia

³Islamic Azad University of Noor, Mazandaran, Iran

Abstract: The inherent economic and social challenges in major cities have been known to foster stress among the urban population. Frequent stress over long periods may well have serious damaging outcomes, resulting in ailments such as burnout syndrome, sleeplessness and exhaustion, depression, feelings of panic, among others. Therefore, providing access to resources that may enable people to cope with the stress of urban life has become a crucial phenomenon in the twentieth century. Increasing empirical evidence indicates that the presence of natural areas can contribute to enhancing the quality of life in many ways. This study examines two historical Persian gardens from the residents' perspective in well-known, historic cities of Iran: Isfahan and Kerman. The data were collected through questionnaires ($n = 252$), semi-structured interviews ($n = 20$), and visual observation techniques. The findings demonstrate that nature, diversity and the gardens' historical background, and coherence motivate the residents' frequent visits to the gardens, which help to address their social, psychological, and physical needs. In addition, the residents' involvements and the variety of experiences that occur in the gardens lead to the creation of deeper meanings and values associated with the gardens. Subsequently, these construct functional and emotional attachment that evokes a sense of place and identity and may contribute to society's health and well-being.

Keywords: nature, urban green spaces, stress, mood change, well-being

INTRODUCTION

Over the last 20 years, stress has been considered a prevalent factor that impacts people's health (Velarde et al. 2007). Health-related studies imply that stress contributes in a wide variety of physical, mental, and behavioral

problems. For example, burnout syndrome, sleeplessness, exhaustion, depression, and feelings of panic are stress-related ailment (Cohen 1978; Lazarus 1991; Ulrich et al. 1991; Taylor et al. 1997; Westman and Eden 1997). In addition, frequent stress over long periods may have serious damaging outcomes. Therefore, local health authorities, health professionals, urban planners, and scholars should work in tandem to address this issue with the public to create changes in the environment that support health (Ulrich

1999; Grahn and Stigsdotter 2003; Stigsdotter 2004; Ottosson and Grahn 2005). Researchers (Ulrich et al. 1991; Baum et al. 1985; Cohen et al. 1986) believe that providing environments that support physiological recovery from stress could make people feel happier, improve their cognitive abilities, and reduce negative behaviors. In this regard, several studies have revealed a strong relationship between human health and nature (e.g., Takano et al. 2002; de Vries et al. 2003; Groenewegen et al. 2006; Maas et al. 2006; Mitchell and Popham 2007). The health effects of access to green spaces and natural areas and their importance are discussed in the next section.

HEALTH OUTCOMES OF EXPOSURE TO THE NATURAL SETTINGS

In the late 1800s, the American city planner Frederick Law Olmsted wrote about the power of nature in restoring the spirit of urban dwellers. He wrote that “being in a natural setting engages the mind without fatigue and yet exercises it; tranquilizes it and yet enlivens it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system” (Olmsted 1865). According to the stress reduction theory (SRT) or psycho-physical stress recovery, natural elements in the urban landscape can counteract physiological stress reactions through a stream of instantaneous emotional reactions (Ulrich 1983). This theory suggests that certain natural features elicit primary limbic-mediated processes of affective and physiological response, leading to restorative outcomes. That is, environments that afford opportunities for recovery from stress contain certain visual stimuli that directly elicit generalized states of positive affect, reduce the demand for vigilance and help return autonomic arousal levels to normal via parasympathetic stimulation (Ulrich 1983; Ulrich et al. 1991).

Attention restoration theory (ART) offers a different mechanism to explain the benefits of exposure to nature. ART suggests that nature has the potential to revive a person’s exhausted mental abilities after a fatiguing cognitive activity. This ability, known as direct attention, not only affects people’s ability to perceive accurately but also affects their ability to suppress the urge to engage in inappropriate behaviors. That is, direct attention has important effects on emotional reactions. According to Kaplan (1995), people who experience low attention capacity show irritability, impatience, and an unwillingness

to help other people. Nature, by restoring cognitive resources (Kaplan 1989, 1995; Cimprich and Ronis 2003), reduces negative behaviors. According to this theory, nature or natural areas most likely enhance mental functioning by distancing people from stressful places psychologically or geographically. Thus, natural areas provide restorative environments that can help strengthen the activities of the right hemisphere of the brain and restore harmony to the functions of the brain as a whole (Furnass 1979). The theory also argues that this ability manifests itself when the environment is harmonious with one’s *P* and has attractive qualities, or when regular and significant amounts of time are spent in that environment. That is, natural settings possess features that make them ideal for reducing mental fatigue and restoring attention capacity (Kaplan 1989). For example, earlier studies by Ulrich (1993) indicated that the presence of water leads to the experience of relaxation and peacefulness. Other researchers (Kaplan 1989; Purcell et al. 2001; Ulrich 2002; Grahn and Stigsdotter 2003; Karmanov and Hamel 2008) revealed that water and green spaces are two important features that favor improvements in mood and stress reduction.

A third mechanism by which nature improves the well-being of city-dwellers is through the facilitation of social connections (Takano et al. 2002; de Vries et al. 2003; Knecht 2004; Maas et al. 2006). In other words, nature promotes the use of outdoor spaces and increases social integration and interaction among neighbors. Natural elements, especially trees, encourage people to spend more time outside, making them more likely to have accidental face-to-face encounters, creating friendships, and other social ties that lead to trust, mutual understanding, shared values, and supportive behaviors (Loures et al. 2007).

Based on this evidence, efforts have been made by city planners and environmental designers to stress the importance of parks, gardens, and urban green spaces for the general health and well-being of urban residents. In the nineteenth century, the design of parks was driven by a strong belief in the possible health advantages (Hamilton and Mercer 1991). Parks, it was hoped, would reduce disease, crime, and social unrest while providing “green lungs for the city and areas for recreation” (Rohde and Kendle 1997). Primary research projects on this topic (Ulrich 1983, 1984; Kaplan 1989, 1992; Marcus and Barnes 1999) revealed the importance of parks in reducing stress as well as providing recovery opportunities. Individuals who used urban green spaces often were much more likely to attain good health compared with those who did not (Grahn and

Stigsdotter 2003; Nielsen and Hansen 2007). Thus, factors such as the proximity of residents to these areas, and accessibility were significant in determining how often individuals explored such places. Related research studies indicate that residents who visit urban green spaces less frequently compared with those who visit more often feel more stressed, upset, and fatigued (Grahn and Stigsdotter 2003; Stigsdotter 2004; Nielsen and Hansen 2007). That is, people who have access to nearby natural settings are healthier overall than other individuals (Kaplan 1989). Grahn and Stigsdotter (2003), as well as Nielsen and Hansen (2007), propose that facilitating access to green areas could be a beneficial element of health programs.

For the aforementioned reasons, the correlation between public health and urban green spaces has been examined in developed countries. Today, urban green spaces are recognized as restorative healing environments that promote positive changes (Karmanov and Hamel 2008; Korpela et al. 2008; Nordh et al. 2009). However, it is unclear to what extent these mechanisms are relevant in different contexts, such as Iran, which appears to lack urban green spaces that are suitable with today's lifestyles. The imitation of European gardens resulted in places that are not suitable for the Iranian culture and climate; consequently, the use of those areas by urban residents has been reduced. Nonetheless, historical gardens are still being actively used by urban residents. Thus, this study tried to examine two popular historic Persian gardens to collect useful information that could be applicable for improving contemporary urban green spaces.

BACKGROUND ON HISTORIC PERSIAN GARDENS

Over half of Iran is desert, and there is an ancient tradition of making gardens that provide relief from the extreme climate during the summer and the winter. Persian gardens are considered the practical and obvious solution.

Persian gardens tell a story about the journey of water and the appearance of life after struggling with dry land and the harsh climate. Water is the key element and a predominant characteristic of Persian gardens, manifested in a very elegant and artistic manner. It is not only used for irrigating plants; its poetic and artistic expression also embellishes the gardens and creates joy, happiness, freshness, movement, and beauty. The distribution of water in a garden is based on the archtypal cross-plan that divides the

garden into four sections. This plan is known as "Chahar Bagh" and was first manifested in Pasargadae, the Royal Garden of Cyrus the Great, the king of the Achaemenian dynasty in 550 BC. This type of garden turned out to be the most notable innovation of that period and was recreated in subsequent eras. In the eleventh century, Persian gardens developed a complex relationship with the city and became public spaces.

METHODOLOGICAL APPROACH

Several theories have been put forward regarding the relationships between people and the green environment. The philosophical underpinnings of this study are based on some of those theories, which can be broadly categorized into two groups: (a) evolution-based theories and (b) cultural preference theories. Evolution-based theories are based on the idea that humans' common evolutionary history shapes their responses (Appleton 1975; Kaplan 1989). Similarly, theories such as the savanna hypothesis (Orians 1980), landscape preference theory (Kaplan and Kaplan 1982; Kaplan 1989), prospect-refuge theory (Appleton 1975), and the biophilia hypothesis (Wilson 1984) explain that people have a more innate bond with natural settings than with urban or man-made settings and that this affiliation may be directly beneficial for overall well-being. The cultural preference theories consider this issue from another perspective. They posit that the relationships are predominantly dependent on the cultural background and personal attributes of individuals (Tuan 1974; Tveit et al. 2006). The Topophilia theory (Tuan 1974) suggests that personal attributes such as gender, occupation, hobbies, academic background, and familiarity are important in forming perceptions, preferences, and attachment to the urban environment. The contrasting belief in evolution-based and cultural preference theories is, however, justified by Hartig (1993) by presenting a new approach which suggests a synthesis of both perspectives. He posits that nature experience has a transactional character, that is, preferences are challenged and changed by cultural influences and experiences. In other words, due to evolutionary history, a common set of landscape features are preferred across cultures and individual differences; and, this circumstance results in the preference being a combination of forces of nature and culture (Tveit et al. 2006). This study also hypothesized that preference and attachment that evoke affiliation to the gardens are

grounded by a mixed of evolution-based and cultural preference theories.

On the other hands, the research relating to human behavior and environment is hybrid in nature and confluence of many other environmental and social science disciplines devoted to the study of the mutual relations between people and their environments. Accordingly, studies on human behavior with built and natural environments may employ quantitative, qualitative, and/or mixed-methods methodological approaches (e.g., Alves 2003; Tyrväinen et al. 2007), in which, the quantitative approach may involve experimental and non-experimental designs such as surveys, and qualitative approach may include narrative, phenomenology, and content analysis (Creswell 2003); and, mixed-methods approach is a methodology that combines both quantitative and qualitative procedures. Nonetheless, due to multidisciplinary nature of the study, usually there is a tendency to employ the mixed-methods approach (Lynch 1960; Tzoulas and James 2003). Hence, this study conducted the strategies of inquiry in the actual field setting by employing the techniques sequentially that include on-site surveys, interviews, and behavioral observations.

METHODS

Multiple information-gathering methods were used to offset the limitations of one method with the strengths of another and to answer confirmatory and exploratory questions simultaneously. Primary data were collected through a survey conducted among the residents of two historical cities in Iran, Isfahan and Kerman, where a substantial number of historic Persian gardens still exist and are actively used by urban residents. To find the most popular and memorable gardens among the existing examples, a preliminary assessment was performed and concluded that *Hasht Behesht* in Isfahan (Fig. 1a) and *Shahzdeh Garden* in Kerman (Fig. 1b) were most frequently cited as the most notable historic gardens.

Study Areas

One of the gardens identified as a study area is the Hasht Behesht Garden, which literally means “eight gardens.” The garden, also known as Baghe Bolbol or the “nightingale garden,” is located on the premises of the Hasht Behesht palace and was built in the *Safavid* era in the 1660s. It is

close to other historic sites, such as *Naghse Jahan* square, *Chehel Soton Palace*, and *Chahar Bagh Avenue* (see Fig. 2a). Another notable garden is the Shahzadeh Garden or the “prince garden,” which is located approximately 24 km southeast of Kerman (see Fig. 2b). The 5.5-ha garden, which has a rectangular shape and is surrounded by wall, was the summer residence of the Qajar princes. Ornamented water fountains powered by gravity are the dominant features.

Sample Design and Sample Size

The sample size for quantitative data collection was selected based on De Vaus’ (2001) work, which provided a method for calculating the sample size according to varying degrees of accuracy (see Table 1). The size of the population from which the sample is drawn is irrelevant to the accuracy of the data, but the smallest subgroup should include at least 100 cases (De Vaus 2001). The respondents chosen for this study were urban residents from various age groups who visit these gardens. The sample sizes needed for qualitative data collection are smaller than those needed for quantitative data to enhance the quality of the responses (Brink 1991). Accordingly, 20 male and female respondents were interviewed, with 10 persons selected for each site. Important considerations were the respondents’ residency in the city and the frequency of their visits to the gardens.

Data Collection

This research employed sequential mixed-methods procedure that collects both quantitative and qualitative during the study. The study begins by collecting quantitative data from surveys in order to generalize results to a population, followed by unobtrusive behavioral observation and qualitative data obtained from semi-structured interviews that collect detailed responses from participants. The self-administered questionnaires were the primary method used for collecting responses from the garden visitors who reside in the cities. A detailed semi-structured face-to-face interview was carried out randomly involving the exploration with 20 numbers of residents who eager to contribute. On the same day, behavioral observations were also used as a supplementary method to obtain information on different types of activities and the amenities and significant attributes of the gardens. Table 2 presents a summary of the parameters of the study based on the main determinants. The characteristics of the residents including age, gender,

Table 1. Method to determine sample size

| Sampling error | Sample size |
|----------------|-------------|
| 1.0 | 10,000 |
| 1.5 | 4,500 |
| 2.0 | 2,500 |
| 2.5 | 1,600 |
| 3.0 | 1,100 |
| 3.5 | 816 |
| 4.0 | 625 |
| 4.5 | 494 |
| 5.0 | 400 |
| 5.5 | 330 |
| 6.0 | 277 |
| 6.5 | 237 |
| 7.0 | 204 |
| 7.5 | 178 |
| 8.0 | 156 |
| 8.5 | 138 |
| 9.0 | 123 |
| 9.5 | 110 |
| 10 | 100 |

Source: De Vaus (2001, p. 63).

Table 2. Parameters of the study

| Determinants | Parameters |
|---|--|
| Characteristics and attributes | Landscape and environmental properties |
| | Physical-spatial characteristics |
| | Socio-cultural attributes |
| Experiential contacts | Functional dimension of gardens |
| | Frequency of visits, length of stay, and accompany |
| Effects of visitations | Psychological benefits |
| | Social benefits |
| | Physical benefits |
| Socio-demographic characteristics of visitors | Age, gender, occupation, length of residency |

immediate experiences. Approximately 300 questionnaires were distributed, but only 252 that were completely filled out were considered in this study. Table 4 summarizes the sections, parameters, and dimensions of measurements on the questionnaire.

The study also included detailed *semi-structured face to face interviews*; a basic outline of questions was used as a

guide during the interview. Thus, the same questions were asked to all of the participants in the interviews (Kumar 1999; Gillham 2005). The questions were developed based on the pilot survey interview and the responses to a survey questionnaire administered before the actual data collection began. The time taken for the interview ranged from 30 min to 1 h, with the respondents spending an average of 50 min answering the questions. The interviews were carried out between 7 a.m. to 11 p.m. on weekdays and weekends. In this research, note-taking was used as a strategy “on-site data processing,” which allows the interviewer to quickly summarize the information and helps the researcher to maintain constant engagement with the data collection process. Note-taking can also help to clarify information that is not clearly recorded. Although the interviews were conducted in Farsi, Iran’s national language, the responses were later translated and transcribed into English for analysis. Every effort was taken to ensure that the original meaning of the dialog was not lost or compromised.

A *visual survey* was also conducted to identify spatial functions and behavioral patterns and their relationship with the physical characteristics of the gardens. Daily observations were carried out between 7 a.m. and 11 p.m. every weekday and on weekends. The activities that people engaged in were recorded on coding sheets based on the individual’s age group and gender, the types of activities they participated in, whether they were alone or with others, and when and where they completed the identified activities. The activities were recorded under specific categories, such as sitting, walking, relaxing, reading books or newspapers, talking, eating, doing exercises or playing sports, or family picnicking. The duration of each activity was also recorded in five categories: less than 5, 5–10, 10–20, 20–30, and more than 30 min. A corresponding score was then assigned to arrive at a total score for the duration of the garden visit for each block of time. For a better appreciation of the gardens and to improve the analysis, a set of photographs was taken to record the physical features of gardens, the behavioral patterns, and the activities that people performed.

Data Analyses

The study applied quantitative and qualitative analyses to interpret the data. The nominal, categorical, and ordinal measures from the survey questionnaire were analyzed using Statistical Product and Services Solutions (SPSS)

Table 3. Overview of research method and strategies of inquiry

| Research approach | Strategies of inquiry | Techniques | Number of respondents/ participants |
|-------------------|----------------------------|---|--|
| Mixed-methods | Questionnaire surveys | Self-administered questionnaire including: closed-ended with a few open-ended questions | 252 |
| | Semi-structured interviews | Semi-structured questions | 20 |
| | Behavioral observations | Unobtrusive observations (assessing types and length of activity, location, age group, and size) | 130 |

Table 4. Parameters in questionnaire survey

| Q parts | Parameters | Dimensions of measurements |
|---|--|---|
| (a) Respondents' characteristics | Gender | Male/female |
| | Age group | Below 10/10–19/20–30/31–40/41–50/51–60/60+ |
| | Occupation | Administrative, academic, doctor, business, managerial, military, student, clerical, technical, worker, unemployed |
| (b) Respondents' engagement with the gardens | Years of residence | Years |
| | Familiarity | Personal link (experiences) |
| | Gardens' comfort and attractiveness | Frequency of visit and length of stay Favorite time of day and year for garden visitations and their reasons |
| | Social interaction and well-being | Accompany and passive or active interactions Encounters with other residents |
| (c) Motives of visitation | Characteristics and qualifications | Reasons, favorite elements |
| | Functional motives | Use, experiences, and activities |
| | Psychological motives | Feelings evoked during garden visitations, sense near elements, moods, and feelings changes after or during garden visitation |

version 16. Accordingly, two types of statistical analyses were performed: descriptive statistics were used to describe the discrete data and are presented as percentages, and inferential statistics were used to explore the relationships between properties and attributes. The data from the recorded interviews were analyzed qualitatively by coding the interview transcripts into categories or themes. The data from the interview manuscripts were analyzed manually but systematically to gain a deeper understanding of the narrative texts and to represent them in a coherent manner. The content analysis of the texts was performed with a less structured format: depending on the frequency and notability of the findings, the transcripts were arranged and clustered into categories or themes. Reducing the large volume of data to more manageable content categories or clusters facilitates comparative and cross-tabulation analyses between categories. The behavioral observations were

analyzed quantitatively by summarizing the data on the activities performed in the gardens. The data were organized categorically, reviewed separately, and coded as continuous variables. Descriptive interpretations of the properties and attributes were also performed. The findings from a review of secondary literature (including books, articles, and government documents) on parks, gardens, and other urban green spaces were triangulated with the findings from the analyses of the interviews and the observations.

RESULTS

A total of 252 respondents took part in the survey. The sample included 152 respondents (60.31%) in Isfahan and 100 respondents (39.68%) in Kerman. Males constituted

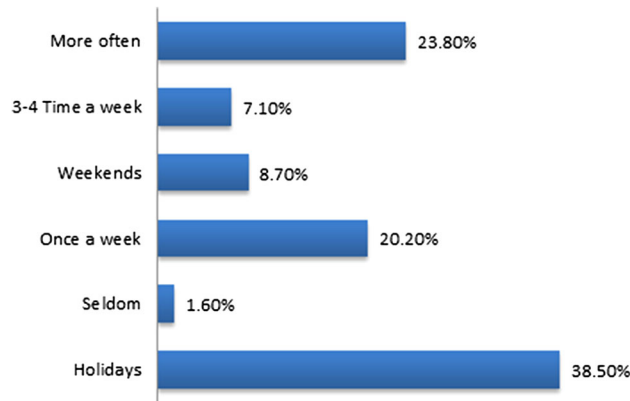


Figure 3. Frequency of garden visitation.

the largest proportion of the respondents (57.5%). The participants' ages ranged from under 10 years old to over 60, with most of the respondents in the 20–30 age groups (48.0%). The mean duration of living in cities was approximately 23 years (SD = 16.16).

Frequency and Length of Visit

To gauge the gardens' popularity, the respondents were asked how frequently they visit the gardens. The results indicate that holidays affect the attendance at the gardens (Fig. 3). However, 23.8% of the respondents mentioned that they visit the gardens often. In addition, 20.2% of the respondents visit the gardens at least once a week.

To better appreciate the gardens' attractiveness, the visitors were asked about the amount of their free time that they spend in the gardens. The analysis revealed that the preferred length of stay in the gardens was 1–2 h (34.5%).

Motives for Visiting Gardens

One of the main inquiries of the research was respondents' motives of visiting. A frequency analysis shows that the gardens' natural setting and vegetation were endorsed by the greatest percentage of the respondents (54.4%) compared with the other options (Fig. 4). The gardens' beauty was the second most important factor (42.9%). Although this finding does not confirm the association between esthetic attributes and people's preferences, it does support this relationship (Nasar 1983; Lothian 1999; Parsons and Daniel 2002; Hidalgo et al. 2006). Gardens were also considered fascinating (29%) and restorative (27.4%) places by the respondents, and the open and unobstructed views and

easy accessibility were cited by almost 24% of the respondents. In addition, 18.3% of the respondents visited the gardens because of their visual diversity and their historical significance within the city.

A content analysis of the data from the interviews also verified the results of the survey. The analysis revealed that the amount of greenery and vegetation in the gardens, especially trees, was the most frequently cited motive for visiting. The beauty of the garden, calmness, tranquility, and being away from daily stresses for a while were the second most frequently cited reasons for visiting. For instance, a middle-aged teacher who said that she never failed to visit the Hasht Behesht garden every day expressed her motivations with the following words: "Here is the best place for relaxing and being away from daily stress for a while. I am accustomed to coming here every day after school before going home to relax. Here ...looking at the tall trees with beautiful leaves where the sunshine doubles their beauty makes me feel calm." Other factors, such as the garden's symbolic aspects, the garden's location, the distance between home and the gardens, and the memories associated with the gardens were also influencing factors. Of the interviewees, 62.7% mentioned that these gardens are historic and serve as a symbol of their city, creating a sense of attachment for them (17.5%).

The cross-tabulation analysis revealed that there are no significant gender-related differences with regard to the motives for visiting the gardens. Instead, various age-related differences were found (Table 5). Meeting other people was a motive cited more frequently among the over 60 participants compared with the under 10 year olds. On the other hand, the gardens' restorative effects were cited as a reason for visiting by more adults than children.

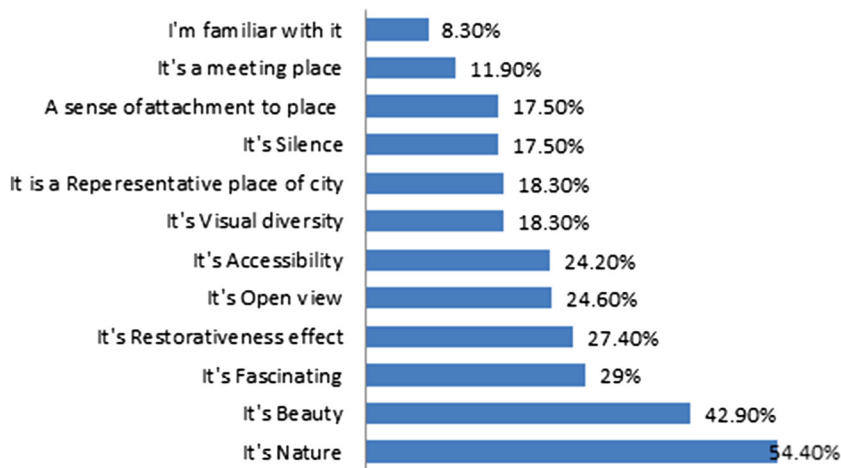


Figure 4. Motivations of gardens for visitors: frequency distribution.

Table 5. Motives-age cross-tabulation (Chi square)

| Motives | Significance |
|----------------------|--------------|
| Quiet | 0.000 |
| Open view | 0.032 |
| Beauty | 0.004 |
| Fascinating | 0.001 |
| Restorative | 0.014 |
| Meeting place | 0.035 |
| Visual diversity | 0.001 |
| Nature and vegetable | 0.003 |
| Accessibility | 0.001 |
| Familiarity | 0.001 |
| Representativeness | 0.009 |
| Sense of attachment | 0.026 |

Significance <0.05.

FUNCTIONAL ASPECTS OF GARDENS

Another aspect of the gardens is how the gardens are used by the residents. The range of activities identified in the gardens reveals the respondents' experiences and whether their demands and expectations are fulfilled in these gardens. The analysis of people's activities in the gardens (Fig. 5) revealed that recreation is the most common activity (49.6%). The observation of nature ranked as the second most important garden experience (40%). The respondents also mentioned that visiting the gardens is like being part of nature (27.8%) reflecting the importance of nature again.

Gardens are part of the cultural landscape related to human interactions with their habitat (Scazzosi 2004). The empirical findings of this study also revealed that the gardens contribute to fulfilling some of their residents' social needs. In this regard, activities such as family picnicking (25.4%) and

being with others (22.2%) support the notion that the social aspects of gardens encourage people to use those areas as part of their daily lifestyle. Furthermore, in alignment with previous studies (see Coley et al. 1997; Kuo et al. 1998), a positive relationship was found between green facilities and social ties. The observational findings underlined the effects of the presence, location, and number of trees as well as water features on visitors' activities. Based on the results, most groups' activities happened under shady trees, on the grassy areas, or near the water features. Therefore, it can be inferred that natural features are highly attractive factors that encourage urban residents to spend more time in the gardens. In accordance, analysis of respondents' time of stay in gardens revealed that mostly preferred to stay in the gardens at least 1–2 h. These results do not confirm, but rather support gardens' attractiveness and their ability to fulfill respondents' needs, so that they prefer to stay for periods longer than 1 h.

Various gender-related differences with regard to some activities were observed ($P < 0.05$). For example, family picnicking was strongly associated with female visitors ($P = 0.004$), whereas other activities such as being with others ($P = 0.077$) and doing exercises ($P = 0.001$) were performed more frequently by the male respondents. Regarding age-related differences (Table 6), the cross-tabulation revealed that recreation activities and sitting in gardens were associated with the group of individuals over 60 years old. Other activities, such as walking and doing exercises, were preferred more often by the teenagers.

EFFECTIVE PHYSICAL FEATURES OF GARDENS

To understand the physical aspects of gardens, the respondents were asked to rank the importance of the gardens' features (see Fig. 6). The analysis showed that

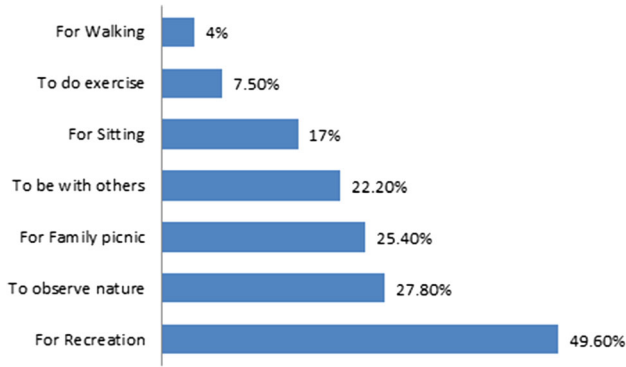


Figure 5. Experiences and activities in gardens.

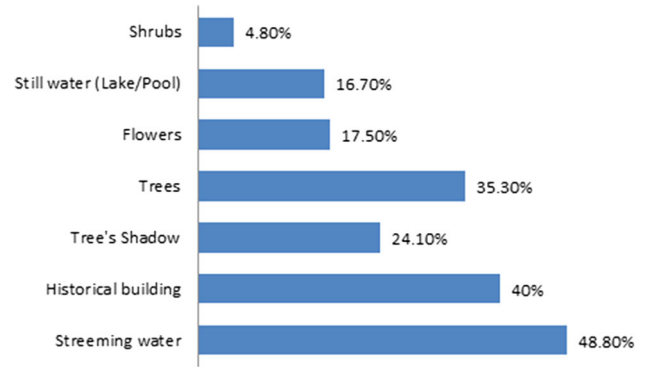


Figure 6. Effective physical features of gardens.

Table 6. Activities-age differences

| Activities | Significance |
|--------------------|--------------|
| Recreation | 0.001 |
| To be with others | 0.001 |
| Sitting | 0.017 |
| Walking | 0.000 |
| Family picnic | 0.000 |
| Doing exercise | 0.000 |
| Nature observation | 0.101 |

Significance <0.05.

approximately half of the respondents believed that water in streams is the most important garden feature. They mentioned that streaming water resembling a natural river is effective in reducing their stress. Similarly, the observational findings also indicated that the visitors primarily sat near water features for contemplation and relaxation, which supports the theory by Hetherington et al. (1993) that the sound of water is an important component of the human experience. The interviewees also mentioned that the sound of water not only enhances the gardens' beauty but also gives them a sense of calmness and relaxation. In some cases, the sound of water even influenced the time spent in the gardens, to the extent that some respondents preferred night visits because the quiet allows them to hear the sound of water clearly. The other physical features highlighted by the respondents included the historical buildings that exist in the gardens (46%). This result revealed the respondents' sense of nostalgia in these gardens and explains why 62.7% of them believe that these gardens symbolize history. The third feature considered by the respondents is trees (35.55) and their shadow (42.1%). The respondents categorized tall old trees as symbols of the

Persian gardens' historic significance. The observational surveys also indicated that the respondents' activities in the gardens (especially group ones) were related to the presence, location, and number of trees.

THE EMOTIONAL DIMENSION OF THE GARDEN EXPERIENCE

Emotional experiences with nature and their relationship with well-being were other important research interests. Accordingly, the respondents were asked about the feelings that gardens evoke. The analysis revealed that 50% of the respondents feel "calm and tranquil" in these gardens (Fig. 7). Reminiscing is another emotional experience that was noted by the respondents (42.8%). Happiness is another feeling that the gardens evoke for 35% of the respondents. Feeling closer to nature (33.7%) supports the affiliation between nature and positive feelings. Finally, 21.8% of the respondents felt more comfortable and healthier (19.4%) in the gardens.

For a better understanding of the importance of nature on people's well-being, the respondents were asked to rank the importance of visiting the gardens for emotional and physical ailment, such as depression, sadness, tiredness, and sickness, on a 1- to 5-point measurement scale. The analysis showed that the responses ranged from important to essential. The respondents believed that visiting gardens could reduce depression (94%) as well as remove tiredness (90%). The results also showed that sadness (81.6%) and physical sickness (76.3%) could be alleviated or reduced after garden visits. Overall, the findings revealed that nature has a beneficial effect on both emotional and physical ailments.

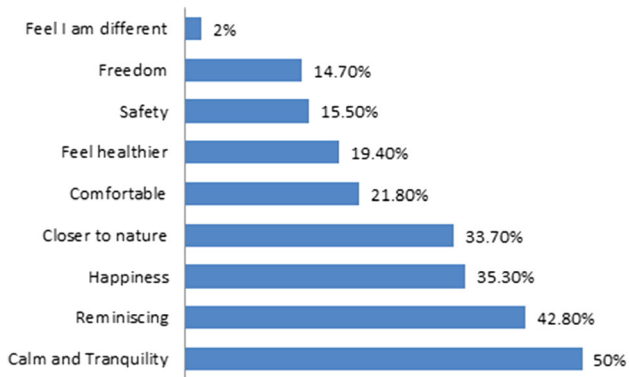


Figure 7. Feelings and emotional experience.

DISCUSSION

The empirical findings of this study support the notion that natural environments can positively influence well-being (Kaplan 1989) and mood (Ulrich 1984). The obtained results are similar to other research projects regarding people's need to experience nature (Kaplan 1989). These results could also reflect the need for a natural environment in urban contexts.

People visit gardens primarily because they want to relax. This result denotes the psychological effects of nature, which evokes calmness and relaxation as well as stress reduction (Parsons et al. 1998; Pretty et al. 2005). The results also suggest that historic Persian gardens, like other urban green spaces (Gobster 1995; Shafer et al. 2000; Gobster 2001; Chiesura 2004; Jim and Chen 2006), could offer important settings for recreation and play. That is, being away from daily life seems to be a characteristic motive for visiting the gardens (Ivarsson and Hagerhall 2008). The residents consider gardens as recreational areas, which were mentioned in Chiesura's (2004) research on the importance of gardens for making cities livable, pleasant, and attractive for their citizens. For this reason, one-quarter of the respondents participate in social activities in the gardens, such as being with others and picnicking with family members. The social functions of the gardens also verify Kuo's (2003) theory that urban green spaces contribute to the health of biological ecosystems as well as the health of social ecosystems. In this case, trees, especially shady ones, play an important role. By providing shaded and cool areas that moderate the occasionally uncomfortable temperatures, trees can also help to reduce the risk of heat-related illnesses among city-dwellers (Nowak et al. 1996; Blum et al. 1998). Invariably, people are persuaded to spend more time outside have more accidental face-to-face

encounters with other community members and establish other social ties (Knecht 2004), which eventually encourages trust, mutual understanding, shared values, and supportive behaviors (Loures et al. 2007). That is, gardens can increase social interaction and integration (Coley et al. 1997) and strengthen community cohesion (Moore et al. 2006; Teig et al. 2009), invoking trust and supportive behaviors and ultimately improving city-dwellers' well-being. Therefore, from a social perspective, residents consider gardens as places for urban nature and daily outdoor recreation opportunities, which are the main factors that could enhance everyday well-being (Eronene et al. 1997).

Findings also show that experiencing nature in the city evokes a large array of positive feelings for people. Calmness and tranquility are the most important feelings that residents experience in the gardens. The tranquil atmosphere of the garden inspires reflection, meditation, and a general feeling of harmony between oneself and one's surroundings. Thus, the respondents frequently mentioned feeling happy, comfortable, safe, free, and even healthier. The findings do not support that these positive feelings are associated with gardens as natural places to relax, but they do support this notion (Kaplan 2001; Korpela 2003; Korpela and Ylén 2007). The results also support the psychological health effects of nature on positive feelings such as pleasure (Ulrich 1983) as well as its ability to reduce negative feelings such as anger and anxiety (Rohde and Kendle 1997).

Similar to the findings by previous researchers (Kaplan 1989; Purcell et al. 2001; Ulrich 2002; Grahn and Stigsdotter 2003; Karmanov and Hamel 2008), the respondents mentioned water and greenery (trees, especially shady ones) as the two most important physical features that motivate them to visit the garden and consequently affect their mood. The respondents mentioned that streaming water increases calmness and accelerates stress reduction. This result supports the notion that water is effective in promoting relaxation and peacefulness in natural surroundings (Ulrich 1993; Purcell et al. 2001). Trees also play a significant role in the gardens and have many important meanings for urban residents. Tall mature trees offer gardens a kind of identity—"historical significance"—and evoke very strong emotional ties (Dwyer et al. 1991, 1992) and a sense of pride for residents (U.S. Environmental Protection Agency 2002). Trees (especially shady ones) also influence residents' presence in the gardens and the types of activities they perform. The amount of time visitors spent in common spaces was strongly related to the presence,

location, and number of trees (Coley et al. 1997; Kuo et al. 1998). This result verifies Knecht's (2004) theory that trees encourage people to spend more time outside. It also indicates the importance of shade and the effectiveness of trees in encouraging people to congregate in the shade regardless of their age.

In summary, the aforementioned emotional and psychological benefits might have critical impacts on the quality of human life and might enhance the residents' everyday well-being (St Leger 2003; Miller 2005; Filho and Salomone 2006). Visiting gardens is important for alleviating emotional and physical ailments. Therefore, from the perspective of environmental health gardens perform a significant function in promoting healthy lifestyles for contemporary urban residents.

CONCLUSION

This study has addressed the role of historic Persian gardens as contemporary Iranian urban green spaces that are still being actively used by urban residents and their importance for inhabitants' health status and well-being. Because of the limitations of choosing gardens from existing examples, it is essential to mention that no general conclusions can be drawn and that the data do not represent the experiences of all citizens. The results are not intended to be generalizable. Thus, consideration of this issue warrants attention in future studies. Nonetheless, some concluding remarks can be made.

The findings of this study suggest that historic Persian gardens are public places that play an integral part in residents' identity and health. The gardens do not just represent physical spaces; rather, they represent the interconnected physical, symbolic, spiritual, and social aspects of citizens' cultures. Gardens can fulfill the psychological needs of contemporary urban residents. Indeed, urban residents considered them as recreational areas, places for relaxing, and places for escaping from daily concerns, which are key ingredients of well-being. For these purposes, the natural elements of gardens have a remarkable role. A growing sense of awareness of the positive effects of these elements was noted among the individuals sampled (i.e., streaming water and shade trees were perceived as elements that contribute to stress reduction and positive mood changes). Furthermore, by serving residents' psychological needs, gardens affect their other needs, e.g., "leisure, interaction, social and community needs." The

social activities that take place in the gardens differ by gender and age group, but almost all of the functional and social needs of the inhabitants appear to be fulfilled, which represents a key factor in the health and well-being of urban dwellers.

In summary, the findings of the study suggest that being in the gardens helps citizens to restore a sense of mental, spiritual, and physical well-being while offering time and space to connect with family members and friends. Fulfillment of social functions and psychological needs of citizens make these gardens valuable municipal resources that could improve the planning and designing of contemporary urban green spaces in Iran. These gardens could be considered as bridging previous garden works with future green spaces designs to create places for self-discovery and social connections. Gardens are places for being together and living together that could enhance people's physical, social, and cognitive functions and increase their sense of attachment to their town and to society, consequently increasing society's health status and well-being.

ACKNOWLEDGMENTS

The authors would like to appreciate UTM and Research Management Research (RMC) for providing the opportunity of this research and thank "Centre for The Study of Built Environment in the Malay World (KALAM)" for funding.

REFERENCES

- Alves S (2003) The Role of Nature-related Activities in the Psychological Well-being of Nursing Home Residents. Doctor Philosophy, The University of Wisconsin-Milwaukee, Wisconsin.
- Appleton J (1975) *The Experience of Landscape*, London: Wiley
- Baum A, Fleming R, Singer J (1985) Understanding environmental stress: strategies for conceptual and methodological integration. In: *Advances in Environmental Psychology: Methods and Environmental Psychology*, Vol 5, Baum A, Singer JE (editors), Hillsdale: Lawrence Erlbaum Association, pp 185–205
- Blum LN, Bresolin LB, Williams MA (1998) Heat-related illness during extreme weather emergencies. *Journal of American Medical Association* 279:1514
- Brink H (1991) Quantitative vs. qualitative research. *Nursing RSA* 6:14–18
- Chiesura A (2004) The role of urban parks for the sustainable city. *Landscape and Urban planning* 68:129–138
- Cimprich B, Ronis D (2003) An environmental intervention to restore attention in women with newly diagnosed breast cancer. *Cancer Nursing* 26(4):284–291

- Cohen S (1978) Environmental load and the allocation of attention. In: *Advances in Environmental Psychology*, Vol 1, Baum A, Singer JE, Valins S (editors), Hillsdale: Lawrence Erlbaum, pp 1–29
- Cohen S, Evans G, Stokols D, Krantz D (1986) *Behavior, Health, and Environmental Stress*, New York: Plenum Press
- Coley R, Kuo F, Sullivan W (1997) Where does community grow? The social context created by nature in urban public housing. *Environment and Behavior* 29:468–494
- Creswell JW (2003) *Research Design: Quantitative, Qualitative, and Mixed Methods Approaches, 2nd ed.*, Thousand Oaks: SAGE
- De Vaus D (2001) *Surveys in Social Research, 5th ed.*, Berkeley: University of California Press
- de Vries S, Verheij RA, Groenewegen PP, Spreeuwenberg P (2003) Natural environments—healthy environments? An exploratory analysis of the relationship between green space and health. *Environment and Planning* 35:1717–1731
- Dwyer J, Schroeder H, Gobster P (1991) The significance of urban forests: towards a deeper understanding of values. *Journal of Arboriculture* 17:276–284
- Dwyer J, McPherson E, Schroeder H, Rountree R (1992) Assessing the benefits and costs of the urban forest. *Journal of Arboriculture* 18:227–234
- Eronene S, Nurmi JE, Aro KS (1997) Planning-oriented, avoidant, and impulsive social reaction styles: a person-oriented approach. *Journal of Research in Personality* 31:34–57
- Filho LW, Salomone M (2006) *Innovative Approaches to Education for Sustainable Development*, Turin, Italy
- Furness B (1979) Health values. In: *The Value of National Parks to the Community: Values and Ways of Improving the Contribution of Australian National Parks to the Community*, Messer J, Mosley JG (editors), Sydney: University of Sydney, Australian Conservation Foundation, pp 60–69
- Gillham B (2005) *Research Interviewing: The Range of Techniques*, Maidenhead: Open University Press
- Gobster PH (1995) Perception and use of a metropolitan greenway system for recreation. *Landscape Urban Plan* 33:401–413
- Gobster PH (2001) Visions of nature: conflict and compatibility in urban park restoration. *Landscape Urban Plan* 56:35–51
- Grahn P, Stigsdotter UA (2003) Landscape planning and stress. *Urban Forestry & Urban Greening* 2(1):1–18
- Groenewegen PP, van den Berg AE, de Vries S, Verheij RA (2006) Vitamin G: effects of green space on health, well-being, and social safety. *BMC Public Health* 6:149
- Hamilton SE, Mercer D (1991) *Urban Parks and Their Visitors*, Melbourne: The Parks Division and Metropolitan Board of Works, pp 1–79
- Hartig T (1993) Nature experience in transactional perspective. *Landscape and Urban Planning* 25:17–36
- Hetherington J, Daniel TC, Brown TC (1993) Is motion more important than it sounds? *The Medium of Presentation in Environmental Research, Environmental Psychology* 13:283–291
- Hidalgo MC, Berto R, Galindo MP, Getrevi A (2006) Identifying attractive and unattractive urban places: categories, restorativeness and aesthetic attributes. *Journal of Medio Ambiente y Comportamiento Humano* 7(2):115–133
- Ivarsson CT, Hagerhall CM (2008) The perceived restorativeness of gardens—assessing the restorativeness of a mixed built and natural scene type. *Urban Forestry and Urban Greening* 7:107–118
- Jim CY, Chen WY (2006) Impacts of urban environmental elements on residential housing prices in Guangzhou (China). *Landscape and Urban Planning* 78(4):422–434
- Kaplan R (1989) The tension between development and open space: insights from public participation. In: *Changing Paradigms*, Hardie G, Moore R, Sanoff H (editors), Oklahoma City: Environmental Design Research Association, pp 193–198
- Kaplan R (1992) *The Psychological Benefits of Nearby Nature*, Portland: Timber Press
- Kaplan S (1995) The restorative benefits of nature: toward an integrative framework. *Journal of Environmental Psychology* 15:169–182
- Kaplan R (2001) The nature of the view from home: psychological benefits. *Environment and Behaviour* 33:507–542
- Kaplan R, Kaplan S (1982) *The Experience of Nature: A Psychological Perspective*, Cambridge: Cambridge University Press
- Karmanov D, Hamel R (2008) Assessing the restorative potential of contemporary urban environment(s): beyond the nature versus urban dichotomy. *Landscape and Urban Planning* 86(2):115–125
- Knecht C (2004) Urban nature and well-being: some empirical support and design implications. *Berkeley Planning Journal* 17:82–108
- Korpela KM (2003) Negative mood and adult place preference. *Environment and Behaviour* 35:331–346
- Korpela KM, Ylén M (2007) Perceived health is associated with visiting natural favourite places in the vicinity. *Health & Place* 13:138–151
- Korpela KM, Ylén M, Tyrväinen L, Silvennoinen H (2008) Determinants of restorative experiences in everyday favorite places. *Health & Place* 14(4):636–652
- Kumar R (1999) *Research Methodology: A Step-by-Step Guide for Beginners*, London: SAGE
- Kuo FE (2003) Social aspects of urban forestry: the role of arboriculture in a healthy social ecology. *Arboriculture* 29(3):148–155
- Kuo FE, Bacaicoa M, Sullivan WC (1998) Transforming inner city landscapes: trees, sense of place and preference. *Environment and Behaviour* 33:343–367
- Lazarus RS (1991) *Emotion and Adaptation*, New York: Oxford University Press
- Lothian A (1999) Landscape and the philosophy of aesthetic: is landscape quality inherent in the landscape or in the eye of beholder? *Journal of landscape and urban planning* 44:177–198
- Loures L, Santos R, Panagopoulos T (2007) Urban parks and sustainable city planning—the case of Portimão, Portugal. *WSEAS Transactions on Environment and Development* 3(10):171–180
- Lynch K (1960) *The Image of the City*, Cambridge: MIT Press
- Maas J, Verheij RA, Groenewegen PP, de Vries S, Spreeuwenberg P (2006) Green space, urbanity and health: how strong is the relation? *Journal of Epidemiology and Community Health* 60(7):587–592
- Marcus CC, Barnes M (1999) *Healing Gardens: Therapeutic Benefits and Design Recommendations*, New York: Wiley
- Miller JR (2005) Biodiversity conservation and the extinction of experience. *Trends in Ecology & Evolution* 20(8):430–434
- Mitchell R, Popham F (2007) Green space, urbanity and health: relationships in England. *Journal of Epidemiological and Community Health* 61:681–683

- Moore M, Townsend M, Oldroyd J (2006) Linking human and ecosystem health: the benefits of community involvement in conservation groups. *EcoHealth Journal of Consortium* 3:255–261
- Nasar JL (1983) Adult viewer's preferences in residential scenes: a study of the relationship of environmental attributes to preference. *Journal of Environment and Behavior* 32(2):357–363
- Nielsen TS, Hansen KB (2007) Do green areas affect health? Results from a Danish survey on the use of green areas and health indicators *Health & Place* 13(4):839–850
- Nordh H, Hartig T, Hagerhall CM, Fry G (2009) Components of small urban parks that predict the possibility for restoration. *Urban Forestry and Urban Greening* 8:225–235
- Nowak DJ, Rowntree RA, McPherson EG, Sisinni SM, Kerkmann ER, Stevens JC (1996) Measuring and analysing urban tree cover. *Landscape and Urban Planning* 36(1):49–57
- Olmsted FL (1865) The Value and Care of Parks. Report to the Congress of the State of California. Reprinted In Nash, R. (Ed.) (1976) *The American Environment* (pp 18-24), Reading, MA: Addison-Wesley.
- Orians GH (1980) Habitat selection: general theory and application to human behavior. In: *The Evolution of Social Behavior*, Lockard JS (editor), New York: Elsevier
- Ottosson J, Grahn P (2005) A comparison of leisure time spent in a garden with leisure time spent indoors: on measures of restoration in residents in geriatric care. *Landscape Research* 30(1):23–55
- Parsons R, Daniel T (2002) Good looking: in defense of scenic landscape aesthetics. *Landscape and Urban Planning* 60:43–56
- Parsons R, Tassinary L, Ulrich R, Hebl M, Grossman-Alexander M (1998) The view from the road: implications for stress recovery and immunization. *Journal of Environmental Psychology* 18:113–140
- Pretty J, Peacock J, Sellens M, Griffin M (2005) The mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research* 15(5):319–337
- Purcell T, Peron E, Berto R (2001) Why do preferences differ between scene types? *Environment and Behaviour* 33:93–106
- Rohde CLE, Kendle AD (1997) Nature for people. In: *Urban Nature Conservation—Landscape Management in the Urban Countryside*, Kendle AD, Forbes S (editors), London: E & FN Spon, pp 319–335
- Scazzosi L (2004) Reading and assessing the landscape as cultural and historical heritage. *Landscape Research* 4:335–355
- Shafer CS, Lee BK, Turner S (2000) A tale of three greenway trails: user perceptions related to quality of life. *Landscape and Urban Planning* 49:163–178
- St Leger L (2003) Health and nature—new challenges for health promotion. *Health Promotion International* 18(3):173–175
- Stigsdotter UA (2004) A garden at your workplace may reduce stress. *Journal of Design & Health* 13(7):147–157
- Takano T, Nakamura K, Watanabe M (2002) Urban residential environments and senior citizens' longevity in megacity areas, the importance of walkable green spaces. *Journal of Epidemiological Community Health* 56:913–918
- Taylor SE, Repetti R, Seeman T (1997) Health psychology: what is an unhealthy environment and how does it get under the skin? *Annual Review of Psychology* 48:411–447
- Teig E, Amulya J, Bardwell L, Buchenau M, Marshall J, Litt J (2009) Collective efficacy in Denver, Colorado: strengthening neighbourhoods and health through community gardens. *Health & Place* 15:1115–1122
- Tuan YF (1974) *Topophilia: A Study of Environmental Perception, Attitudes and Values*, Englewood Cliffs: Prentice-Hall
- Tveit M, Ode A, Fry G (2006) Key concepts in a framework for analyzing visual landscape character. *Landscape Research* 31(3):229–255
- Tyrväinen L, Mäkinen K, Schipperijn J (2007) Tool for mapping social values of urban woodlands and other green areas. *Landscape and Urban Planning* 79:5–19
- Tzoulas K, James P (2003) *Finding Links Between Urban Biodiversity and Human Health and Well-being*, Manchester: Research Institute for the Built and Human Environment
- Ulrich RS (1983) Aesthetic and affective response to natural environment. *Behavior and the natural Environment* 6:85–125
- Ulrich RS (1984) View through a window may influence recovery from surgery. *Science* 224(4647):420
- Ulrich RS (1993) *Biophilia, and Natural Landscapes. The Biophilia Hypothesis*, Washington, DC: Island Press, pp 73–137
- Ulrich RS (1999) Effects of gardens on health outcomes: theory and research. In: *Healing Gardens: Therapeutic Benefits and Design Recommendations*, Marcus CC, Barnes M (editors), New York: Wiley
- Ulrich RS (2002) *Health Benefits of Gardens in Hospitals. Paper for conference: Plants for People*. International Exhibition Floriade. http://www.plantsatwork.org/pdf/HealthSettingsUlrich_copy.pdf. Accessed 20 Oct 2005
- Ulrich RS, Simons RF, Losito BD, Fiorito E, Miles MA, Zelson M (1991) Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology* 11:231–248
- U.S. Environmental Protection Agency (2002) *Community, Culture, and the Environment: A Guide to Understand Sense of Place*, EPA 842- B-01-03, Washington, DC: U.S. EPA.
- Velarde MD, Fry G, Tveit M (2007) Health effects of viewing landscapes—landscapes types in environmental psychology. *Urban Forestry and Urban Greening* 10:1–14
- Westman M, Eden D (1997) Effects of a respite from work on burnout: vacation relief and fade-out. *Journal of Applied Psychology* 82:516–527
- Wilson EO (1984) *Biophilia*, Cambridge: Harvard University Press