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To cite this article: R.B. Hull IV & Sean E. Michael (1995) Nature-based Recreation, mood change, and stress restoration, Leisure Sciences, 17:1, 1-14, DOI: 10.1080/01490409509513239

To link to this article: http://dx.doi.org/10.1080/01490409509513239

Published online: 13 Jul 2009.
Nature-Based Recreation, Mood Change, and Stress Restoration

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Abstract People recreating outdoors (at an urban park) and people recreating indoors (in their homes) assessed their moods at the start, middle, and end of their brief (less than 2-hr) leisure experiences. Moods changed slightly but significantly, and some of these changes were consistent with predictions that leisure reduces stress. Contrary to expectations, recreating near nature produced no more restoration than did recreating indoors, away from nature.

Keywords mood regulation, emotion, arousal, recreation, stress, experience, benefit

In this article, we explore the relationships between leisure and stress reduction. Of particular interest is the stress-reducing potential of recreating near nature. In these pragmatic times, one of the arguments for using public dollars to support outdoor recreation opportunities is that these opportunities provide public benefit (Driver, Brown, & Peterson, 1991). Stress management or stress restoration is a potential benefit of leisure. The toll of stress comes in at least three forms: emotional, physical, and cognitive. Emotional stress includes anxiety, anomie, isolation, and the thoughts and behaviors associated with those feelings (Clark & Watson, 1985; Thayer, 1989; Zuckerman, 1979). Physical symptoms of stress include degradation of the immune system, raised blood pressure, increased muscle tension, and numerous other behavioral and physiological changes (Evans & Cohen, 1987; Ulrich et al., 1991). Cognitive symptoms of stress include reduced attention capacity and the consequent degradation of performance on cognitive tasks (Evans & Cohen, 1987; R. Kaplan & Kaplan, 1989). Stress restoration through leisure would change these negative moods into positive moods, improve physiological states, and improve powers of concentration. This ability of leisure to provide physical and mental relaxation and thereby restore and compensate for the stress and angst of work is a long-standing hypothesis of leisure studies (Heywood, 1978; Parker, 1976; Staines, 1980).

There also exists a long-standing belief that encounters with nature reduce stress.
Recent publications have reviewed and studied potential reasons why nature-based recreation might reduce stress (i.e., Hartig, Mang, & Evans, 1991; R. Kaplan & Kaplan, 1989; Ulrich et al., 1991). Cultural explanations for why nature causes stress reduction suggest that people learn to associate positive meanings and feelings with nature such as memories of past positive experiences (e.g., recreation), symbols of health and endurance, and personal reminders of family and friends (e.g., Hull, Lam, & Vigo, 1994; Proshansky, Fabian, & Kaminoff, 1983; Rochberg-Halton, 1984). Encounters with nature, therefore, evoke good feelings, trigger positive thoughts, and consequently restore the individual to a positive mental state. Evolutionary explanations for why nature causes stress reduction (i.e., Appleton, 1975; Parsons, 1991; Ulrich, 1994) suggest that humans are conditioned by evolutionary pressures to respond positively to natural elements that enhance prospects of survival (e.g., water; verdant, savanna-like vistas; prospect-refuge; etc.). These theories suggest that evolution “taught” humans to feel good about approaching or lingering near life-supporting landscape elements. Therefore, whenever these elements are encountered, whether or not one’s survival is in doubt, one experiences positive feelings and stress restoration. Information-processing explanations for why nature causes stress reduction (e.g., R. Kaplan & Kaplan, 1989; Wohlwill, 1976) suggest that viewing nature facilitates restoration because nature can be fascinating, coherent, not overly complex, and nontaxing. These properties allow people to experience nature without taxing their perceptual or attention systems, thereby allowing restoration of these systems.

Baum (1991) argued that the setting of leisure may have less impact on stress reduction than simply being at leisure: “It is likely that recreation opportunities which are readily available in our everyday environment provide more benefits than relaxing or recreation in the . . . [natural setting] which may produce optimal benefits” (p. 408). This observation begs the question: Does setting matter? We explored this question by examining the relationship between mood change and stress for people recreating outdoors near nature and for people recreating indoors at home. We expected that leisure time, in general, would produce restorative mood changes but that leisure time spent in natural settings would be more restorative than leisure time spent indoors. In addition, we expected that highly stressed persons would experience more pronounced restorative mood changes than would less stressed persons. More specifically, we hypothesized that stressed persons, in contrast to less stressed persons, would experience greater increases in positive mood states (feelings of calm and energy) and greater decreases in negative mood states (feelings of anxiety and tiredness). We also hypothesized that these restorative patterns of mood change would be more pronounced for people recreating near nature than for people partaking in similar activities indoors.

Mood was used here as an indicator of stress; stress can be felt as anxiety, loss of energy, or reduced calm (e.g., Clark & Watson, 1985; Thayer, 1989; Zuckerman, 1979). In addition, mood was of interest here because it represents a fundamental quality of the subjective experience of leisure (Hammitt, 1980; Hull, 1990; Tinsley & Tinsley, 1986); leisure is a state of mind, an experience defined by attributes such as freedom, excitement, pleasure, and satisfaction. A final reason why mood was selected as the dependent variable in this study is that mood can be measured on site, during leisure experiences, without dramatically altering the leisure experience as would be the case if invasive physiological measures or cognitive performance tests were used.

There exist numerous conceptual models and measurement instruments for mood. Therefore, numerous ways to characterize mood change (stress reduction) exist (Mackay, 1980). Most of these theories fall into one of two broad categories: dimensional or fundamental (Shaver, Schwartz, Kirson, & O’Connor, 1987): In this study we restricted
our scope to the dimensional model of mood–emotion, in particular Thayer’s (1989) multidimensional arousal theory.

Thayer (1978, 1987a, 1989) proffered a model of mood in which arousal varies along two dimensions: energetic arousal and tense arousal (Figure 1). Energetic arousal varies from a tired, sleepy feeling state with bodily quiescence at one extreme to an energetic, vigorous feeling state with bodily activation and focused attention at the other extreme. Tense arousal varies from a calm, relaxed feeling state with bodily quiescence to an anxious, tense feeling state with the motor systems highly aroused but inhibited, attention racing, and all systems prepared for an emergency (fight-or-flight) response.

Stress is generally characterized by negatively toned emotions such as fear, tension, and anxiety and by the absence of positively toned emotions such as pleasure and calmness (Thayer, 1989; Ulrich et al., 1991). Thayer found a complex pattern of feelings associated with different levels of stress. At low stress levels, feelings of energy and tiredness can be moderate, and feelings of tension are usually low. At moderate levels of stress, energy actually increases (presumably to cope with the stressor), tiredness decreases dramatically, and tension increases. At high levels of stress, energy starts to wane, tiredness increases dramatically, and tension reaches a pinnacle.

There exist several relevant studies reporting relationships between mood and stress. Ulrich et al. (1991) reported that participants felt less anger, less aggression, less fear, and more positive feelings after viewing photographs containing natural landscapes than after viewing urban scenes. Similarly, Hartig et al. (1991) reported that participants who took a leisurely walk through a natural setting had higher ratings of happiness and lower ratings of anger–aggression than did participants who took a leisurely walk through an urban area. More and Payne (1978) did not study stress per se but did find that negative moods decreased slightly during brief visits to a park, suggesting restoration occurred. However, they also found that positive moods decreased during the park visit. On balance, there appears sufficient evidence of relationships among leisure, mood change, stress reduction, and exposure to nature to recommend further study.

Figure 1. An adaptation of Thayer’s (1989) model of mood and arousal.
General Method

We attempted to study leisure experience as it occurs in actual situations, in the context of ongoing streams of behavior. We deemed this approach critical because a leisure experience occurs in and is sensitive to the ecology of a situation. Experimental controls imposed in laboratory studies to increase internal validity by limiting confounding factors can create an artificial context, alter the situation, disrupt the stream of behavior, and thus hinder study of the subtleties and nuances of experience (Hormuth, 1986; Morris & Reily, 1987; Thayer, 1987b, p. 20; Thayer, 1989, Chapter 7). Bringing people into a laboratory, for example, can overwhelm subtle mood states associated with leisure. A more detailed case has been made for this mode of inquiry, and its validity, by researchers who use the experience sampling method (e.g., Csikszentmihalyi & Figurski, 1982; Csikszentmihalyi & Larson, 1987; Hormuth, 1986; Kubey & Csikszentmihalyi, 1990; Thayer, 1987b, 1989), time diaries (e.g., Robinson, 1985), and frame-sequence analysis (B. Kaplan, Wapner, & Cohen, 1976).

Basically, we interrupted people during their leisure experiences and asked them to describe their current feelings. The research was divided into two parts: Study 1 involved assessment of experiences while participants recreated at a small suburban park, and Study 2 was more exploratory and involved a subset of Study 1 participants who volunteered to assess their moods while they recreated in their homes.

Study 1

Method

Site. The site was a 20-acre park containing interconnecting ponds, rolling hills, paved walkways, numerous treed areas, open fields, and several office buildings. The park was at the edge of a large university, within 1 mile of most university-housed students, and within several miles of most residents of the surrounding city.

Subjects. The sample of recreators were approached during April 1992. In total, 186 people were approached, of whom 35 (17 men and 18 women) declined to participate. Of the 151 people who agreed to participate, 39 did not finish and 4 made recording errors serious enough to invalidate their data. Thus the final number of usable participants was 108 (48 men and 60 women). The average age of participants was 22 years (range, 17–50 years). The majority of the participants were college students.

Most participants arrived at the park by motor vehicle through a single entrance, parked along one of several roads, and walked from 5 to several hundred feet to where they based their stay at the park (or just continued to walk along the paved paths).

The average length of stay was 85 min and ranged from 45 min to 3 hr. The second questionnaire was administered on average 38 min after initial contact. Participants’ activities varied while at the park: 35% participated in active leisure (walked, jogged, or played games), 34% participated in sedentary leisure (read, watched others, or conversed), and 30% participated in passive leisure (sunbathed or slept). Participants’ social contact also varied during their time at the park: 31% of respondents recreated alone, 36% recreated with one other person, and 33% recreated with more than one other person.

Instrument. Thayer’s (1989) model of mood is represented by the following four state measures (represented here with four items for each state): energetic (energetic, lively,
vigorously, and full of pep), tired (sleepy, tired, drowsy, and sluggish), calm (placid, calm, at rest, and quiet), and anxious (jittery, clutched-up, fearful, and tense). Participants used Thayer’s 4-point scale to rate how well each item (i.e., the words in parentheses) described how they were feeling at the moment (1 = definitely not, 2 = can’t decide, 3 = feel slightly, and 4 = definitely feel).

We combined the responses to items to form indices for calm, energetic, tired, and anxious. A factor analysis and varimax rotation of the 16 mood items identified four main factors that conformed closely with Thayer’s (1989) theoretical model, with items loading highly and precisely on expected dimensions. The Cronbach’s alpha estimates for the mood indices evidenced good reliability: energetic, .85; tired, .92; calm, .90; and anxious, .89.

We assessed stress using a 10-item questionnaire designed to assess the amount of stress participants had recently experienced. Participants were asked to rate whether they had encountered the following stressful events during the previous 3 days: concerns with deadlines, concerns about work or school, arguments with someone, witnessing something stressful, death of someone you knew, illness of someone special, daily routine getting to you, weather getting to you, personal health problems, and money problems. The stress-related items were abstracted from a list of salient daily hassles identified by Clark and Watson (1985). Participants rated these items on a 4-point scale ranging from 1 (definitely yes) to 4 (definitely not), and the associated numerical weightings were summed to index participants’ stress levels.

Procedure. Using a bicycle, a male interviewer followed vehicles as they entered the park, approaching potential participants as they emerged from their vehicles. The sample was one of convenience; once the interviewer was ready, the first vehicle to enter was pursued. Everyone who emerged from the vehicle was invited to participate. If a person agreed to participate he or she was asked to complete the “arriving” questionnaire. The participant’s location (or direction of walking) was noted so he or she could be approached approximately 30 min later to complete the “during” questionnaire. A “departing” questionnaire was placed under the windshield wiper of the vehicle with instructions to complete it before leaving and to deposit it in a well-marked container located near the park exit. Several pieces of candy were left in the departing questionnaire envelope in an attempt to build good will and increase compliance.

Moods were assessed at each of the three contact times, whereas stress was assessed only at the time of departure.

Analyses. We tested most hypotheses using a repeated measures analysis of variance (ANOVA), with time as a three-level, repeated-measure within-subjects variable and mood as the dependent measure. Separate analyses were run for each mood (tired, energy, anxious, and calm). Observations were partitioned into two groups (high and low stress) depending on whether they fell above or below the group average stress level. We used

1It is possible that offering a treat as a reward to participants altered their moods. In fact, treats are used in some studies specifically as a device to enhance mood. However, we felt this method was worth this potential bias because we wanted to retain as many participants as possible (especially low sensation seekers, who often decline to participate), because participants were being asked to do something in return for their treat and therefore might consider it payment rather than a gift, and because all participants would have the same treatment, making the effect constant. Participants who arrived by themselves were further enticed by a $10 payment if they were selected to participate in an at-home version of the same study (Michael, 1992). Participants did not know if they would be selected to receive the $10 until we contacted them by mail several days after the onsite contact.
SPSS-X multivariate analysis of variance (MANOVA, SPSS Inc., 1988) for computations and the Greenhouse-Geisser correction factor for sphericity to adjust degrees of freedom and $F$ significance levels. The reported significance levels reflect this adjustment.

Omega-squared ($\omega^2$) statistics are reported below to estimate the effect size. Omega-squared varies from 0 to 1. Keppel (1982) suggested that large effects in social science studies are associated with an omega-squared of approximately 0.15 or greater, medium effects with an omega-squared of approximately 0.06, and small effects with an omega-squared of approximately 0.01.

**Results**

The strongest evidence of stress reduction comes from the relationships among stress, anxiety, and time spent at the park. Anxiety decreased with time, as hypothesized ($p < .001; \omega^2 = 0.15; \text{Table 1, Figure 2}$). Also as expected, stressed persons were, on the whole,

<table>
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<th>$p$</th>
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*Note.* The ‘averaged’ tests of significance were used. A sphericity correction factor was used to modify degrees of freedom and calculate $F$ statistical significance. The raw degrees of freedom are reported, but significance levels reflect the sphericity correction. Omega-squared is an effect size measure representing the amount of variance explained by each factor. The within-cells sum of squares used to test the effect of time (a repeated-measures variable) are different from within-cells sum of squares used to test the effect of stress (a crossed variable).
Figure 2. Moods of high and low stressed park visitors: Plot of moods experienced on arrival, 30 min later, and on departure from the park.

more anxious ($p < .016; \omega^2 = 0.053$). More important, a significant interaction between stress and time ($p < .02; \omega^2 = 0.037$) suggests that highly stressed persons started out more anxious than less stressed persons and lost more anxiety as time at leisure progressed, nearly catching up with the lower anxiety level of less stressed persons by the second time period (Figure 2).

Changes in energy were less significant and not necessarily supportive of the hypotheses ($p < .08; \omega^2 = 0.024$; Table 1). We expected stress reduction to be associated with increased feelings of energy, but instead we observed that energy levels decreased with time at leisure (Figure 2). The interaction between stress and time was somewhat significant ($p < .1; \omega^2 = 0.022$), suggesting that highly stressed persons were different from less stressed persons in how their feelings of energy changed during their time at leisure. Highly stressed persons gained a bit of energy between arriving at the site and administration of the second questionnaire, but lost this gain by the time they departed. In contrast, less stressed persons steadily lost energy throughout their onsite recreation experiences.

Feeling of calmness changed little during the three time periods (time factor not significant, $p < .93, \omega^2 = 0$; Stress × Time interaction not significant, $p < .6, \omega^2 = 0.005$; Table 1). In addition, persons with higher than average stress did not experience more (or less) calmness than did persons with lower than average stress ($p < .98, \omega^2 = 0$).
Feelings of tiredness did decrease with time \( (p < .005, \omega^2 = 0.05; \text{Table 1}) \), as would be expected with stress reduction. However, contrary to what was predicted, stressed persons did not differ from less stressed persons in the average amount or rate of change of the tiredness they experienced \( (\text{stress factor not significant}, p < .17, \omega^2 = 0.018; \text{Stress} \times \text{Time interaction not significant}, p < .19, \omega^2 = 0.016) \).

**Discussion**

Stress reduction is typically associated with reduced negative feelings. Such change was observed. Anxiety decreased, especially in highly stressed individuals who (presumably) were in need of greater stress reduction. The other negative mood we observed—tiredness—also decreased during time at leisure. However, our confidence in attributing the reduction in tiredness to stress reduction is weak because stressed persons did not change more than less stressed persons. Our findings of decreased negative moods are consistent with findings from previous studies examining stress reduction during nature-based recreation \( \text{(Hartig et al., 1991; More & Payne, 1978; Ulrich et al., 1991)} \).

Changes (or the absence of change) in the positive moods (energy and calmness) offer unconvincing evidence that stress reduction occurred. We expected that positive moods would increase. However, feelings of calmness did not change at all, and feelings of energy actually decreased. More and Payne \( \text{(1978)} \) reported a similar finding in that a positive mood similar to energy \( \text{(i.e., vigor)} \) decreased during park visits.

Interestingly, stressed people differed from less stressed people in how their feelings of energy changed while at the park, making possible an interpretation of our observations that is consistent with stress reduction as an explanation of the change. It seems reasonable \( \text{(given the benefit of hindsight)} \) that people should lose energy during a park visit. The demands of being outside, away from home, and in public consume energy. Given this line of reasoning, it makes sense to see energy levels decrease for people who are not stressed. That is, unstressed recreationists have energy to burn and do so during leisure. Stressed persons, in contrast, are in need of energy and may use the leisure opportunity differently than less stressed persons—to restore energy. This difference seems to be reflected in the patterns we observed \( \text{(Figure 2)} \). However, these “supportive” findings are contrary to what we first hypothesized, dependent on our post hoc interpretation, and thus are not convincing unless replicated.

Support for a conclusion that recreating near nature facilitates stress reduction was not overwhelming, but on balance the changes in mood observed here support the explanation that some stress reduction occurred. Study 1 did not allow exploration of the question of what caused the stress restoration: nature or leisure. Study 2, although exploratory owing to its small sample size, attempted to contrast mood changes attributable to being at leisure near nature with those attributable to just being at leisure.

**Study 2**

**Method**

**Subjects.** Participants chosen for Study 2 were a subset of those described above. During the initial contact in Study 1, people were asked if they would consider participating in the at-home part of the research and told that they would be given $10 for completing the at-home questionnaire. Persons who agreed to participate filled out their names and addresses on the questionnaire. All but 7 people volunteered for the second study. To
make the comparison of at-park to at-home leisure more sensitive, we attempted to control the potentially confounding factors of activity level and social interaction. Hence, participants for the second study were selected from those who were (a) alone while at the park and (b) engaged in a passive activity (i.e., reading, people-watching, and sunbathing). We assumed these conditions could be more easily replicated at home. Twenty-seven participants met these criteria, agreed to participate, and were mailed the questionnaire. Twenty-three participants returned completed questionnaires, 3 with incomplete data, resulting in 20 participants (10 men and 10 women).

Instrument and Procedure. Instruments similar to Study 1 were used. People were mailed the at-home questionnaire within 1 month of their park visit. To make sure persons participated in sedentary activities, instructions directed persons to fill out the questionnaire while they engaged in an activity similar to what they did while at the park (we recorded what they did at the park and reminded them of it). Examples of acceptably similar activities were given: reading (for pleasure, not for school or work), watching TV, listening to music, and so forth. Participants were asked not to make a special time for this study but to fill out the questionnaire while doing something they would have done regardless of the study, at a time they felt like doing it (presumably leisure, but this was not specified). The only conditions placed on participants were that they be alone, at home, indoors, and engaged in a passive activity such as those described above. Participants were asked to complete the questionnaire within 1 week of having received it.

Participants were instructed to self-administer three questionnaires. They were to complete the first when they started their leisure, the second approximately 30 min later, and the third when they terminated their leisure. Participants were instructed to note the time they filled out each questionnaire. The second questionnaire was completed, on average, 33 min after the first one. The third questionnaire was completed, on average, 68 min after the first. At the conclusion of the study, participants were asked for a description of their activities, the surrounding room, and any disturbances (such as phone calls) that occurred during the study.

Site. The at-home site was to be an interior room. Participants were instructed to select an interior space at home where they normally engaged in passive leisure activities and where they would likely not be disturbed by other people during this study. The rooms chosen included living rooms (12), bedrooms (3), TV rooms (2), kitchens (2), and unknown (1).

Descriptions of the activities in which people engaged at home included watching TV (13), listening to music (4), and reading (3). TV shows ranged from situation comedies to talk shows, books ranged from the Bible to mystery novels, and music ranged from classical to rock. Many people experienced minor interruptions during the study, including phone calls (11, mostly taken by a housemate) and someone walking through the room (4).

Analyses. To explore the difference between home- and park-based leisure, we conducted two-way repeated measures ANOVAs for each mood with both site (park vs. home) and time (1, 2, or 3) as within-subjects variables.

Results

On average (across all time periods) recreationists felt significantly less calm ($p < .014$, $\omega^2 = 0.28$), more tired ($p < .05$, $\omega^2 = 0.19$), and more anxious ($p < .009$, $\omega^2 = 0.34$) at home than at the park (Table 2 and Figure 3). As time passed, both at the park and at home,
persons experienced a slight decrease in energy (i.e., significant time effect for energy, $p < .09$, $\omega^2 = 0.12$) and in anxiety ($p < .003$, $\omega^2 = 0.3$). No significant interactions were found between site (i.e., home vs. park) and these mood changes (i.e., the Site $\times$ Time interactions were not significant), suggesting that whether one recreated near nature or not had little impact on the rate of change in moods experienced during leisure.

We analyzed the at-home data separately from the at-park data in order to examine whether stress moderated the changes in moods (as it did with changes in anxiety felt while at the park). That is, we conducted MANOVAs (similar to those reported in Table 1) for the at-home data using stress as a between-subjects variable. No significant interactions between stress and time were observed (statistics not reported).

| Table 2 |

Multivariate analysis of variance of mood changes at park versus at home

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Note. The “averaged” tests of significance were used. A sphericity correction factor was used to modify degrees of freedom and calculate $F$ statistical significance. The raw degrees of freedom are reported, but significance levels reflect the sphericity correction. Omega-squared is an effect size measure representing the amount of variance explained by each factor. The within-cells sum of squares used to test the effect of time (a repeated-measures variable) are different from within-cells sum of squares used to test the effect of stress (a crossed variable). Site is the variable that compares home to park settings.
Mood Change and Stress Restoration

Figure 3. Moods of park and home recreationists: plot of moods experienced at beginning of leisure, 30 min later, and on completion of home-based leisure.

Discussion

Baum (1991) noted that the setting of leisure may be less relevant to stress restoration than simply being at leisure. The only way to explore this question is with a comparison across sites, such as we attempted in Study 2. Because of the small sample size and lack of control during data collection while participants were at leisure at home, the results are clearly exploratory. However, these data bear directly on the critical question of whether stress reduction is the result of exposure to nature, participation in leisure, or some combination of the two.

Because both time at leisure and exposure to nature potentially cause restoration, we expected less restorative mood changes to occur during leisure time spent indoors, at home, than during leisure time spent near nature, at a park. The comparison between park- and home-based recreation had only a few statistically significant findings. Because there were no significant interactions between site and time (Table 2), we failed to find that recreating near nature is more restorative than recreating at home. All we can conclude from the results is that people started in better moods at the park and remained in better moods. We do not know whether the better moods at the park were a consequence of site characteristics (i.e., nature vs. no nature) or due to some other quality that distinguished between the two leisure experiences (i.e., travel, planning, expectations, or symbolism). It
may be, for example, that people who are in better moods are more likely to select park visits for their leisure time or that the time spent in travel to a park produces a greater sense of escape and hence better moods. Obviously countless other explanations can be offered.

We do know that the observed differences between home and park recreation experiences were not due to differences in stress. We compared persons' average stress levels before their visits to the park with their average stress levels before the home-based leisure and found no significant difference, $t (19), p > .2$.

The only evidence that more stress reduction occurred while recreating near nature than at home comes from a lack of evidence. In Study 1, stressed people experienced a greater reduction in anxiety than did unstressed people. We did not find this significant interaction between stress and anxiety in the data collected at home. Thus, stress apparently played a role in mood changes at the park (stressed people were more restored) but did not play a role at home (stressed people experienced no more restoration than others).

Conclusions

Some of the observed mood changes were consistent with the proposition that stress restoration results while recreating near nature. For example, anxiety decreased during the park visit, and this was more so for highly stressed persons than for less stressed persons. These findings are consistent with previous studies of stress reduction attributed to contact with nature (Hartig et al., 1991; Ulrich et al., 1991). However, a comparison of leisure spent indoors to leisure spent near nature found no differences in restorative-like mood changes. Anxiety did decrease during leisure time at home, but not more or less than during leisure time spent at a park. Hence, on the basis of this data set, it is not possible to suggest with any certainty that recreating near nature is more restorative than recreating away from nature. There is evidence, however, to support the pragmatic argument for provision of leisure opportunities: Leisure at park settings seems to produce the public benefit of stress reduction.

On another note, the results suggest that measures of mood reflect attributes of a leisure experience. We observed several significant mood changes that occurred during recreation (anxiety, tiredness, and energy decreased; calmness remained unchanged). These findings are similar to findings from other studies (Hammitt, 1980; Hull, Stewart, & Yi, 1992; More & Payne, 1978) and in combination suggest that mood change is a characteristic of the leisure experience. Driver and Tocher (1975), Knopf (1987), Kubey and Csikszentmihalyi (1990), Mannell and Iso-Ahola (1987), and Tinsley and Tinsley (1986) recommended study and understanding of the leisure experience as it unfolds. The method used here (i.e., repeated assessments of recreationists’ mood states during a leisure experience) offers one means to do this. An obvious and necessary extension is to sample the experience before and after the onsite recreation experience, building on the work of Hammitt (1980). Such an extension would enable study of the whole recreation experience: from pre- to postexperience conditions.

References


F. T. Juster & F. P. Stafford (Eds.), *Time, goods, and well-being*. Ann Arbor: University of Michigan, Survey Research Center.


