

## Mental Health and Well-Being

How significant will an accessible greenhouse be in your neighborhood? During winter's cold and drear the old Butterfly Greenhouse was heavily utilized as a temporary refuge from the winter blahs. But was it only an amenity? Extensive scientific research has demonstrated the many health benefits related to available nearby nature. Therefore the Biodome would be a community health resource, with a value far beyond that of an amenity. Mental health, physical health and personal well-being can be directly enhanced by a high quality year round garden close at hand.

Experimental investigations of restorative environments containing green plants, trees, flowers and waterscapes show two main effects:

- Stress reduction or decrease in the after effects of stress
- Recovery from mental fatigue, specifically the capacity of directed attention required to focus on tasks in the face of distractions or extended mental effort

These effects certainly impact anyone's mental acuity. Cimprich (1989) has shown that after a demanding examination, college students exhibited a decline in directed attention capacity. In her own words, "Thus, the development of attentional fatigue is salient in the college experience and could undermine a student's ability to succeed at a university." (Tennessen and Cimprich 1995)

The accumulated data show that access to nearby nature is significant for mental functioning as a buffer against fatigue and stress in learning situations. Plants and greenery contribute to job satisfaction and community quality of life. Having a view of nature can affect the course of hospital stays and the condition of prison inmates.

Circumstances where deprivation of contact with a natural environment is characteristic the need for such inputs have been clearly shown. Moore (1982) found that prison inmates whose cells looked out on nearby farms and forests made fewer sick calls to the infirmary. West (1985) found that prisoners with natural views when compared with those having views of walls or buildings had lower frequencies of stress related health problems such as headaches and digestive upsets.

Research has shown the impact of a little bit of nature or sunlight on people suffering medical conditions in hospitals. Patients recovering from surgery who could see a small copse of trees from their hospital window had more favorable recovery, shorter hospital stays, and required lower intake of potent narcotic painkillers than matched patients at the same hospital whose windows looked at the building's brick walls. (Ulrich 1984) Cases of delirium in intensive care units have been attributed to the deprivation of contact with any kind of natural inputs in windowless wards. (Wilson 1972) There is even evidence that mortality rates are lower in intensive care units that are sunnier. (Wiley 1999)

These and other studies ( Verdeber 1986, Verderber, & Reuman 1987, Ulrich 1979, 1981, Keep 1980, Jesse *et al.* 1986, Heerwagen 1990) have convinced medical establishments of the life-saving significance of views of nature. The Joint Commission for the Accreditation of Healthcare Organizations is reviewing new guidelines to ascertain the views a patient's room has of nature and how much can be seen laying flat in bed.

In two different studies, the latter of over 600 employees, the availability of nearby nature to interact with or view, resulted in less perceived job pressure and job stress, fewer ailments and headaches, greater satisfaction and was a strong positive factor in enthusiasm about work. ( R. Kaplan 1988, 1993) Other studies reinforce with similar results the importance of natural content, plants, flowers, trees, in the daily work experience to buffer against job strain and mental fatigue. (Lavina 1983, 1985, Leather 1998) Other studies have investigated the effects of the lack of windows and adaptations to a lack of natural elements. (Ruys 1970, Heerwagen and Orians 1986)

One interesting study attempted to compare the effects of plants on worker satisfaction on two floors of a corporate office. The 11<sup>th</sup> floor was plantscaped while on the 9<sup>th</sup> floor all the plants, even the employees own plants, were deliberately removed. Later, half the employees on the 9<sup>th</sup> floor admitted having gone upstairs specifically to see the plants. (Randall et al 1992) Clearly, some aspect of the human psyche made it impossible to keep the employees from getting a needed dose of greenery. Large corporations have financed landscaping and interior plantscaping as a matter of policy, claiming that plants increase productivity, improve morale, and decrease absenteeism.

In a study of university residence hall occupants, their directed attention capabilities were evaluated and compared between groups who had different amounts of nature visible from their windows. (Tennessen and Cimprich 1995) Across the view categories, from all built to all natural, there was a trend of improved rating of the various measures with increased natural elements in view. Students with all natural views scored significantly higher on several of the tests. In addition to performing significantly better, students with the most natural views rated their own attentional functioning, i.e. planning, deciding, concentrating on details, as more effective than those in all other view categories. This study demonstrates the positive effect of nature viewed from a residence hall window on student's intellectual functioning. How much greater would the benefits be if only a short walk away one could be immersed in natural surroundings?

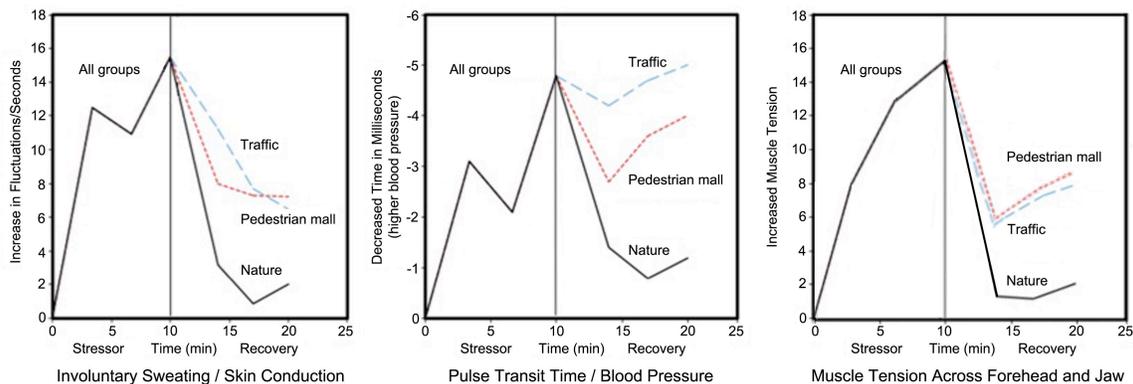
A study by Ulrich (1979) of students who were experiencing mild stress after a final exam showed that the group viewing color slides of everyday nature had greater recovery than those viewing city scenes lacking vegetation. When this study was repeated by Honeyman (1990) she found the group viewing the vegetation less urban scenes actually registered increased stress and less positive affect.

Amongst many assessments psychologists use of mental functioning, proofreading is considered a rigorous and valid method of gauging attentional focus. This familiar scholastic endeavor, has a clear relationship to educational performance. Hartig *et al.* (1991) reported two studies where proofreading was used as a test of nature's attention-

restoring effect. In the first study, three groups were compared; one that went on a wilderness trip, one that went on an urban vacation, and the third group had no vacation. Only the wilderness vacationers showed improvements on their proofreading scores. In the second study, after forty minutes of tasks designed to induce attentional fatigue participants were given a break period consisting of a nature walk, or a walk around town, or passive relaxation sitting back. Then they were given a proofreading test. Those who had taken the nature walk scored the highest.

Most telling of all recent research is Ulrich's (*et al.* 1991) investigations into recovery from stress. 120 undergraduate volunteers underwent a ten minute stressor period while viewing a black and white film about the prevention of work accidents, "It Didn't Have to Happen", that has been found to be an effective stressor in previous studies (Lazarus 1965). This was followed up with another viewing session where the volunteers were instructed to relax while looking at either scenes of trees and streams or pedestrians moving through an outdoor shopping mall, or traffic on urban streets in a business district. During these experimental periods blood pressure, heart rate, muscle tension and skin conductance of the subjects was recorded. Along with the physiological recordings subjective mental states of the students were assessed using the Zukerman Inventory of Personal Reactions (ZIPERS) (Zuckerman 1977), a test used throughout the previous studies.

#### Rapid Stress Relief Response to Nature



120 undergraduates viewed a stressful 10-min black and white film and then were exposed to a 10-min color-sound videotape of different natural or urban outdoor settings. Stress recovery during the environmental presentations was faster and more complete when exposed to the nature rather than the urban environment. Used with permission from R. Ulrich.

As shown above, the simulated natural environment produced a significantly different recovery course than did the urban environments. The skin conductance recordings in figure 1, familiar as the polygraph test or lie detector, show the natural scenes caused very rapid recovery toward the pre-experimental unstressed baseline. In only four minutes about 80% of the electrical fluctuations caused by involuntary sweating had regressed to a calmer state and continued to improve up to 95% of the way to normal in the next three minutes. The pulse transit times in figure 2, which reflect blood pressure, also showed nearly 80% recovery in four minutes for the group experiencing nature as a relaxer. By contrast, the group exposed to a follow up of street traffic didn't show any significant relaxation or stress recovery during 10 minutes. Stress levels evaluated through changes in voluntary muscle tension (figure 3) showed that muscle tension plunged for the nature viewing group; 90% relaxation in only four minutes.

Along with the physiological readings, the administered psychological tests showed significant results as well. The 10 -minute nature viewing experience had decreased feelings of fear, anger, aggression below the initially reported pre-experimental baseline and increased positive feelings (affect). The recovery associated with the natural exposure was so pronounced that those in the nature-viewing group were actually feeling better than before the beginning of the experiment.

The physiological findings indicate that nature settings produce significant recovery from stress in only 4 minutes. This rapid recovery demonstrates that brief contact with vegetation can foster restoration from daily stress and work pressure. The psychological data suggests the importance a nearby garden of warmth could have, even for a drop in of only 10 minutes!

Our society has not quite recognized the importance of nature to individual health. Personally, we are not consciously aware of the importance of our own interactions with nature, often downplaying it as a pastime secondary to more pressing economic pursuits. Despite the lack of a clear realization, a majority of people do associate nature and plants with stress relief and mental restoration. Over 100 studies of recreation experiences in urban natural areas and wilderness areas have found the most important perceived benefit among participants to be stress relief. (Driver 76, Knopf 87, Schroeder 89) Plants have a strangely soothing effect as noted by Robert Neese (1959) while an inmate at Iowa State Prison "... when tempers flared due to the tension of constant confinement, a couple of hours of work in the garden made pacifists of potential battlers."

The annual survey conducted for the National Gardening Association by the Gallup Organization, Inc. is done face to face in more than 2000 households in 50 states. Results from the survey conducted in 1989 included the statements below, with the following percentages showing agreement. (Butterfield & Relf 1992)

The natural world is essential to my well-being      46%  
Being around plants makes me feel calmer and more relaxed      40%  
One of the most satisfying aspects of gardening is the peace and tranquility it brings.      37%

Judging from the survey's confidence levels these are the attitudes toward plants and nature held by well over 40 million American households. Yet municipal planners and other public officials are only now beginning to understand these views mean natural areas and greenspace are not expendable items in the budget and simply amenities.

National surveys have shown (Fried 1982, 1984) that the strongest predictor of local residential satisfaction was the ease of access to nature and that this was the second most important factor, after marital factors, in overall life satisfaction. Other studies, done in Michigan, (Frey 1981, R. Kaplan 1981, 1982, 1983, 1985, Askawa 1984) found that neighborhood satisfaction was linked to the availability nearby nature and was significant in general life satisfaction as well. Therefore satisfaction at home within your local community could be strongly impacted by a green garden in January or February.

Quiet, peacefulness and tranquility were the most prominent (79%) qualities reported in people's preferred settings at the Morton Arboretum in Chicago (Schroeder 1995). The Kaplan's long study (12 years) of the USDA's Outdoor Challenge (hiking) Program conducted in Michigan's upper peninsula found 85% of the participants commented in their journals on the peacefulness and tranquility they were experiencing, not just once but usually more than three times (Kaplan & Talbot 1983). Our own SGP campus and community survey found respondents with similar views: 73% looked forward to using the greenhouse for "Quiet time", or in people's own words – "stress relief", "breaks", and "relaxation". Our objective is to provide a relaxing haven for a short break during the workday.

The data presented here is only a sample of the great bulk of recent research discoveries. So far this information has changed medical perspectives and is changing healthcare facility designs. Dramatic as it is, these new recognitions have not yet revolutionized our beliefs about our hierarchy of needs (Maslow 1962) to include more nature interaction. They do demonstrate we should choose to improve our surroundings. This is very clear in children and the elderly. (Talbot & Kaplan 1991, Browne 1992, Byoung-Sukkweon *et al.* 1998, Taylor *et al.* 1998) We have seen that interaction with nearby nature affects quality of life in medical settings, prisons, at work, at home, and in the community.

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