



## Research Paper

## Stress recovery in forest or handicraft environments – An intervention study



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## ABSTRACT

In modern society stress is a major problem, causing lack of mental and social well-being as well as potential vulnerability to problems at work. Previous studies have found natural environments to be relaxing. In this intervention study, performed in Northern Sweden, the hypothesis was that an outdoor forest environment would be more relaxing than an indoor handicraft environment. Forty-six participants with high stress levels (PSQ  $\geq 0.4$ ) (33 women, 13 men, average age 48 years) were randomly assigned to visit either the forest environment (n = 27) or the handicraft environment (n = 19). The participants visited their assigned environment twice a week during three months, either in autumn or spring. During each visit they spent two hours performing, simple and undemanding activities. Psychological health outcomes were measured by the questionnaires CIS, PSQ, SCQ, SMBQ, SF-36 before and after the three months interventions. Sleeping patterns were monitored by an Actiwatch and sleep diary. The participants' mood before and after each visit were estimated by a questionnaire. The results show that the participants' health had improved after the interventions in both the forest and handicraft environments. The sleep latency increased slightly among participants in the handicraft environment. For participants in both environments the levels of fatigue, stress and burnout were all lower. They felt less limitation due to physical problems and did not feel so tired. Also their mental health had improved. From start to end of a visit to either environments the participants' mood was improved, and they felt more relaxed, alert, happy, harmonious, peaceful and clearheaded. Over time during the intervention, they also felt significantly more clearheaded. We conclude that the health of all participants improved, irrespective of the environment visited.

## 1. Introduction

## 1.1. Stress and its consequences

In developed countries generally, and Sweden specifically, people are increasingly exposed to stress. Prolonged stress, without opportunities for restoration, can cause chronic fatigue and various other adverse physiological and psychological symptoms (Danielsson et al., 2012). Consequently, mental exhaustion and negative feelings are increasing, people have less energy and are becoming increasingly unhappy, as reported for instance by the Directorate General for Communication of the European Commission (2010). At young age stress can even cause changes in brain morphology and affect functions like learning (Hollis et al., 2013).

Symptoms of stress may include reductions in memory capacity and ability to concentrate, insomnia, and increases in heart rate, headaches and muscular aches (De Vente et al., 2003; Anon., 2003; Anon., 2009; Dahlgren et al., 2005, 2006; Potter et al., 2009). Exposure to stress may also have persistent effects, for example some functional limitations and

disabilities at old age may be linked to stress exposure 30 years previously (Kulmala et al., 2013). Consequences of the symptoms may include reductions in functionality both socially and at work (Anon., 2003). Hence, stress is frequently related to people's employment (Lindholm et al., 2005; Milczarek et al., 2009; Anon., 2013), and sick-leave due to mental illness (commonly linked to inability to cope and severe stress) is also increasing among the Swedish population (Anon., 2010; Försäkringskassan 2013). Frequencies of stress-related physical symptoms (severe pain in neck and shoulders, constant fatigue, moderate or severe anxiety and nervousness) are also increasing. Furthermore, recovery from stress-associated fatigue syndromes takes a long time (Vercoulen et al., 1996), and people who have had time off due to stress usually remain more sensitive to stress after returning to work (Anon., 2003). Hence, mental ill-health and musculoskeletal disorders (both of which may be strongly associated with stress) are the two main classes of diagnoses entitling people to disability pensions in Sweden (Danielsson et al., 2012).

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## 1.2. Theory

Humans evolved in natural environments and it is only in recent centuries that we have lived in towns (Hartig et al., 2011). In that short time we have developed highly mobile, dense, high-tech societies packed with tools that enable us to move through large crowds and execute tasks much more rapidly than before, driving demands for everything to be done faster. We must constantly perform more rapidly, and constantly make quick decisions. However, our brains and physiological systems have not evolved at the same pace as our technology, and we become exhausted when we constantly have to make decisions and perform at our best. This exhaustion can be related to the distinction between spontaneous and directed attention (Kaplan and Kaplan 1989). Focused attention is used when making decisions and requires tiring concentration. It must be used constantly even when moving through busy urban environments simply (for instance) to avoid being knocked down or knocking down someone else. Spontaneous attention refers to noticing something without any need to make decisions, for instance when looking at a view, or simply taking in our surroundings. It is used in natural environments, which are both restful and restorative because they provide precisely the amount of stimuli that we are evolved to handle. Hence, we respond positively to our “original environment”, in which everything is understandable, predictable and manageable, we get a sense of coherence and feel safe, and so the environment provides support and is restorative.

### 1.3. Effects of nature in the neighborhood

In recent years contact with nature has received increasing attention as a way of reducing stress. Green environments offer urban populations opportunities for restoration, and the more time people spend in contact with nature, the less they are affected by stressful events (Hartig et al., 2003; Grahn and Stigsdotter 2003; Ottosson and Grahn 2008). There is also a clear correlation between distances to green areas and people's levels of stress; the further away a green area is situated the higher risk for people to get high stress levels (Hörnsten and Fredman 2000; Nielsen and Hansen 2007; Stigsdotter et al., 2010). Thus, green areas in the neighborhood provide havens from life crises and stress, providing people with places where they can quickly recuperate and prepare for the next challenge (Wells and Evans 2003; Grahn and Stigsdotter 2003). Simply viewing nature from the office window make us more positively disposed towards our work, resulting in less negative reactions towards stressful situations (Kaplan and Kaplan 1989). Similarly, the ability to view nature through a window has highly beneficial effects for patients in hospitals (Ulrich 1984; Raanas et al., 2011), reducing the length of their stays, and requirements for both care from the personnel and analgesics (Ulrich 1984; Kline 2009).

### 1.4. Effects of nature on stress recovery

People recover from stress, both physiologically and psychologically, more rapidly in green areas than in urban environments (Ulrich et al., 1991; Berto 2005). Similarly, visiting a natural area results in a slower heartbeat, lower blood pressure and cortisol levels in the saliva, more positive thinking, less aggression and fear, more calmness and feelings of refreshment than visiting an urban environment (Ulrich et al., 1991; Juyoung et al., 2009). For people suffering from exhaustion disorder (also known as fatigue or burnout) visits to forest environments are perceived as significantly more restorative, more mood-enhancing and better for restoring attention capacity than city visits (Sonntag-Öström et al., 2014). Furthermore, visiting a natural environment improves people's ability to cope with everyday life by providing better perspectives of what is manageable, and what should be valued (and hence prioritized) in life (Talbot and Kaplan 1986; Nordh et al., 2009; Sonntag-Öström et al., 2014). Pensioners' ability to concentrate also increases, and they feel healthier, if they can spend

time out in nature (Ottosson and Grahn 2005).

In addition, the therapeutic and restorative effects of nature are positively correlated with the severity of crises people have experienced (Ottosson and Grahn 2008). Hence, patients suffering from exhaustion disorder are frequently offered garden therapy (Tenngart Ivarsson and Grahn, 2010), in which several “rooms” with different characteristics, activities and atmospheres may be provided (Stigsdotter and Grahn, 2002). Some “rooms” offer peace and quiet, with no activity, while others encourage activities. In the beginning of the treatment many patients prefer to stay in the wildest and woodiest part of the garden (Tenngart Ivarsson and Grahn, 2010). Heavily exhausted patients also choose the most forested parts with no activities. The trees fascinate and give a sense of safety that is lacking in everyday life. Regular visits to boreal forest environments may also enhance the mood of patients with exhaustion disorder. For example, after a two hour forest visit in solitude, patients who participated in studies presented by Sonntag-Öström et al. (2015a) felt more relaxed, alert, clear-headed, peaceful, happier and more harmonious.

Nature based therapy includes green nature, physiotherapy, conventional therapy, socializing, stress management, relaxation and creative activities as handicraft and gardening (Sahlin et al., 2015a, 2015b; Pálsdóttir et al., 2014). This mix of activities in a green environment has been found to be successful in rehabilitation from stress (Adevi and Lieberg, 2012).

### 1.5. Creative environments

Environments can support restoration by absence of demands (i.e. emotional demands, noise or crowds) or contain qualities that support restoration (von Lindern et al., 2017). Environments that are not natural can support restoration and offer relaxation, particularly those that promote creative engagement, which reduces stress, anxiety and mood disturbances (Stuckey and Nobel 2010). For example, when people work with clay they not only physically create objects and feel the clay in their hands, but also mentally plan what to do next and observe the object being produced and finished. Thus, it activates people's body and minds (Sholt and Gavron 2006), without making excessive demands. Anthroposophical art therapy reduced cancer patients' depression levels (Bar-Sela et al., 2007), and increased levels of well-being, confidence, motivation self-care and social relationships of persons with mental illness (Allan et al., 2015). Participating in community arts programs increased mental health and well-being for persons from disadvantaged backgrounds (Kelaher et al., 2014). Some regarded the creative activities as improving the self-management of mental health (Lawson et al., 2014). A collaborative art-making task reduced stress levels and increased social support in a group of hospice caregivers (Salzano et al., 2013). Consequently, several kinds of environment other than nature can have helpful effects for people suffering from stress, based on the activities performed in them. However, it has been argued that human beings have preference for nature environments and that this preference has evolutionary origin and therefore is innate (Appleton 1975; Orians 1980; Wilson 1984). Physical activities in natural outdoor environment improves restoration and mental health better than indoor activities (Mitchell 2012; Weng and Chiang 2014; Rogerson et al., 2016). Therefore, we hypothesized that nature in the form of an outdoor forest environment would promote recovery from stress better than an indoor environment.

Our aim was to examine if two different environments, an outdoor forest and an indoor handicraft environment, have unique effects on stress recovery in addition to comparable activities performed in them; and if so, the possible reason to this. The aim was also to study if there were any differences in the environments where the activities were performed.

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