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# A Garden at your Workplace May Reduce Stress

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## Abstract

The increase in stress and stress-related ill-health is escalating dramatically in the Western World. An alarmingly growing part of the budget for medical services in Sweden is being used for people suffering from different stress-related ill-health.

In this paper, we present some results from a study in which 656 randomly selected people in nine Swedish cities answered a questionnaire addressing their experiences of stress and their use of green outdoor environments at their workplaces. The results may be interpreted as showing that access to a garden at work may have a positive impact both on stress and on "trivsel", a Swedish word meaning comfort, pleasure and well-being. Apart from actually being in a garden, a view of a garden may also decrease employees' level of stress and affect trivsel in a positive way.

According to our results, laying out more and easily accessible gardens adjacent to workplaces could create environments that are more restorative and freer from demands and stress.

**Keywords:** Garden, workplace, stress and restorative environment

## Introduction

About a century ago, most people lived in a world where severe hardships shortened their lives. Many jobs were physically strenuous with long working days and little rest, and this took its toll on people's health. This in combination with, among other things, overcrowded neighbourhood, foul air, poor sanitary conditions, food of low nutritional value, and at times not food enough, made an ideal breeding ground for severe infectious diseases (Puranen, 1991). Today, the situation is different. In the Western World, most physically strenuous jobs have disappeared. Lodgings have become more spacious, there is enough food with high nutritional value, and sanitary conditions have improved considerably. Because of this, infectious diseases pose less of a threat to health today. In large parts of the world, it is no longer hard and dangerous jobs and poor lodgings that constitute major health hazards. Most ill-health that are on the increase today are related instead to behaviour involving risk, such as having a sedentary lifestyle, smoking, using drugs, consuming too much fatty foods, and leading a stressful life (Orsega-Smith et al., 2000).

During an alarmingly short period of time, stress and stress-related complaints have developed into ill-health that affect more and more individuals of all ages and social groups (Maslach, 2001; Grahn & Stigsdotter, 2003).

During 2002, 14% of the working population was absent from work due to poor health. In 2003, the number of individuals on the long-term sick-list increased (Regeringskansliet, 2003a). The health insurance costs for sickness benefits, rehabilitation and early retirement pensions were almost 10 billion Euro in 2002 (Regeringskansliet, 2003b). The most important causes of the increased numbers on the long-term sick list are an increased number of older labours and an experienced increase in workload at work (Regeringskansliet 2003 c). In light of these facts, the process of sick-listing and rehabilitation should be streamlined and to a greater degree based on the individual and the workplace (Socialdepartementet SOU 2002:5.2).

A large part of our weekdays is spent at work. Recent investigations show that both school-children and gainfully employed people in Sweden and the rest of Europe suffer increasingly from stress at their workplaces (Johansson, 2000). What can be done to reduce stress instead? One can try to avoid stress factors through better planning or get more exercise. One can also seek out environments that reduce stress. This paper is about the latter possibility. Is it the case that outdoor areas at workplaces influence people's stress? Our working hypothesis is that well-designed and green gardens at workplaces may contribute to creating a less stressful everyday environment for employees. The aim of this study is to examine whether there is a relationship between gardens at workplaces and employees' experience of stress.

### *Nature as restorative environments*

The notion that nature has a healing and soothing power is an ancient understanding. During the 1980s, several researchers became interested in this subject. Stephen Kaplan and Janet Talbot's (1983) research shows that the nature experience gives visitors a fairly quick and strong recovery from fatigue. They explained this as the restorative power of nature, which gives rest and recovery. Not only visiting nature per se has been shown to have restorative power, but having a view of nature from a building is also significant. Roger Ulrich's research indica-

tes that merely being able to view nature from a hospital has a positive influence on recovery after surgery (Ulrich, 1984). Both these researchers suggest that verdure and nature as such accelerate human beings' recovery from stress. More recently, these earlier results have been followed up and supported by new findings (Hartig et al., 1996; Herzog et al., 1997; Ulrich, 1999, 2001; Grahn & Stigsdotter, 2003).

Why does nature have a restorative power on humans? Some researchers have focused on the evolutionary lapse between man and nature (Coss, 1991; Ulrich, 1993; Appleton, 1996; Herzog, 1997). To survive and reproduce in the wild, primitive man had to be able to read in nature the possibilities and obstacles of the environment, so-called "affordances" (Gibson, 1982). Thus, a human being needs to understand the messages of nature very quickly, often in a fraction of a second. It could be a matter of realising when danger is or is not imminent. A nature area that sends messages of safety are restorative it allows the visitor's whole body to relax and recover from stress. These messages may be a matter of humankind's spontaneous and unconscious response to natural stimuli signalling safety (Coss, 1991; Ulrich, 1993). According to another theory on why nature offers human beings restorative experiences, modern man is surrounded by too much information that he must sort and assess the importance of (Kaplan & Kaplan, 1989; Hartig et al., 1996). The theory is based on the fact that the human brain has two types of attention: directed attention belonging to the higher cognitive centres, and soft fascination linked to the old parts of the brain. In contrast to the city environment, nature contains very little information that must be sorted and assessed (Kaplan & Kaplan, 1989). In nature, the higher cognitive centres can therefore rest, while the old part of the brain is stimulated, which gives the visitor restorative experiences.

### *A way to measure stress*

In the city, city dwellers are continuously exposed to different unnatural environments as well

as to large amounts of information that must be sorted. Thus, green areas in the city serve an extremely important purpose as restorative environments. Research shows that a city's green areas can even be viewed as a health-promoting factor, i.e., a means by which to maintain the health of city dwellers (Grahm & Stigsdotter, 2003; Prop, 2002/03:35). In Sweden today, stress has been designated as a new national illness. The illnesses most often afflicting long-term sick-listed Swedes are stress-related depression and pain, as well as backache, tiredness, irritation, and ache in the back of the head (Ibid). Research shows that the illnesses *stress*, *irritation* and *fatigue* together point to a strong factor, which is interpreted as *Level of Stress*, LS (Grahm & Stigsdotter 2003). When stress is mentioned in this article, it refers to LS

### ***Depicting employees' experienced pleasure, comfort and well-being***

In Sweden, when speaking of an individual's home and workplace, the notion of *trivsel* is frequently used. The word can be said to encompass the English words pleasure, comfort and well-being. Unable to find an English term that is equally broad in meaning, we have chosen to use the Swedish word *trivsel* here.

### **Method**

A questionnaire was sent by post to 2,200 individuals of all ages, who were selected at random and lived in nine Swedish cities: Enköping, Halmstad, Kristianstad, Lund, Trelleborg, Trollhättan, Uppsala, Varberg and Västerås.

The cities are located in geographical areas in which most of the Swedish population live: that is close to Stockholm, Gothenburg and Malmö. The state-owned company DAFA, which keeps the Swedish personal register and address register, randomized the addresses. One hundred and sixty-three letters were returned to sender, which means that 2,027 questionnaires were successfully delivered. The response-rate thus was 47%, as 953 completed or nearly completed questionnaires were received. Of these, 656 were answered by working people, the rest being children, pensioners, and unemployed. On closer examination of the profile of respondents, it was found that the distribution of socio-demographic data is representative of the general situation in Sweden. No statistically significant deviation was found with regard to socio-economic grouping, age or sex between the received material and the material one could expect (Statistics Sweden, 2001).

The questionnaire contained three different parts. The first part focused on the respondents' personal data, such as age, sex, profession, home environment and access to garden at home and at work. Part two dealt with how often and how long people visited the open green spaces of the town, while the third part asked the respondents to self-estimate their health status. All questions were pre-coded, often with multiple-choice options, however with an opportunity to add their own remarks. The answers have been statistically processed using the statistical software SAS (SAS Statistics, 1996).



**RESULTS**

*Gardens at workplaces*

Can gardens at workplaces influence the level of stress of employees? In order to answer this question, access to a green outdoor area at the workplace was assessed in terms of the respondent’s LS and Socioeconomic index, SEI. Table 1 shows that more than two thirds of the respondents say that they have access to a garden at their workplace, 400 out of 584. The results suggest that if you have access to a garden at your workplace, you will suffer from stress on fewer occasions per year than if you do

not have access to a garden. This difference is significant. The socio-economic index, on the other hand, is of no significant importance.

In order to gain insight into workplace conditions, we constructed a workplace greenery index. Here, we have divided "having no garden" into two classes, where:

**Workplace greenery index 1** means having no chance at all of breaks at the workplace, neither in the form of a view through a window overlooking a garden nor by spending time out of doors.

	Having a garden	Having no garden	Significance
LS	89.42	130.14	p<0.02
SEI	4.07	4.18	Ns
N	400	184	

Table 1: Analysis of connection between level of stress and access to a garden at the respondent’s workplace, SAS T-test. N=584

Workplace greenery index	N		LS
W-index 1	95	Having no view of a garden and no chance to go out during breaks	153.73
W-index 2	86	Having no view of a garden and a chance of a break out of doors once a month at most	104.08
W-index 3	276	Having a view of a garden and few or no chances of a break out of doors (once a week at most)	94.66
W-index 4	117	Having a view of a green garden and chances of a break in a green garden more than once a week	77.07

Table 2. The table shows the classification of workplace greenery index in relation to L! Significant difference SAS GLM, analysis of variance  $p < 0.02$ ,  $N = 574$

**Workplace greenery index 2** means having a yard to spend time in during breaks but making little use of it, and having no chance to take short "breaks" by looking through a window overlooking a garden.

"Having a garden" was also divided into two classes, where:

**Workplace greenery index 3** means having access to a small garden where a break may be taken at times as well as having a view of a garden at the workplace.

**Workplace greenery index 4** means having both a view of a garden at the workplace and access to a garden that is rich in greenery, where a break is taken more than once a week.

In order to divide the results into four index classes, we have added some conditions, which resulted in ten missing values. Table 2 shows that the majority, 393 out of 574, have access to a green area at their workplace, either as a view or as a garden to spend time in. The importance of this is implied by the fact that LS decreases as the workplace greenery index increases. This suggests that if you have a view of a green garden and

also the possibility to spend your breaks in it, you will suffer from stress on fewer occasions than those who have neither a green view nor a chance of going out during breaks.

#### **Trivsel (pleasure, comfort and well-being) at the workplace**

We found it interesting to examine whether there is a connection between the *trivsel* of the respondents at their workplace and a view of a garden as well as access to a garden to spend time in. We therefore posed the following question: "Do you experience *trivsel* at your workplace?" The respondents gave their answers on a seven-grade scale from "No, not at all" to "Yes, very much so". In order to have fewer and more even classes in terms of number of respondents, the scale was transformed to a three-grade one, where "*Trivsel* low" corresponds to "*Trivsel* at workplace" 0-2 on the seven-grade scale, "*Trivsel* medium" to "*Trivsel* at workplace" 3-5, and "*Trivsel* high" to "*Trivsel* at workplace" 6. Is there a connection between *trivsel* at the workplace and access to green outdoor areas at the workplace? Table 3 shows that there may well be such a connection. The level of significance of the relationship is  $p < 0.0001$ .

	Having a garden	Having no garden	
<i>Trivsel</i> (comfort, pleasure and well-being) at workplace	1.29	0.86	p<0.0001
N	397	180	

Table 3. Connection between *trivsel* at workplace and access to garden. Significance test SAS T-test p<0.0001. N=577

	<i>Trivsel</i> low	<i>Trivsel</i> medium	<i>Trivsel</i> high	Significance
LS	160.82	89.89	67.65	p<0.0001
N	148	276	223	

Table 4. Connection between LS and *trivsel* (comfort, pleasure and well-being) at workplace. Significance tested by SAS GLM analysis of variance. N=647

	<i>Trivsel</i> low	<i>Trivsel</i> medium	<i>Trivsel</i> high	Significance
Workplace greenery index	2.19	2.68	3.09	p<0.0001
N	118	253	206	

Table 5. Connection between workplace greenery index and *trivsel* at workplace. Significance tested by SAS. GLM analysis of variance. N=577

The question that now presents itself is whether there is a connection between *trivsel* at the workplace and LS. Table 4 accounts for this relation. From the table one may see that there is a possible connection. The level of significance of the relationship is p<0.0001.

How much, then, does the workplace greenery index influence *trivsel* at the workplace? These relations are accounted for in Table 5. We interpret them to suggest that *trivsel* at the workplace increases with the workplace greenery index. The connection is significant.

Because LS, workplace greenery index and *trivsel* all show significant connections with each other, we tested a path analysis in order to find out to discover what connections are the strongest. We carried out the path analysis between these three variables using the GLM analysis of variance Type III Sums of squares. Model LS = workplace greenery index and *trivsel*. The result was as follows: *Trivsel* p=0.0001, Workplace greenery

index p=0.11. This indicates that *trivsel* per se significantly influences LS. The workplace greenery index, however, shows a strong connection with *trivsel*, which means that it is not unimportant

**The overall importance of having a view and spending time in a garden at work**

What has most importance for *trivsel* and LS, respectively: having a view of a garden or actually spending time in a garden? We carried out two path analyses as follows: Path analysis 1: LS = view / spending time out of doors. Here, we wished to study which of the two variables – view and spending time out of doors – showed the strongest connection with LS. The result was as follows: View = 0.44, Spending time out of doors = 0.44. N=648. We interpret this as showing that both variables separately have the same value with regard to stress reduction.

Path analysis 2: *Trivsel* = view / spending time out of doors. Here, we wished to study which of the two variables – view and spending time out of doors – showed the strongest connection with

*trivsel* at the workplace. The result was as follows: View  $p < 0.0001$ , Spending time out of doors  $p < 0.0001$ . We interpret this as showing that spending time out of doors and view are equally important ways to increase *trivsel* at the workplace.

## Discussion

In our study, we posed the question of people's *trivsel* at their workplace. We had not imagined that we would get such a clear answer to this question. The concept of *trivsel*, however, not only encompasses "pleasure and comfort" but also a dimension of well-being. Our original intention was to compare people's experience of stress with their access to a garden at their workplace. When we examined the connections between the answers to the questions, however, *trivsel* stood out as one of the most interesting variables to proceed with. The relation between *trivsel*, stress and outdoor environment is clear and leads us to a discussion of what health really is. Our results show strong significant connections between *trivsel* and stress ( $p < 0.0001$ ). The World Health Organization (WHO) defines health as "a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. Health is a resource for everyday life, not the object of living. It is a positive concept emphasising social and personal resources as well as physical capabilities" (World Health Organization, 1996). This definition describes health as a positive, almost Utopian state comprising the whole individual, both mind and body, in relation to his or her situation.

We also find a significant connection between access to a garden and decrease in LS at the workplace. But if we include *trivsel* as a further variable, the result is that the connection between LS and the workplace greenery index becomes non-significant,  $p = 0.11$ . The results still show a connection between stress, *trivsel* and access to a garden. The connection between stress and access to a garden "vanishes" when *trivsel* is included in path analysis. This does not mean, however, that the connection is uninteresting. In Sweden, much of the debate concerns *trivsel* at the workplace, what employers

are like, satisfaction with individual assignments, relations to colleagues and how clearly you feel you can control and influence your work situation. Our results, however, put forward another aspect, showing that access to a green area is a significant part of *trivsel* at the workplace.

Furthermore, when you are at your workplace, you may need pauses for recovery. These pauses, however, are often strictly limited. You are tied up with your assignments and do not have free disposal of your time. It may often be the case that you have to be at one and the same location, at a desk for instance, for hours at a stretch. We expected to find stronger connections between spending time in a garden and LS than between having a view of a garden and LS, but the results suggest that the effect of spending time in a garden and of having a view of one is the same both with regard to stress reduction and *trivsel* at the workplace. We interpret this as evidence that breaks in the form of taking in a view may be important, just as important as spending this time in the garden. Our inquiry showed that the respondents rarely took a break in the garden during a working week – only once or twice a week. This can be compared to the numerous opportunities to take a quick look at a garden during a working day. For a person who is working, a garden may be constantly present if he or she has a chance to look out over it. Despite the very few occasions on which, on average, people had a chance to spend time in a garden, it turned out that these breaks were as rewarding as all the opportunities to take in a view. Such a finding causes one to consider what a daily opportunity to visit a garden could mean in terms of *trivsel* and LS at the workplace.

In our judgement, spending time in a garden can stimulate all our senses in response to stimuli that Ulrich (1999) classifies as "no danger" signals. At the same time, we are given opportunities to rest and restore the part of the brain that sorts out information as well as to obtain satisfaction, a kind of "massage" of the senses, through the experience of soft fascination – scent, temperature, touch,



and so on. The design of the garden should, thus, be very important.

For rest and recovery to function effectively, architects and social planners at the turn of the 19th century adopted the position that workplaces and housing areas should be completely separated, which led to urban areas with residential neighbourhoods and urban areas for industry and labour. What these social planners and architects may have overlooked at the time is that areas for labour and industry must also offer opportunities for recovery and rest.

The strength of this study is that it was carried out on a random sample of people, who together form a representative picture of conditions in Sweden with respect to sex, age and socio-economic status. In general, the respondents have filled in the questionnaires well. This indicates that the questions were easy to understand and answer. The weakness of the material is that the results only give a picture of conditions in a sample of Swedish cities. Internationally speaking, Sweden is a somewhat unusual country: together with Norway, it tops the list of UN countries with the most equality in terms of sex and socio-economic conditions (UNDP, 2002). On the whole, it would be desirable if this study were followed up by studies in other countries.

If the present results should hold, this would entail a rediscovered view of health and gardens. In our opinion, instead of trying to cure stress complaints, we could prevent them using gardens. Laying out gardens at workplaces may be an effective, democratic, comparatively cheap and aesthetic weapon against the new widespread ill-health called stress. If supported by other studies, these results will suggest a more progressive role for architects, landscape architects and city planners.

## Conclusion

This paper dealt with outdoor environments at workplaces and employees' experiences of *trivsel* (comfort, pleasure and well-being) and stress. Our findings can be interpreted as indicating

that gardens at workplaces play an important part in offering a more stress-free environment, irrespective of sex, age or socio-economic background. We wish to stress the following results in particular:

- Having access to a garden at the workplace may have a positive influence on stress as well as on *trivsel* (comfort, pleasure and well-being)
- Apart from spending time in a garden at the workplace, merely having a view of a garden may also affect employees' stress levels and *trivsel* positively.

According to our results, laying out more and easily accessible green outdoor areas adjacent to workplaces could create environments that are more restorative and freer from demands and stress.

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