

# BENEFITS OF VIEWING NATURE IN URBAN ENVIRONMENTS

Green roofs' ability to heighten concentration, relieve stress, and provide a stronger sense of security.

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## Abstract

Green roofs are recognized for contributing to a more environmentally conscious city through their ability to reduce the amount of stormwater runoff, lower the Urban Heat Island effect, increase biodiversity and help offset pollution through particulate absorption from the plants of the roof. What might be overlooked is how they could improve the mental outlook of the community. This paper looks into the psychological benefits of viewing nature, and how green roofs can benefit the community in a holistic sense.

## Introduction

With the urban greening movement, green roofs play a strong role as city expansion takes place, and can counteract some of the damage development takes on community health and environmental resources. The City of Los Angeles claimed the annual carbon emissions of one car could be offset by one square meter of green roof, and if 20% of the industrial and commercial roofs in Detroit Michigan were sedum green roofs, 889 tons of carbon emissions could be removed from the air (Rowe, 2011), (Fig 1). Green roofs are publically recognized as implementations to help improve the environment of a city. What isn't clear is how the public might perceive green roofs as they view them from a distance.

As human population increases and cities expand, more of the views we will see on a daily basis will be out of dense building space onto other closely packed buildings. The type of landscape we view in our everyday life could have more inference on our overall health than one might assume. Specifically, what we view from looking

out the window from our homes, work, or school (or where one spends the majority of their day) could be an indication of stress relief/increased stress, may help strengthen one's concentration or detract, and improve one's outlook on life or increase a person's risk of depression. The view of comparison is natural elements (trees, flowers, grass) vs. built elements (walls, buildings, industry) in an urban setting. To specify, how does our overall sense of well being amend itself when our sight is directed on the built environment, compared to the natural environment?

It's important to note this paper is addressing the psychological wellbeing from citizens who are not currently sick or hospitalized. Rather, this paper is specifically exploring potential benefits of viewing greenery from one's home, place of work, or school, from the perception of the general public.

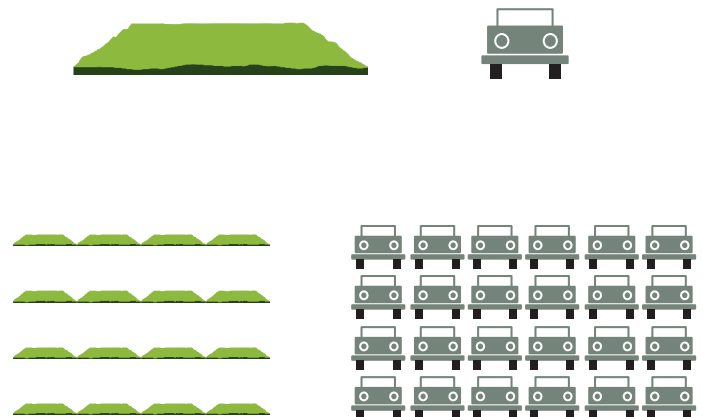


FIGURE 1.  
One square meter of green roof could offset the annual particulate matter emissions of one car if vehicle is driven 10,000 miles per year. (City of Los Angeles, 2006).  
If 20% of all industrial and commercial roof surfaces in Detroit, MI were extensive sedum green roofs, 889 tons of car emissions would be removed. (Rowe, 2011).

## Attention

As creatures of habit, it's interesting to think about the way your interior world relates to the exterior one as you go about your day. We become so accustomed to going in and out of buildings, spending the majority of our time in them, that we may lose sight of the natural world around us and not know the full psychological effects of living in the urban realm. What gives a person a view into the outside world from where they spend the most of their time is likely going to be a window. How much the view from the window effects your day and productivity, could surprisingly hold a lot more weight than one might assume.

Research has shown that exposure to the natural world could actually help a person keep their attention or restore their capability to concentrate (Tennessen, 1995). When trying to accomplish a task, distractions could appear from one's surroundings (noise) or mental state (internal anxiety or overactive mind) that make it so the individual's attempt to focus, is likely to crash due to mental fatigue. Rachel and Stephen Kaplan's (environmental psychologists), "Attention Restoration Theory" (ART) (fig 2), describes how natural surroundings can have a restorative effect on psychological exhaustion, and can help restore one's mental battery (specifically for this task-orientated attention, which the Kaplan's call "directed attention.") What ART explains, is it gives the brain the ability to rest by focusing it's attention on something in the natural world, such as birds or trees. The Kaplan's call this, "soft fascination," which is "an aesthetic experience that invites attention but leaves room for reflection" (Kaplan and Kaplan, 1989).

This theory has been tested in many different ways, but the overall argument is that the nature we view can benefit society as a whole, making a stronger argument for more green roofs, because we view onto them. An apparent subject group to test attention capabilities would be students, because they are in a constant mode of using directed attention to accomplish school projects. A study done by Carolyn M. Tennessen and Bernadine

Cimprich in 1995, took a group of undergraduates students who lived on campus at a university in the Midwest United States. Their dorms consisted of a window with either: an all natural view, mostly natural view, mostly built view, and all built view. The study tested Kaplan and Kaplan's ART theory,

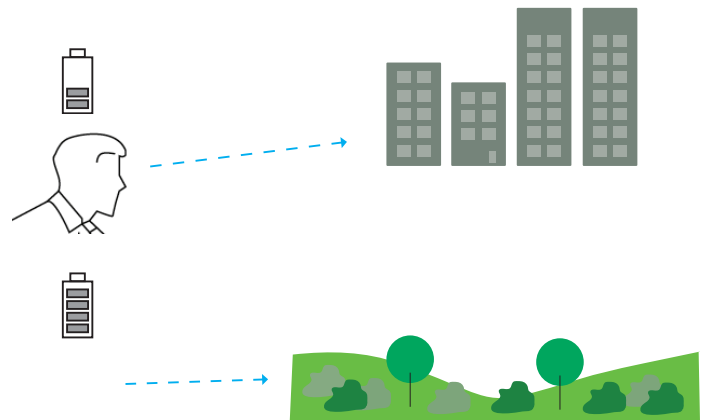


FIGURE 2.  
*Attention Restoration Theory*

with a specific test used to measure attention. The results showed that the students with an all-natural view performed significantly better on two different attention-measuring tests, and reported "their attention function as more effective than those in all the other view groups combined" (Tennessen, 1995). Their results ended up supporting the Attention Restoration Theory. A similar study was later conducted, but with adults who were randomly assigned to 'green' high-rise apartment buildings and ended up scoring considerably higher on objective measure of attention than did residents assigned to 'barren' buildings. (Kuo, 2001), (Fig. 3)

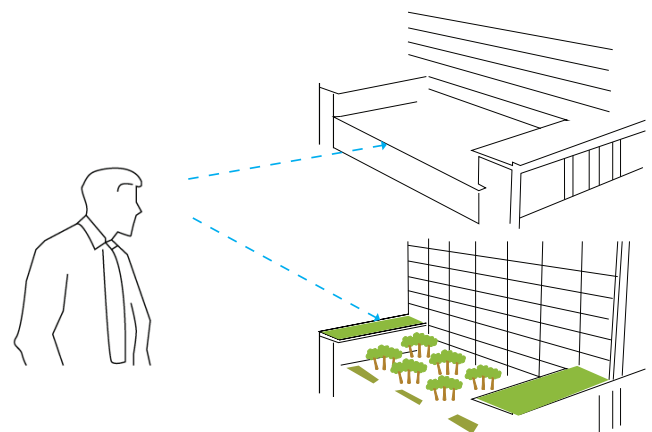
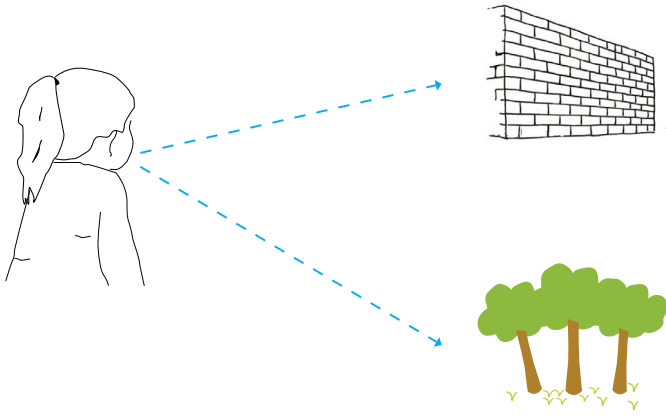


FIGURE 3.  
*Adults scored higher on objective measures of attention than did residents assigned to 'barren' buildings.*



**FIGURE 4.**  
*Girls with 'greener' views from apartment windows were better able to concentrate, inhibit initial impulses, and delay gratification, compared to those with built views.*

Younger populations in North America, such as inner city girls about to enter high school, might be at-risk of poor decision making because of home and school environments. Inner city children are more likely to live in 'barren' landscapes, with a heavily built view, perhaps because "housing managers and city officials decide to cut budgets for landscaping in inner city areas" (A. F. Taylor et al, 2002). A study was conducted to test if views of nature from home would help enhance their capacity for self-discipline in teenage girls, stating they were at risk of academic underachievement, juvenile delinquency, and teenage pregnancy. (A.F. Taylor et al, 2002), (fig 4). They discovered that the girls who had a view of near-home nature, showed positive improvement for delaying gratification (thus increasing attention capabilities), stating that by having more views of nearby nature, the less likely negative outcomes of failed self-discipline are likely to happen (A. F. Taylor et al, 2002).

## Stress

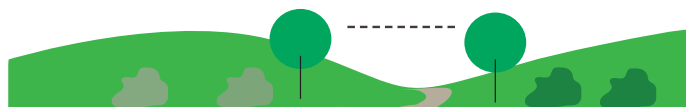
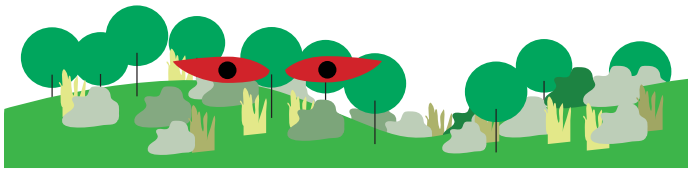
In North America, our demands, tasks and needs can prevail over the amount of time we have in a day to accomplish said responsibilities. The amount of stress levels people claim to experience is at an alarming high. A report from the American Psychological Association published reports on a stress study they did on cities throughout the United States, claiming, "More adults report that their stress is increasing rather than decreasing. 39 percent said their stress had increased over the past year and even more said that their

stress had increased over the past five years (44 percent)." (APA, 2012). The report goes on to explain many of the health risks associated with high stress levels: weight gain, irritability, anger, fatigue, lack of interest, motivation or energy, headaches, and upset stomachs due to stress. Research shows that having a view onto nature might be able to help relieve stress. One theory is Ulrich's "Stress Recovery Theory" that "predicts natural scenes tend to reduce stress, whereas settings in the built environment tend to hinder recovery from stress" (Velarde et al. 2007). A laboratory experiment conducted in the Netherlands in 2004, had researchers gather stressed participants and assigned them at random to view simulations of natural and urban settings. The results showed that the images of natural environments "lead to faster and more complete stress recover than viewing built ones." (Van den Berg et al. 2010) A common thread in many reports note that a large part of the satisfaction derived from nature does not mean one needs to be in it, but can still receive health benefits by observing it (Velarde et al. 2007). This is positive news as we take into account the role a green roof can play in the psychological health of the community, as many green roofs will be viewed on and not necessarily have people be physically in them. When one is suffering from stress, having the opportunity to pause and look out window onto a natural setting might give an opportunity to mentally recover and may stimulate reflection for personal growth. Thus, more opportunities to view (and have) city greenery can lead to stress relief.

## Perceptions of safety

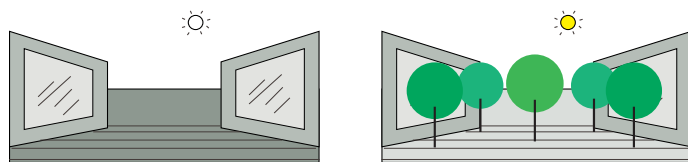
While the view of nature can help restore attention and relieve stress for the viewer, it's also important to emphasize that the type of nature one sees might change the viewer's perception of safety or sense of danger. A report in early 2014 collected various research articles, and most of which conveyed that in urban green spaces, a sense of fear came from dense, unmaintained vegetation (such as too many trees and bushes planted closely together). This was because it gave viewers a sense that someone could be hiding in the vegetation, since their view was obstructed from the heavy planting (Sreetheran et al, 2014),

(Fig 5). Therefore, open views and open distance onto vegetation was favored in these reports, because respondents said they could see clearly through the plants, eliminating the possibility for people or animals to be hidden from view.



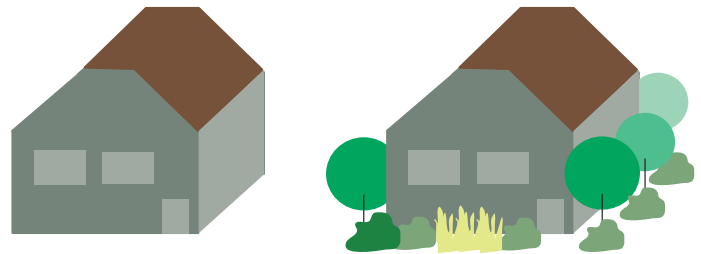
**FIGURE 5.**  
*Unmaintained vegetation evokes fear in urban green space vs. Open views with vegetation spacing have positive association of sense of security.*

The nature of viewing onto green roofs requires an involuntary “open view.” It’s still important to note, however, that if the roof is densely planted, viewers might have a negative reaction to the plantings and to the roof. Plantings can be used to increase a viewer’s sense of security, if they are well maintained. One study said that in a Chicago housing research project, the presence of trees in a courtyard gave residents a stronger sense of security than courtyards without vegetation (Fig 6) and in another study, they had subjects rate their sense of safety from drawings of houses with vegetation and those without, and found the images of housing with vegetation to be overall safer. (Brower et al, from Sreetheran et al, 2014), (Fig 7). It leads to an interesting idea that adding vegetation to the built environment can give the viewer a renewed sense of safety. By applying this thought to green roofs, vegetation would most



**FIGURE 6.**  
*Presence of trees in residential courtyard had strong effects on residents’ sense of safety compared to barren courtyard.” (Kuo et al. 1998)*

likely need to be on an intensive roof with open and well-maintained vegetation for this theory to hold some truth.



**FIGURE 7.**  
*Residents found property that had vegetation growing around the house to be safer than those without.*

## Conclusion

As we continue to expand our built environment, we lose the natural one. The health implications of this are not fully realized, as living with industry and imprinting high carbon footprints is a relatively new lifestyle of the past century. But the evidence exists for why we need nature, and how it can help restore our mental distress. As a result of the demand for more nature in the city, the rise of professionals who design and manage landscapes are increasing. The role of these professions is now given a fairly large responsibility of aiding the restoration of the mental health of the urban citizen. Catherine Ward Thompson, a professor of Landscape Architecture in Edinburgh, claims, “Today we have research that addresses 21st century demands and standards of evidence for policy and practice, so as to understand how to take the health implications of landscape architecture seriously.”

The design and implementation of green roofs can increase the amount of nature one sees from their high-rise apartment building, or place of work. The simple act of having more greenery to view in the world around us, could help creating a stronger sense of safety, lower mental fatigue (which enables the ability to better handle the release of stress that results in aggression and irritability), and give children who might be at risk, more abilities to concentrate and do better in school. The more opportunities we have to employ green space, the healthier our communities and psychological welfare will be.

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