Rx Vitamin G: What dose of GREEN do we actually need?

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" states the World Health Organization (1946). However, the current focus in this important area seems to be on reducing diseases, while less attention is paid on aspects how to improve the health and wellbeing of populations. More and more emphasis is being laid on the importance of physical activity and active living concepts. But, on the other hand, there is mounting evidence that mental ill-health has become a substantial health problem for many cohorts of people. Growing body of research recognizes that the built environment (including the physical structures and infrastructure of communities) and the natural environment (including parks, greenways, lakes, etc.) play a significant role in shaping our health (Frank et al., 2003; Wheeler, 2004).

The pressures of modern living in cities are precursors to increasing number of problems that we face today including chronic illness, social stress, and larger social disparity. Urban stressors in general tend to affect the mental well-being of the residents. Urban parks act as green stepping stones in the urban fabric and to some extent fill in the need for people's everyday contact with nature. Consequently, urban parks are becoming increasingly important as previous studies reveal that exposure and access to green spaces can have a wide range of social, economic, environmental and health benefits (Kawachi & Berkman, 2001; Maas et al., 2006). Exposure to nature can contribute towards prevention of diseases and foster faster recovery from ailment (Ulrich 1984), as well as relief from stress and depression (van den Berg, et al. 2010; Ward et al., 2012). Urban parks with designed landscape elements have been shown to aid physiological stress reduction (Hartig, et al., 1991; Ulrich et al., 1991).

Being in contact with nature has thus been associated with stress relief and recovery from the hassles of everyday life and the fact that the natural environment is a key determinant of health is incontestable. However, what remains unknown from the literature is the ideal amount of green exposure and the physical design characteristics of these natural restorative environments that are associated with stress recovery. Lack of this knowledge prevents landscape architects and urban planners from making evidence-based design and management decisions that might improve the health and longevity of people in the communities they serve.

The main purpose of my study is to broaden the understanding of the design characteristics of urban parks (green spaces in people's everyday urban life) that are associated with stress reduction caused by daily urban life stressors. This study tries to fill in the critical gap in our knowledge regarding the dose-response for the effect green exposure on stress reduction.

While the urban parks consist of different landscape elements including vegetation, water features, landform, skyline and built elements, my study will focus on the amount of vegetation and green exposure. What is the ideal amount of trees and other forms of vegetation to bring in calming and effects from acute stress? Do higher densities of vegetation produce more relaxing and calming effects? Is the stress recovery directly proportional to the amount of green exposure and the two have a linear
relationship or the stress recovery reduces with greater and greater amounts of vegetation? My study begins to address some of these questions using an urban park setting in multi-method approach for investigation.

For this study, stress-relieving effects of urban parks have been hypothesized and will be tested in a laboratory setting. Participants will be engaged in Tier Social Stress Test (TSST) that has been designed to induce mental/psychological stress. They will then be randomly assigned to one of the four groups to experience an immersive virtual reality environment using a head mounted device. This device will use an image of a park with different amounts of green/tree coverage. Salivary cortisol levels (stress hormone) will be measured before and after the intervention as a biomarker for stress levels in the participants. It is hypothesized that the decrease in cortisol levels will be significantly stronger for one of the intervention groups.

These findings can provide evidence about the amount of green exposure that promotes relief from acute stress. Stress is a one of world’s most serious public health issues and like most public health issues, the best way of dealing with this kind of issue is to prevent it. Creating healthy living environments with the ideal amount vegetation can be an effective way to aid stress reduction, which in turn might help reduce chronic stress and the many diseases that accompany it, such as cardiovascular disease, stroke, cancer, depression, and asthma.

The results of this study can be useful for landscape designers and urban planners to create places that are not only supportive of physical activity but can also promote well-being of urban residents.