

# A DOSE OF URBAN FOREST

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## Significance

The demands and pressures of modern life are precursors to two of the most deadly medical problems we face today, cardiac disease and stroke. Long-term responses to stressful events put individuals at higher risk for these serious conditions. Fortunately, there is mounting evidence that exposure to urban forests enhances the resources that allow people to more effectively manage their stresses.

In these studies, we found that people not only prefer urban forests with greater tree cover density, but more importantly that they recover faster from stressful events as tree cover density increases.

When it comes to urban forests and recovery from stress, every tree matters.

These findings, however, differed by gender. For women, there was a strong effect of tree density on psychological stress. For men the impact was seen in psychological, physiological, and hormonal measures of stress.

These findings are consistent with previous work showing that people living in close contact with urban forests are more likely to live longer, pay attention better, have stronger ties to their neighbors, and experience a host of other positive benefits.

You can download the scientific journal articles and other materials associated with this work at [willsull.net](http://willsull.net).

The bottom line: we should plant trees at every doorstep.



## How much urban forest?

Does adding more and more trees to an urban forest yield a reliable increase in human health and wellbeing? Or is there a point at which adding additional trees will have minimal effect, no effect, or even a negative effect? Do people prefer more trees over fewer trees in an urban forest? Are more trees associated with more calming and less stress? Are these effects linear, or do they lessen with greater and greater densities of trees?

With support from the US Forest Service we conducted a series of studies to address these questions.

### *Preference study*

We first sought to understand how the density of the urban forest impacts preference or urban landscapes. We took pictures of 121 community streets in four Midwestern urban areas in the U.S. and produced a panoramic photograph of each site. We then measured the density of the tree cover along each street. Then, 320 individuals provided preference ratings for a randomized subset of the photographs (15 pictures per person).



Figure 1. A neighborhood street with a relatively high density of trees. In this study, tree density varied from a low of 2% to a high of 62%.

Does the density of the urban forest predict preference for the urban landscape? Yes, as can be seen in Figure 2, when sites are relatively barren, a slight increase in tree density yields a steep increase in preference. After the density exceeds about 10%, higher densities yield smaller, but still positive increases in preference. Planting trees in barren residential areas will result in considerably more impact than if the same trees were planted in already green areas. Still, the finding demonstrate that, for preference, every tree matters.

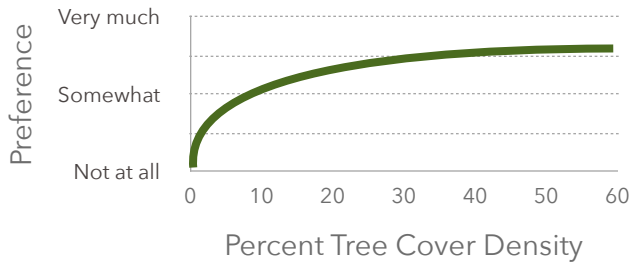


Figure 2. Results of the Preference study showing the relationship between urban forest tree density and the preference for those landscapes.



Figure 3. Examples of two street scenes from the 3-D videos. The top image has 2% tree canopy cover, the bottom

After the stressful experience, participants were randomly assigned to view one of ten, six-minute 3-D videos of neighborhood streets. The density of tree cover within each video was consistent (e.g., all images in one video showed scenes of either 2, 4, 6, 9, 15, 24, 36, 44, 54, or 62% canopy cover). Before and after they watched the video, we measured participant’s stress reactions by assessing salivary cortisol, skin conductance, and their psychological sense of stress.

Does the density of the urban forest impact people’s recovery from a stressful experience? Yes, as can be seen in Figure 4, there is a positive, linear effect of tree canopy cover on a person’s stress reduction. The greater the density of the canopy cover, the greater the recovery from the stressful experience (Jiang, 2013).

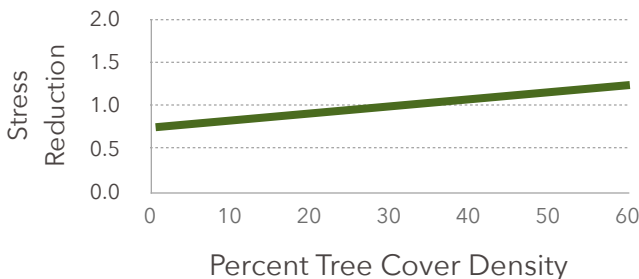


Figure 4. Summary results of the Stress study showing greater urban forest tree density results in greater recovery from a stressful event (Jiang, 2013, Chapter 6).

### Stress Studies

We next sought to understand the extent to which exposure to more dense urban forests might lead to faster recovery from a stressful event. We recruited 160 adults for a laboratory experiment in which participants engaged in a stressful experience. First, they made a five-minute impromptu speech as part of a mock job interview in front of two interviewers and a video camera. Second, they solved a series of subtraction problems—for five full minutes—without the aid of paper and pencil or any type of computing device. Not surprisingly, this experience proved stressful.

### Products

We have produced a variety of products to help people understand this work and its implications. These products include: scientific journal articles, a Ph.D. dissertation, video lectures in which we explain the findings, PowerPoint slides that are available to download, and abstracts from conference presentations. Visit [willsull.net](http://willsull.net) for more detailed information and to download these products. You can contact William Sullivan at [wcsulliv@Illinois.edu](mailto:wcsulliv@Illinois.edu) and Bin Jiang at [jiangbin@hku.hk](mailto:jiangbin@hku.hk).

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