A Dose-Response Curve Describing the Relationship Between Urban Tree Cover Density and Self-Reported Stress Recovery

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.

Abstract

Although it is well established that viewing nature can help individuals recover from a stressful experience, the dose-response curve describing the relationship between tree cover density and stress recovery is totally unclear. A total of 160 participants engaged in a standard Trier Social Stress Test to induce stress. Participants were then randomly assigned to watch 1 of 10 three-dimensional videos of street scenes that varied in the density of tree cover (from 2% to 62%). Participants completed a Visual Analog Scale questionnaire at three points in the experiment. Analysis revealed a positive, linear association between the density of urban street trees and self-reported stress recovery, adjusted R^2 = .05, $F(1, 149)$ = 8.53, $p < .01$. This relationship holds after controlling for gender, age, and baseline stress levels. A content analysis of participants' written narratives revealed a similar but even stronger association. These findings suggest that viewing tree canopy in communities can significantly aid stress recovery and that every tree matters.

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Figure 1. Panoramic photographs of two 3-D videos with a low (top, 2%) and a high (bottom, 61%) eye-level tree cover density. *Jiang et al. http://eab.sagepub.com/*

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dose-response curve, tree cover density, stress recovery, Visual Analog Scale, 3-D visual media

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