



The Benefits of Time Outdoors

The Sierra Club and the Greater Good Science Center at UC-Berkeley are proposing a three-year, longitudinal study. This cutting edge, \$2.8 million research will document the benefits of the outdoors to support positive physical and mental health changes specific to youth from typically economically disadvantaged backgrounds and largely non-white neighborhoods. Preliminary research is underway this summer, and the full project will begin in 2015 with 75 youth and 75 veterans each year being exposed to the outdoors. Using state-of-the-art laboratory, field based, and mobile phone supported data gathering we will show that outdoor experiences improve physical and mental health.

Data will be gathered through laboratory visits prior to and following outdoor experiences, daily diaries and in vivo reporting throughout the programming and technology for expanded participants nationwide. Some of the physical data gathered will include non-invasive measures like genotyping, neuroendocrinology, autonomic physiology (as heart rate, respiration rate, and electrodermal activity). These will show specifically how exposure and immersion in nature over time positively impacts:

- Reduced inflammatory cytokine activity (it is increasingly clear that chronically elevated activity in the cytokine system is related to depression, anxiety, and poor physical health)
- Cortisol levels
- Vagal tone
- Pain
- Sleep

The initial pilot phase of the research will start this summer. All research, along with physical health measures to include obesity prevention and weight loss will highlight three classes of beneficial effects:

- Social benefits and social connections. Nature creates experiences of awe, which leads people to feel more empathetically and pro-socially inclined towards others.
- Cognitive benefits / cognitive perspective. Time in nature is being found to lead people to feel a sense of perspective and distance to stressful experiences, which lowers stress reactivity and anxiety.
- Purpose and self-efficacy. Brief experiences of nature seem to recalibrate people, to remind them of their deeper purposes in their lives.

Taken together, we believe that these findings will suggest time in nature, leading often to a sense of awe and inspiration will have direct and long term effects upon physical health. This research should then be able to be used as a significant tool to support policy decisions and funding around outdoor recreation, recess, urban design changes to support easy access to and useable green space as well as programmatic and policy shifts around health support for youth, veterans, and all Americans.