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## Effectiveness and feasibility of a 10-minute employee stress intervention: Outdoor Booster Break

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### ABSTRACT

There is a growing recognition that workplace environments affect employee health. Nature contact exposures in the workplace have been shown to be healthful for employees. This pilot study was designed to test the feasibility and efficacy of a daily outdoor work break (Outdoor Booster Break) compared to a daily indoor break. A census of university office staff was invited to participate ( $N=244$ ). Phase 1 focused on feasibility—participants ( $n=119$ ) reported that the Outdoor Booster Break was feasible (74%), practical (80%), and worthwhile (83%). During Phase II we used a single-site randomized controlled trial (RCT) to examine the effects of an Outdoor Booster Break—compared with a control indoor work break group—for 4 weeks on employee stress. Perceived stress was measured at pretest and posttest for both conditions. Mean posttest stress scores were lower for both the control group ( $n=19$ ) and the treatment group ( $n=18$ ). A main effects ANCOVA model controlling for baseline stress revealed posttest stress was lower for the treatment group compared to controls ( $p=.041$ ). Taking a work break appears to have stress-reducing benefits, but the Outdoor Booster Break reduced stress significantly more than an indoor break. Implications for employers, worksite health promoters, and future research are discussed.

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## Introduction

Worksite Health Promotion Programs (WHPP) provide many benefits for employers and employees. Employers that offer their employees WHPP benefit from improved employee health and morale (Goetzel & Ozminkowski, 2008; Henke, Goetzel, McHugh, & Issac, 2011). In addition, WHPP make good fiscal sense for employers. WHPP have been shown to improve employee presenteesim, which is a measure of employee productivity (Cancelliere, Cassidy, Ammendolia, & Cote, 2011). Providing meaningful opportunities for employees to improve health also improves health and thus reduces employees' medical expenditures (Henke et al., 2011). For example,

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Johnson & Johnson companies, an early adopter in worksite health promotion over 30 years ago, has been the focus of recent study. Henke et al. (2011) found that Johnson & Johnson companies “average annual per employee savings were \$565 in 2009, producing a return on investment equal to a range of \$1.88–\$3.92 saved for every dollar spent on the program” (p. 490). In addition, researchers of a recent large-scale study across many companies and among over 200,000 employees found that employees’ modifiable health risks—risks that could be altered with changes in employee lifestyle or the work environment—accounted for more than one fourth of health care costs (O’Donnell, Schultz, & Yen, 2015).

Employee stress is an example of a modifiable risk that is an important predictor of employee health (Ganster & Rosen, 2013). Chronic work stress results in physical, mental, and behavioral health risks for employees. Employees who are chronically stressed are at increased risk of many ailments such as cardiovascular disease, metabolic syndrome and obesity, depression and anxiety, decreased immune system function, and decreased mental function related to memory and learning (Backe et al., 2011; Chandola, Brunner, & Marmot, 2006; Ganster & Rosen, 2013; Heraclides, Chandola, Witte, & Brunner, 2012; Kivimaki et al., 2006; Zeller & Levin, 2013). Thus it is no surprise that employees experiencing high stress experience greater reductions in workplace productivity, increase in turnover, and increase in medical expenditure (Wolever et al., 2012; Zeller & Levin, 2013). In fact, employees with high stress have been estimated to have significantly higher (45%–46%) medical expenditures compared to employees with lower stress (Goetzel et al., 1998; Mino, Babazono, Tsuda, & Yasuda, 2006).

## **Background**

### ***Workplace environments***

Worksite health promoters have long understood that workplace environmental design affects employee stress and health. It is now widely believed that environmental modifications of the workplace are central to meaningful health promotion efforts (Engbers, van Poppel, Paw, & van Mechelen, 2005). Workplace environments with nutrient-deficient food choices (“junk food”), inaccessible or unused stairways (exclusive elevator use), and insufficient employee break areas negatively affect employees. In addition, workplace environments typified by environmental stressors such as noise, crowding, and stress-invoking design features have been shown to increase employee stress and reduce well-being (Evenson, Raanaas, Hagerhall, Johansson, & Patil, 2015; Huang, Robertson, & Chang, 2004). Worksite health promoters work to reduce these workplace environmental stressors to foster health among employees.

## ***Benefits of nature: A theoretical framework***

The theoretical framework to understand nature contact and health at work and other settings has been explored across disciplines. The question, “how does nature contact improve health?” has been a focus of study in the biological, psychological, and public health sciences. The biophilia hypothesis was based on biological and evolutionary findings and asserts that nature contact exposures are calming for people today because of the linkage to survival in the past (Wilson, 1984). The attentional restoration theory (ART) builds off of the biological framework and incorporates findings from studies of the brain and stress response after exposure to natural elements (Kaplan, 1995). The theory contends that one’s environmental context is an important factor in the perception of stress and thus stress-related health outcomes. Specifically, the environmental ART asserts that exposure to nature contact (1) enhances or restores cognitive resources, such as attention and problem solving, to alter the perceived demand-resource balance in favor of coping and health and or (2) stimulates underutilized areas of the brain, which shifts and balances the concentrated stimulation (Kaplan, 1995; Ulrich et al., 1991).

## ***Nature contact at work and other settings***

Nature contact is one important design feature or exposure that has been shown to reduce stress and improve physical health in many populations and settings (Elzeyadi, 2011; Frumkin, 2001; Largo-Wight, 2011; Shanahan et al., 2015). In the workplace, nature contact has been explored in cross sectional studies and associated with employee job satisfaction, well-being, self-reported health, reduced stress, and reduced absenteeism (Gilchrist, Brown, & Montarzano, 2015; Kaplan, 1993, 2007; Largo-Wight, Chen, Dodd, & Weiler, 2011; Lottrup, Grahn, & Stigsdotter, 2013; Mendell et al., 2002). Outdoor exposure appears to be especially important for indoor office staff or desk-bound employees (Gilchrist et al., 2015; Largo-Wight et al., 2011; Lottrup et al., 2013), which represent approximately 70% of the nonindustrial, nonagricultural American workforce (Mendell et al., 2002). In one study among 501 office staff, workplace nature contact exposures such as indoor plants in the office, view from the office window, and outdoor work breaks were examined and compared. The findings suggest that each of the nature contact exposures at work examined were associated with less self-reported perceived stress and less health complaints, but brief outdoor work breaks and outdoor lunch breaks had the strongest inverse correlation to stress and health complaints (Largo-Wight et al., 2011). These correlational findings suggest that brief outdoor breaks may be a valuable environmental intervention or practice for employees.

This study was designed to test the feasibility and efficacy of a daily environmental intervention at work: the Outdoor Booster Break. A Booster

Break is a purposeful, regular work break “intended to improve physical and psychological health, enhance job satisfaction, and sustain or increase work productivity” (Taylor et al., 2013, p. 415). Booster Breaks have been highlighted as a practical, efficient opportunity for brief worksite health promotion (WHP) incorporated into the workday (Taylor, 2005, 2011). Past findings on indoor Booster Breaks have had mixed results on impacting employee stress (Taylor, Horan, Pinion, & Liehr, 2014; Taylor et al., 2013, 2010, 2016). This study’s Outdoor Booster Break is supported by nature contact past findings, and researchers have suggested the need for this type of environmental intervention study (Hartig, 2006). The setting (outdoors) and the act of sensing or noticing the natural elements in the environment (nature contact) were the defining aspect of the nature contact Booster Break in this study.

Recent findings suggest that “microbreaks” or very brief Booster Breaks of nature contact or outdoor exposure have promoted stress reduction among healthy populations (Bratman, Daily, Levy, & Gross, 2015; Hartig, 2006). In a recent study, Largo-Wight, O’Hara, and Chen (2016) randomized undergraduate students into three listening conditions—recorded nature sounds, classical music, and silence—and found that the nature sound group were the only participants to show a significant reduction in muscle tension, pulse, and self-reported stress and the physiological stress reduction happened as early as 7 minutes into the listening intervention. In another study, Lee, Williams, Sargent, Williams, and Johnson (2015) randomized undergraduate students into two viewing conditions and found that a brief (40-second) view of green rooftops resulted in greater ability to complete work tasks compared to participants randomized to briefly view concrete rooftops. These findings suggest that even brief exposure of nature contact appear to boost cognitive restoration and coping.

The purpose of this study was to explore the feasibility and efficacy of a brief work break outside (Outdoor Booster Break) among office employees. Specifically, we sought to understand the feasibility of brief outdoor work breaks during the regular workday for office staff. We also examined and compared the health impact among office employees that took a daily work break outdoors versus those that took a daily work break indoors over 4 weeks. This study was the first known health-promoting nature contact intervention study among employees at work.

## Method

There were two phases of this pilot study. The first phase was focused on the feasibility of outdoor work break. The second phase was focused on the effectiveness of an outdoor work break versus an indoor work break. A census of university office staff in the southeast in springtime was invited to participate ( $N = 244$ ) in both phases of the study. All data were collected via web-based survey.

### ***Phase I: Feasibility of Outdoor Booster Break***

The first phase of the study assessed perceived feasibility of the Outdoor Booster Break and was designed to inform the efficacy study (Phase II). An online survey focused on work break behavior and feasibility of the proposed intervention was sent to the census of office staff. Office staff reported the average frequency of taking work breaks and barriers for not taking work breaks. Participants also read the Outdoor Booster Break protocol and then responded to feasibility items in an online survey. The Outdoor Booster Break protocol was the following:

Take at least one 10-minute work break **outdoors** every workday this week. During your work break, sit outside and focus all of your attention on the natural elements that surround you such as the clouds, sky, temperature, sounds, birds, squirrels, trees, grass, vegetation, water or fountain, etc. Do not do anything else. Please do not talk on the phone, text, read, walk, etc. Instead, take notice of the natural elements around for your work break.

### ***Phase II: Efficacy of Outdoor Booster Break***

The second phase of the study examined the efficacy of the Outdoor Booster Breaks among employees. We used a single-site, prospective RCT to examine the effects of an Outdoor Booster Break—compared with a control standard work break group—on self-reported generalized stress. Participants were randomized into either control or treatment condition lasting 4 weeks. Both conditions involved taking one 10- to 15-minute work break daily. The participants took their assigned work break at their convenience and individually (i.e., solo break). The control group took a daily indoor standard work break. The control group was instructed to take a daily 10- to 15-minute work break any place indoors. The participants self-selected where indoors they would take a break and what they would do during their break. The control group participated in one standard, unconstrained work break indoors each day. The control group protocol was, “Take at least one 10-minute work break **indoors** every workday this week. During your work break, do whatever you would like that is not work-related.”

The treatment group took one daily outdoor work break each day. The treatment group was instructed to take a daily 10- to 15-minute work break any place outdoors while focusing on natural elements. The treatment group protocol was:

Take at least one 10-minute work break **outdoors** every workday this week. During your work break, sit outside and focus all of your attention on the natural elements that surround you such as the clouds, sky, temperature, sounds, birds, squirrels, trees, grass, vegetation, water or fountain, etc. Do not do anything else. Please do not talk on the phone, text, read, walk, etc. Instead, take notice of the natural elements around for your work break.

All participants took a work break and had the opportunity for rest, a break from work, and reflection. Only the treatment group had the opportunity for nature contact. Tailored weekly e-mails were sent to the participants on Monday mornings reminding them to participate in their condition everyday in the upcoming week. Adherence to the assigned daily break, sociodemographic variables, and perceived stress were measured online in both conditions.

Perceived stress was measured two times—at pretest and posttest—for both conditions with a self-report perceived stress instrument. The Perceived Stress Questionnaire (PSQ) (Levenstein et al., 1993) is a 30-item survey with items such as “you have too many things to do,” “you feel lonely or isolated,” and “you find yourself in situations of conflict.” Participants indicated how often the items applied to them in the preceding month based on a 4-point Likert-type scale ranging from *almost never* to *usually*. One of the PSQ’s main strengths is that it provides a reliable and stable over-time measure of self-reported perceived stress. The instrument’s test-retest reliability was  $\alpha = .82$  and the internal reliability was  $\alpha = .92$ . The authors measured PSQ’s construct validity by assessing the correlations between the PSQ and other established perceived stress questionnaires such as Cohen’s Perceived Stress Scale ( $r = .73$ ,  $p < .05$ ) (Levenstein et al., 1993). Adherence to the daily break and sociodemographic variables were also measured in both conditions at posttest.

## Results

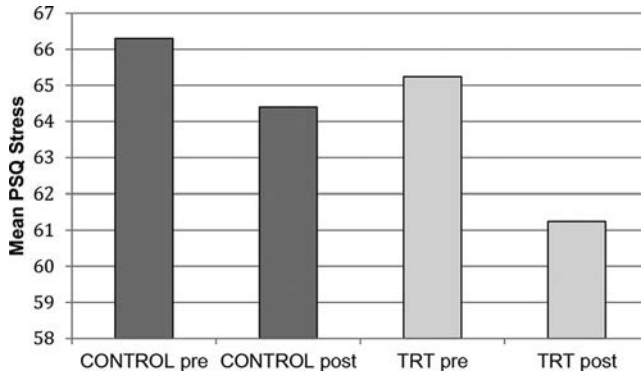
### ***Phase I: Feasibility of Outdoor Booster Break***

For the first phase of the study, the response rate was 60% ( $n = 119$ ). Participants were almost entirely women ( $n = 117$ ) and 78.2% White non-Hispanic with the average age of 48.3. The majority of office staff reported they took at least one work break daily and more than 80% reported feeling better after work breaks. The most common reasons for not taking a work break included losing track of time (40%), too much to do (32%), and not wanting to take a break (22%).

Participants reported that the Outdoor Booster Break sounded feasible (74%), practical (80%), and worthwhile (83%). There were no major perceived barriers for taking a break outdoors reported; there was little concern about expected outdoor barriers such as the weather (3%) and no place to sit outside (6%).

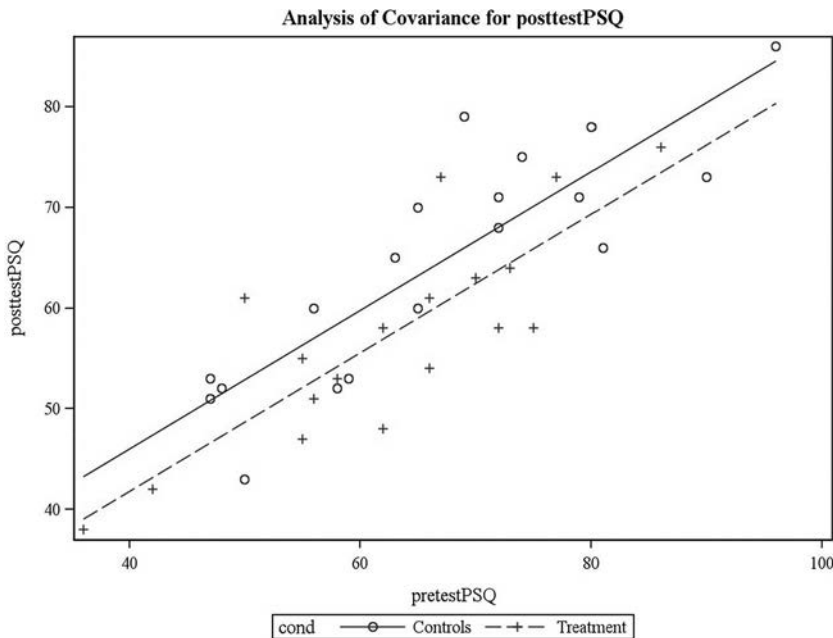
### ***Phase II: Efficacy of Outdoor Booster Break***

Thirty-seven office staff participated in the efficacy phase of the month-long pilot study. The majority of the participants were women (91.8%) with the



**Figure 1.** Pre- and postmean stress in treatment (Outdoor Booster Break) and control (indoor work break) groups.

average age of 48.8. Participants reported the following: 68% White non-Hispanic, 13% Black or African American, 8% Hispanic, 6% Asian, 2% Native American, and 3% other. There were no statistically significant differences in demographics or baseline stress between the participants randomized into the control ( $n = 19$ ) and treatment ( $n = 18$ ) groups. Observed average posttest stress scores were lower for both the control group ( $p = .173$ ) and the treatment group ( $p = 0.0065$ ; 95% confidence interval [CI]: [1.69, 8.88]). See Figure 1.



**Figure 2.** Pre- and poststress for participants in treatment (Outdoor Booster Break) and control (indoor work break) groups.



A main effects ANCOVA model controlling for baseline stress revealed posttest stress was 4.22 points lower (95% CI: [0.17, 8.28]) for the treatment group compared to controls ( $p = 0.041$ ) [Figure 2](#). The interaction and additional covariates (age, sex, education, income) were not significant. There was no significant difference in compliance between the groups ( $p = .133$  with Fisher's exact test). Participants reported very high compliance to the conditions; 88% did not miss any assigned work breaks and the remaining participants missed 1 to 2 days of the work breaks.

## Discussion

Phase I findings revealed that most of the office staff in this study reported they regularly took work breaks. As expected ([Hartig, 2006](#)), the outdoor work break protocol was perceived as worthwhile, practical, and feasible. There were very low reports of concerns about weather and other barriers of outdoor work breaks.

Phase II findings of this study indicated that taking a work break in general resulted in a reduction of stress among the employees. All employees benefited from a reduction of generalized stress after 4 weeks of daily work breaks. But, as expected, the participants randomized into the Outdoor Booster Breaks resulted in significantly greater reduction in stress over the 4-week study than the participants who took a standard indoor work break. These findings are consistent with other published findings on the benefit of nature contact exposures at work ([Gilchrist et al., 2015](#); [Kaplan, 1993, 2007](#); [Largo-Wight et al., 2011](#); [Lottrup et al., 2013](#); [Mendell et al., 2002](#)). Facilitating and promoting outdoor work breaks appear to reduce stress and may promote health and productivity among employees.

The findings of this study are especially important because environmental interventions such as brief nature contact exposures with the Outdoor Booster Break are simple and practical solutions in the workplace. Environmental interventions like a brief Outdoor Booster Break circumvent traditional WHPP barriers such as low attendance and loss of work time ([Goetzel & Ozminkowski, 2008](#)). In addition, a 10-minute work break outdoors requires less effort and commitment on the part of the employee and promoter than other stress interventions rooted in cognitive-behavioral approaches such as positive reappraisal training or mindfulness workshops ([Glanz & Schwartz, 2008](#); [Osilla et al., 2012](#)).

## Limitations and future research

This study had limitations. First, the sample size and group sizes were small. This was the first known pilot study of its kind to explore the impact of a nature contact intervention in the workplace on employee stress and findings

should be considered preliminary. Future researchers should replicate this study on a larger scale to explore the impact of Outdoor Booster Breaks with more employees across several companies and industries.

Another limitation of this study is the generalizability of the findings to male workers. Future researchers should assess the impact of Outdoor Booster Breaks with greater male representation. Also perceived stress was the only outcome measured. Future researchers should study the Outdoor Booster Break and explore the impact of other outcomes such as physiological stress, productivity, absenteeism, and work satisfaction.

In addition, this study's intervention was self-administered; employees were randomized into conditions and reminded weekly to follow the protocol. Although this increases feasibility and practicality of the study, this could pose issues related adherence to the intervention. In this study, we measured compliance to the assigned intervention and found no differences between groups, but future researchers may consider additional measures of compliance and adherence.

Last, this study was conducted in the spring months in the Southeast United States. The weather during the study was mostly bright and sunny with temperatures that ranged from the low 70s to mid 80s. The weather was conducive to an Outdoor Booster Breaks. The generalizability of this study's findings to areas of the country or world that have more severe weather or temperatures present a possible limitation. Future researchers should assess the impact of the Outdoor Booster Breaks in other climates and regions. We expect the use of Outdoor Booster Breaks to be seasonal, whereas in other areas it may be year-round.

## Conclusions

This study is based on the assumption that employees benefit from healthy workplaces. Workplaces that are free of environmental stressors such as crowding, clutter, and noise (e.g., Evenson et al., 2015) and those that facilitate the opportunity for nature contact through design and health promotion likely enhance the health of its employees.

This study points to several implications for employers and worksite health promoters. First, environmental stress interventions such as Outdoor Booster Breaks are relatively simple to implement. Creating healthy workplaces is a health promotion effort that may be more practical and feasible than many other labor-intensive health promotion efforts. Creating a healthful work environment—with the purposeful use of nature contact—is a simple and practical step to improve employee health and productivity. Environmental improvements require little, if any, commitment and effort from the employee. In a way, improving the workplace environment to foster health among employees is one way to “set the employees up for success.”

Companies and worksite health promoters should consider facilitating outdoor work breaks by improving the environment through outdoor employee break infrastructure and through workplace policies or culture. Ideally, outdoor employee break infrastructure should be comfortable. Health promoters should focus consideration on comfortable seating, shade, and temperature (Largo-Wight et al., 2011). In addition, outdoor employee break infrastructure should stimulate employee interest. The view from the bench, for example, should be considered and may be cultivated to include gardens, trees, or water features to foster greater restoration (e.g., Kaplan, 2007; Largo-Wight et al., 2011). Finally, company policies and culture may encourage employees to take brief, daily Booster Breaks for health and include employee wellness education on the importance of stress reduction for overall health, productivity, and success.

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