
Booster Breaks in the workplace: participants' perspectives on health-promoting work breaks

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Abstract

Increasing sedentary work has been associated with greater cardiovascular and metabolic risk, as well as premature mortality. Interrupting the sedentary workday with health-promoting work breaks can counter these negative health effects. To examine the potential sustainability of work-break programs, we assessed the acceptance of these breaks among participants in a Booster Break program. We analyzed qualitative responses from 35 participants across five worksites where one 15-min physical activity break was taken each workday. Two worksites completed a 1-year intervention and three worksites completed a 6-month intervention. Responses to two open-ended questions about the acceptance and feasibility of Booster Breaks were obtained from a survey administered after the intervention. Three themes for benefits and two themes for barriers were identified. The benefit themes were (i) reduced stress and promoted enjoyment, (ii) increased health awareness and facilitated behavior change, and (iii) enhanced workplace

social interaction. The barrier themes were the need for (iv) greater variety in Booster Break routines and (v) greater management support. This study provides empirical support for the acceptance and feasibility of Booster Breaks during the workday. Emphasizing the benefits and minimizing the barriers are strategies that can be used to implement Booster Breaks in other workplaces.

Introduction

Sedentary behavior has increased over the past 5 decades [1]. Adults in the United States and Australia spend ~56% of their time in sedentary behavior [2, 3]; this prevalence is disturbing because sedentary behavior is hazardous to one's health. Recent reviews of empirical studies [4–7] provide clear and compelling evidence that prolonged sitting has adverse health consequences. For example, in a study of 17 013 adults, a dose–response association was found between sitting time and cardiovascular disease mortality, independent of leisure-time

physical activity [8]. In another study, there was a progressive rise in mortality risk for each 1-hour increment in television viewing, irrespective of leisure-time physical activity levels and adiposity status [9]. The physiologic effects of prolonged sitting time include the inactivation of lipoprotein lipase and deleterious effects on lipid metabolism [6]. Interrupting periods of prolonged sitting reduces metabolic risk [10]. The optimal frequency, duration, and intensity of movement needed to reduce the metabolic risk related to prolonged sitting are being investigated; however, it is clear that any type of movement used to interrupt prolonged sitting is better than no movement [7, 10].

The Booster Break is an example of a health-promoting work break inspired by the *Lift Off!* and Instant Recess[®] Model [11–13]. The Booster Break program is designed to interrupt prolonged sitting at the workplace. Booster Breaks are defined as ‘organized, routine work breaks intended to improve physical and psychological health, enhance job satisfaction, and sustain or increase work productivity’ [14–17]. Workers perform Booster Breaks wearing common work attire during work breaks. Typical Booster Break practices include physical activity, meditation, and rhythmic breathing.

The physical activity Booster Break involves following an established protocol of physical movements. A feasibility study showed that one daily 15-min physical activity Booster Break significantly improved participants’ high-density lipoprotein levels [17], thereby mitigating at least one unfavorable consequence of prolonged sitting.

Previous studies have focused primarily on quantitative analyses to understand the components of effective workplace health promotion interventions [18–21]. Few studies have assessed participants’ perspectives, which are essential to informing employers’ decisions about implementing or continuing a Booster Break program. The purpose of this study was to examine participants’ acceptance of and satisfaction with physical activity Booster Breaks implemented in traditional work environments and to identify benefits and barriers.

Methods

Study design

The theoretical framework underpinning this study was content analysis (i.e. systematically organizing data in a structured format) [22]. We used this approach to perform a program evaluation of the Booster Break intervention. Program evaluation is the systematic collection of data about the activities and characteristics of programs to make judgments about the program, improve program effectiveness, and inform decisions about future programs. Qualitative methods are often used in evaluations to tell the program’s story by capturing and communicating the participants’ stories [23]. Consistent with standard practice, we used the Consolidated Criteria for Reporting Qualitative Studies guidelines, a formal checklist (consisting of 32 criteria) developed to improve the quality of reporting of qualitative research [22].

Dissemination and implementation research (or knowledge translation) identifies factors that influence dissemination and implementation processes. Such findings constitute Type 3 evidence, which is needed for the effective adaptation and implementation of interventions. For example, data regarding how the intervention was received and how the intervention should be implemented are considered Type 3 evidence. This evidence derives from the context of the intervention and is the least commonly reported type of evidence. This study was designed to produce Type 3 evidence [24].

Participant selection and recruitment

The eligibility criteria were English proficiency, full-time employment (35–40 hours/week), age 18–70 years, and no medical condition because of which a physician had prohibited physical activity. All participants resided in a large, urban southwestern city of the United States and worked at one of five worksites: a law firm, a hospital, an education agency, a city health department, and a court reporting, video, and records organization (Table I). The five worksites represented a variety of sizes: one small (<50 employees), two medium (51–200

Table I. Total Booster Break participants and number and percentage of survey respondents by site

Site	Industry	Participants, <i>n</i>	Survey respondents		
			6 months, <i>n</i>	1 year, <i>n</i>	Total percentage
1	Court reporting and video	7	7 ^a	7	100
2	City health department	29	2 ^a	9	31
3	Major hospital	5	1	N/A	20
4	Department of education	31	11	N/A	35
5	Major law firm	10	7	N/A	70
	Total	82	19 ^b	16	43

^aThese individuals responded at both 6 months and 1 year. ^bFor Sites 1 and 2, the total number of respondents at 6 months was not included in the 6-month total to preclude double counting of respondents when calculating the overall percent of participation (final column of table).

employees), and two large (>200 employees). All participants' jobs required sitting for at least 5 hours per day. The positions included legal and medical transcriptionists, paralegals, clerical positions, laboratory scientists, educational consultants/specialists, health scientists, and telephone receptionists.

The Booster Break session was offered as an alternative to an individual's existing work break or to no work break. The research was approved by the appropriate institutional review committees and the Committee for the Protection of Human Subjects at The University of Texas Health Science Center.

At each of the five worksites, management designated departments that could participate in the Booster Break study. The principal investigator and research coordinator arranged a face-to-face recruitment presentation at each worksite. All employees who attended the presentation received a free lunch. After the principal investigator gave the presentation, the research coordinator distributed consent forms to all attendees. Of the 93 attendees at the five worksites, 82 (88%) signed the consent forms. The tangible incentives to participate were \$25 for completing all assessments and free health screening assessments (i.e. blood pressure and fasting levels of glucose, cholesterol, and triglycerides) conducted at the worksite during the workday. Personalized feedback from a physician was mailed to each participant's home. Although the research team could not document precisely what proportion of potential participants attended each

presentation, the manager at each site indicated to the research team that the luncheon attendees represented 100% (two sites) or the majority (three sites) of eligible participants.

Booster Break protocol

The Booster Break program was implemented according to standard protocols [17] at five worksites of various sizes and types, as part of a cluster randomized controlled trial of the program. The objectives of the program were to increase physical activity and interrupt prolonged sitting during the workday, and thus improve health. At each worksite, two to five employees were trained and certified as Booster Break worksite facilitators by a master Booster Break professional trainer. The certification workshop lasted 10–12 hours and included assigned readings, lectures, demonstrations, and practice sessions. To be certified as a facilitator, each person had to pass a written exam and practical test.

These facilitators attempted to motivate coworkers in their departments and modeled the sequence of movements during each Booster Break session; sessions were conducted in any large, open space at the worksite (e.g. conference room and lunchroom). Each group had 5–15 participants. The Booster Break physical activity protocol has four phases: warm-up (aerobic movements) (1–2 min), aerobic/toning/strengthening/stretching movements (10–12 min), cool down (flexibility movements) (1–2 min), and relaxation/visualization (15–30 s).

No equipment was required. Music was optional; Booster Break facilitators and participants made this decision collaboratively.

The movement routine is designed to be safe and suitable for a variety of fitness levels. Because many participants were previously sedentary, the Booster Break routine was considered an aerobic activity for many employees. For more fit participants, the Booster Break session was a physical activity of light to mild intensity. Booster Break sessions were held once each workday during one 15-min break and were held at the worksite the same time each workday; the choice of time was made by each participating site.

Implementation

Two sites provided two daily Booster Break sessions, one in the morning and one in the afternoon, to accommodate different employee schedules and maximize attendance. Employees were expected to attend one session daily each workday. The weekly average for Booster Break sessions being offered was greater than 75% and ranged from 70 to 100%.

To gauge attendance, we collected the attendance sheets for 117 sessions during a 6-month period at one of the sites. The average monthly attendance for the Booster Break sessions ranged from 76 to 86% [17].

Follow-up assessments

All Booster Break participants were eligible to complete follow-up assessments after participating in the Booster Break sessions; no participants were excluded because of low attendance at Booster Break sessions. The survey questions were pilot tested for clarity and ease of understanding at one of the five sites ($n=7$). The results were used to revise the presentation and wording of a few questions to improve the participants' understanding of the purpose of the question. There were no audio or visual recordings, prompts or guides by the research staff, or field notes, and transcripts were not returned to participants for comment or correction.

The evaluation survey included the International Physical Activity Questionnaire (long version) and

scales about work-break history, work social support, quality of life, time spent sitting, correlates of physical activity, and demographic questions. The survey also included five questions related to participants' attendance at, satisfaction with, and experience of the program. In addition, there were three open-ended questions: (i) 'For the previous 6 months, please describe how the Booster Break experience has influenced your life (e.g. stress, energy, coworker relationships, physical activity, eating habits, satisfaction with life and quality of life);' (ii) 'If asked, what would you tell someone about Booster Breaks?'; and (iii) 'How can the Booster Break be improved?'

Each survey took ~10 min to complete. Only the participants and researchers were present when the survey was completed. As stated in the consent form, participants could choose not to answer any questions in the evaluation survey. Therefore, the research team did not probe, encourage, or insist that questions be answered. The participants completed the surveys in one sitting, and no further attempts were made to collect data because of the voluntary nature of the study.

At two worksites, participants completed a 1-year intervention and responded to the Booster Break evaluation surveys at 6 months (the mid-point of the intervention) and 1 year (the end of the intervention). At the other three worksites, participants completed a 6-month intervention and responded to the Booster Break evaluation survey at 6 months (the end of the intervention) (Table I). These data were collected in 2009 and 2010.

Data analysis and reporting

One data coder transcribed verbatim all handwritten responses. No software was used to analyze the data. All responses to open-ended questions were transcribed verbatim, and analysts received the content in the same written format. Two open-ended questions from the survey were selected for this study: (i) 'For the previous 6 months, please describe how the Booster Break experience has influenced your life?' (ii) 'How can the Booster Break be improved?' These two questions were the most likely to yield

information important for decision makers and to enable us to identify benefits and barriers. According to standard and accepted procedures for qualitative data analysis, open-ended responses were analyzed for consistent and coherent themes [25–27].

The research team that initially analyzed the data consisted of the research coordinator, who had previous contact with the participants, and a student and a professor/physician, who had no interaction with the participants. For consistency and reliability, these analysts received training in standard qualitative analytic procedures [25–27] from the principal investigator according to a designated protocol which included selecting significant sections from participants' statements to derive and identify themes. Previous qualitative studies co-authored by the principal investigator are cited in the reference list [28–31].

The three analysts identified the salient beliefs about participating in Booster Breaks, independently determined the recurrent themes by classifying related beliefs, and independently ranked the recurrent themes by their frequency, salience, and intensity in accordance with standard qualitative analysis procedures [25–27]. To ensure consistency and trustworthiness, the themes identified by the three analysts were submitted to a larger research team for review, analysis, and verification. This team consisted of five faculty members in behavioral sciences and medicine, only one of whom—the principal investigator who recruited participants and supervised data collection—had any interaction with the participants. All analysts read the same verbatim transcripts of the participants' responses.

Major and recurrent themes were confirmed and validated through group consensus. Participants' quotations are presented to illustrate the recurrent themes.

Results

Participant demographics

The 82 Booster Break program participants comprised 12 men and 70 women. Their racial and

ethnic composition was non-Hispanic White (29.6%), African American (35.8%), Hispanic (24.7%), Asian American (2.5%), and unknown (7.4%). The mean age was 44.2 years (range, 24–68 years).

Of the 82 participants, 35 (43%; 6 men and 29 women) voluntarily responded to the open-ended questions from the evaluation survey. Of the 35 respondents, the racial and ethnic composition was non-Hispanic White (40%), African American (31.4%), Hispanic (25.7%), and Asian American (2.9%); non-Hispanic Whites responded at a greater rate than their representation in the total sample (40% versus 30%). The mean age of the respondents was 45.2 years (range, 24–68 years). Apart from the proportion of non-Hispanic Whites, respondents and non-respondents did not differ meaningfully on demographic variables.

Themes

In the survey responses, the analysts identified three themes that expressed benefits of the Booster Break experience: (i) reduced stress and promoted enjoyment, (ii) increased health awareness and facilitated behavior change, and (iii) enhanced workplace social interactions. Two themes were identified that described barriers (areas for improvement): (iv) need for greater variety in the Booster Break routine and (v) need for greater management support.

Benefits

Reduced stress and promoted enjoyment. The dominant theme was that the Booster Break experience reduced stress and provided an enjoyable time during the day. Apart from the social nature of the Booster Break session, the actual physical movements were a basis for stress relief. Selected quotes:

Released stress and helped me clear my mind for at least a few minutes. Great experience to meet new or unfamiliar faces. Being in the Booster Break helped me on my way home due to me living far. I was able to focus better after the break with more energy and awareness. I noticed it on my driving.

(Male, non-Hispanic White, 24 years old, participant 4059)

The Booster Break experience has been fun. My stress level is reduced once I walk in the conference room. Co-worker relationships have strengthened over the past year. I am very satisfied with my life and quality of life. (Female, non-Hispanic White, 36 years old, participant 1008)

Booster Break experience was wonderful and very relaxing. It gave me a lot of energy especially those days that I was very stressed due a problem at work or home. (Female, Hispanic, 45 years old, participant 2033)

There were days when my neck and body muscles were tight. After I did the Booster Break I felt relaxed. I could definitely recommend the Booster Break to all my co-workers. (Female, Asian, 56 years old, participant 2036)

Increased health awareness and facilitated behavior change. The second dominant theme was that the Booster Break experience created greater health awareness and promoted behavior change. Thus, the Booster Break created a ripple effect for other changes beyond the workplace. Some of the changes were related to improved health awareness and more favorable attitudes about being physically active. Other changes included intentions to change behavior and actual behavior changes. Selected quotes:

The break was a catalyst in helping me change my lifestyle. The Booster Break is definitely worth the time and the benefits are great. (Male, African American, 56 years old, participant 4035)

Great way to get the blood flowing during the workday and can be a positive motivator to regular exercise. (Male, African American, 28 years old, participant 2031)

I think it has given me a goal of trying to get regular activities and exercise back into my

busy life. (Male, non-Hispanic White, 57 years old, participant 1003)

Positive influence. Made one more aware of how much I'm not exercising and how it could benefit one to exercise more. They are a good way to exercise and relieve a little stress at work. Doesn't take too much time. (Female, African American, 40 years old, participant 5018)

Enhanced workplace social interactions

The third dominant theme from the Booster Break experience was enhanced social interactions. The Booster Break experience promoted greater positive feelings in the workplace, because the sessions were perceived as enjoyable. Coworkers had an opportunity to interact with each other in a different setting, for a non-work-related purpose, and often with others with whom they previously had only limited contact during the workday. The interactions involved coworkers at different levels of the company's hierarchy. Overall, the social interactions during the Booster Break sessions were rated as very positive. Selected quotes:

Improved focus at work. Improved relationships with co-workers. Helped me to fit some physical activity into a busy day. Motivated me to start thinking about my health more. I really enjoyed them - gave me a chance to get away from the desk, de-stress, and enjoy my co-workers. We even had a lot of laughs which was good for morale! (Female, non-Hispanic White, 46 years old, participant 4086)

Co-worker relationships enhanced, health improved with regular exercise. Each workplace should make it a part of the workplace permanently. (Female, African American, 60 years old, participant 2016)

Take time every day to relax: Reflect on myself; Relieve stress; Met co-workers who have become good friends. (Male, African American, 28 years old, participant 2031)

I was helped doing the Booster Break for example: stress level was less, met new people, acquired new friendships. [Booster Break] works. Everyone needs that 15 minute break on a daily basis. (Female, African American, 53 years old, participant 2046)

I have improved my way of working. Also all the co-workers have a better relationship. It's fun and exciting. I would encourage everyone to do it. (Female, Hispanic, 62 years old, participant 4040)

Made me more conscious of my health, stretched, mental break from work. More social [with] co-workers. Met people I didn't work closely with. Positive/teaming. [It] refreshes your mind so you can return and focus better on work activities. (Female, non-Hispanic White, 52 years old, participant 4076)

The Booster Break was lots of fun. I enjoyed it every time I was able to attend. I talked more to my fellow co-workers but at the same time they all enjoyed the quick 15 minute workout we got. Did help motivate me to stay active. I would love to see the Booster Break be performed at other worksites. It was fun, exciting, energizing. It will definitely benefit you in the long run. (Female, Hispanic, 28 years old, participant 5016)

When I did attend, it felt good to stretch and to get away from work. I enjoyed the relaxation. It was rewarding to see members have positive outcomes from Booster Break. My hip pain went away completely. It was a positive experience. Feel better about employer. (Female, non-Hispanic White, 39 years old, participant 4012)

Barriers (areas for improvement)

Need for greater variety in Booster Break routine. Among the suggestions for improving the physical activity Booster Break, the primary theme was greater variety in the Booster Break

session. This variety included more frequent changes in the Booster Break routine and more choices in types of physical movements. Selected quotes:

Variability—I get tired of the same old moves—a couple of 3 or 4 different routines would be good. (Female, African American, 44 years old, participant 4025)

More variety within the 15 minutes. (Female, non-Hispanic White, 52 years old, participant 4076)

More variety of exercise routines. (Female, non-Hispanic White, 46 years old, participant 4086)

Need for greater management support. The second most dominant theme related to barriers was the perception that greater management support is needed. Suggestions included that managers should (i) participate in the Booster Break sessions, (ii) encourage participation in Booster Breaks, and (iii) not penalize employees who wish to participate in the sessions. Selected quotes:

Managers, supervisors need to be more supportive. When we would ask participants why they missed the session, the excuse was their supervisor or manager... I hated having to move or find a location at the last minute. (Female, Hispanic, 45 years old, participant 2033)

Get the management at your job to be a little more encouraging to their employees. Have the management get involved as well and participate in the Booster Break. (Female, African American, 38 years old, participant 3015)

Discussion

Qualitative analysis of participants' responses to the Booster Break evaluation survey revealed three clear themes for benefits: stress reduction and enjoyment, catalyst for health awareness and behavior change, and enhanced workplace social interaction.

This analysis also revealed two clear themes for barriers: lack of variety in Booster Break routines and lack of management support. Overall, our findings support the physical activity Booster Break in particular and health-promoting work breaks in general as a strategy for interrupting sedentary work life and promoting enjoyment, social interaction, and stress reduction.

To our knowledge, two previous studies have investigated benefits and barriers related to worksite physical activity programs. In a study by Tucker *et al.* [32], a 10-week worksite physical activity intervention was performed at a single site with hospital-based nurses who were mothers. Afterward, three focus groups with 17 participants concluded that the benefits of the intervention were fun, stress relief, and support from coworkers and managers. These results are consistent with our findings, even though our study had a different context and setting (i.e. 35 respondents, five worksites, variety of occupations, and extensive experience with a worksite physical activity intervention). The recommendations from their focus groups included lengthening the intervention, engaging coworkers, providing adequate privacy, adding demonstrations, expanding the use of technology, and providing healthy food. These recommendations and barriers differ from those revealed by our study, probably because the previous study used a different intervention. In the Tucker *et al.*'s study, the intervention involved a menu of options, which included walking treadmill workstations, standing workstations, walking nursing rounds and meetings, Nintendo Wii game tools, cues for taking stairs and walking breaks, and a 3-min Energy Burst video clip intended to increase physical activity by 1 hour each workday (i.e. Well Nurse 24/7). In contrast, the Booster Break program was based on a protocol and coworker-led group physical activity sessions that were ~15 min long. However, both interventions were similar in that physical activity was incorporated into the workflow during the workday.

The other previous study reported results that focused exclusively on the perspectives of call center managers (i.e. employers) to identify facilitators of and barriers to workplace physical activity

programs [33]. In-depth interviews were conducted with 15 managers. Call center managers identified a need for guidance, fresh ideas and information, financial assistance to offset costs, dedicated resources for health promotion, workplace wellness teams with employee representation, senior management support, and local champions and role models as facilitators for initiating physical activity programs in the workplace. In contrast, the nature of call center work (e.g. fast paced with heavy call volume), concerns of managers' (e.g. doubted employee interest in physical activity), and characteristics of the call center (e.g. smaller organizations have too few employees to make physical activity promotion feasible) were reported as barriers to implementing physical activity programs in the workplace. The authors recommended that future research investigates the perspectives of employees who have participated in workplace physical activity.

Our findings address this gap in the scientific literature. Our respondents had 6 months or 1 year of experience with workplace physical activity and reported their perspectives. Therefore, this study provides new information, a unique perspective, and a rationale for decision makers and program planners to develop and implement effective workplace physical activity programs.

One intriguing finding is related to the types of beneficial outcomes participants reported obtaining from the Booster Break experience. Traditionally, work-break practices emanate from an avoidance mindset designed to seek refuge, relief, and time to alleviate fatigue, distress, monotony, and boredom [34] (J. Weaver, personal communication). Thus, work breaks are intended to allow workers to escape from routine tasks or taxing work. In contrast, the fundamental underpinnings of the Booster Break concept are an intentional, engagement mindset embracing health-promoting behaviors and enjoyment during work breaks [14–17, 35–37]. This mindset is evident in the positive themes identified in this study, which extend beyond simple relief from boredom and monotony.

The three benefit themes we derived from the participants' responses provide empirical support

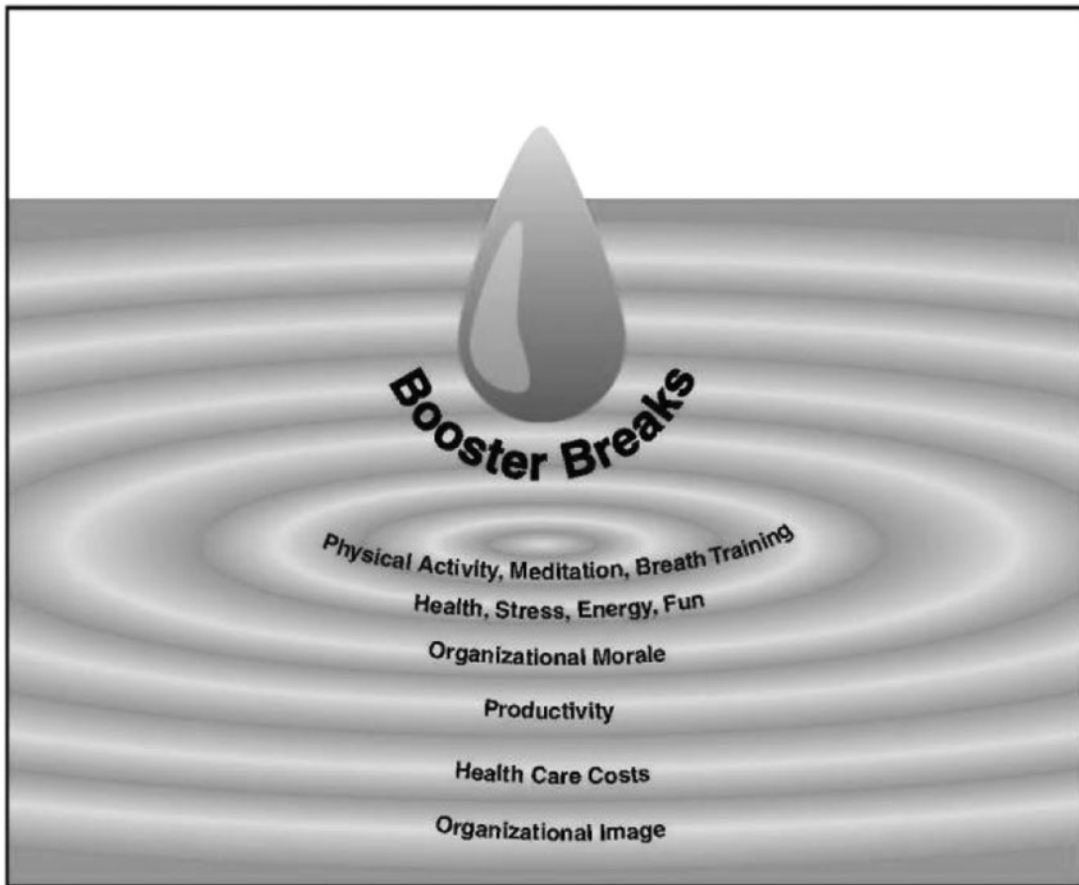


Fig. 1. Booster Break Ripple Effects Model.

From Taylor WC. *Booster Breaks: an easy-to-implement workplace policy designed to improve employee health, increase productivity, and lower health care costs.* *J Workplace Behav Health* 2011; **26**: 70–84. Copyright © Taylor & Francis Group, LLC. Reprinted by permission of (Taylor & Frances, <http://www.tandfonline.com>).

for the first three levels of the recently developed Booster Break Ripple Effects Model [15] (Fig. 1), which delineates the immediate and long-term benefits and advantages of health-promoting work breaks. Booster Breaks have potential favorable outcomes ranging from improving social interactions to enhancing overall organizational image. Booster Breaks also provide an opportunity to escape the typical workday routine and relieve stress in a way that promotes workplace social interaction and enjoyment. The first three levels of the Booster Break Ripple Effects Model are (i) behaviors (i.e. physical

activity, meditation, or rhythmic breathing); (ii) improving health, decreasing stress, and increasing energy and enjoyment; and (iii) improving employee morale [15].

Two of the benefit-related themes that our analysis revealed—reduce stress and promote enjoyment, and catalyst for health awareness and behavior change—are consistent with the expectations of Level 2 of the Booster Break Ripple Effects Model. The third benefit-related theme, enhanced workplace social interactions, is consistent with Level 3 of the model. Support for the first

three levels has the potential to affect the next three levels of the model, which are productivity, health-care costs, and organizational image (Fig. 1). Future research can assess the extent to which all levels of the Booster Break Ripple Effects Model are supported by empirical data and affect health in the workplace.

To maintain participant enthusiasm and enhance sustainability, the two themes related to improving the Booster Break experience merit careful attention. The first theme, greater variety in the Booster Break session, suggests that health-promoting physical activity work breaks can benefit from greater variety and more choices. Changing the routine regularly may make the experience more challenging and satisfying for all participants. The second theme, the need for greater management support, suggests that the absence of management support diminishes and undermines employee enthusiasm for health-promoting work breaks, ultimately reducing attendance and overall willingness to participate. In some cases, managers may punish employees for engaging in health-promoting work breaks.

These barriers can be minimized. The Booster Break program requires no equipment, so the routine can be changed easily. Also, the Booster Break practice should be a minimal disruption during the workday because it happens during standard 15-min work breaks and can produce immediate and long-term benefits. A greater awareness of these advantages can assist in consolidating stronger management support.

In a national survey, ~71% of respondents agreed that employers should provide time during the workday for employees to be physically active [38]. Thus, workers are likely to be receptive to a program of health-promoting work breaks. As decision makers plan, initiate, and implement such programs, the benefits of enjoyment, health awareness, and coworker social interaction should be noted and emphasized. Additionally, strong and consistent management support is essential. Management participation in health-promoting work breaks sends a clear message of approval [39].

The strengths of this study include a racially and ethnically diverse study sample, unique contributions to a limited database and insights from actual participants who have experienced 6 months or 1 year of workplace physical activity. As this study shows, answers to open-ended questions constitute useful data that allow for a new understanding of health-promoting work-break programs about which the knowledge base has been insufficient. Also, for two of the five sites, the Booster Break evaluation: Six Months and One Year Survey was a repeated measure, collected at both 6 and 12 months. Comparing the 6- and 12-month responses from the two sites revealed that reduced stress and improved energy were more prevalent at the 12-month assessment.

The limitations of this study include the fact that only a subset (43%) of the study cohort wrote responses to the open-ended questions, so the extent to which the respondents are representative of the total study population is unclear. However, except for a greater representation of non-Hispanic Whites, the age, gender, and racial and ethnic compositions were similar between the total study cohort and the respondents to the open-ended questions. Also, the response rate to the closed-ended questions was greater than 95%. Because there were no inclusion and exclusion criteria, biases related to extent of participation in the Booster Break sessions are unknown. Additional research is needed to assess the generalizability of our results. Also, most of the participants were women (>80%), so we do not know the extent to which these results generalize to populations that are predominantly men. Additionally, the sample was restricted to English-speaking employees and full-time workers who were eligible for work breaks. It was beyond the scope of this research program to translate the survey into other languages.

Successfully implementing Booster Breaks and similar interventions at worksites will require capitalizing on the benefits and minimizing the barriers reported by the participants in this study. Further research is needed to assess the extent to which our findings generalize to group health-promoting

work breaks that are not guided by a coworker, as well as to solo health-promoting work breaks that involve engaging in health-promoting behaviors during work breaks without a group context and experience. In addition, as more health-promoting work-break programs are being planned to counteract the adverse consequences of sedentary behavior, further research is needed about participant perspectives to continually improve program development and to promote the successful implementation of these programs.

The Booster Break program was designed to interrupt prolonged sitting at the workplace. In a group context, interrupting prolonged sitting can be fun and enjoyable. Our previous research on the physical activity Booster Break showed that during a 6-month period, participants lost an average of 14 pounds (8% weight loss) and significantly increased their plasma high-density lipoprotein level from 50 to 57 (≥ 60 is optimal) [17]. Both of these changes substantially reduce one's risk of cardiovascular disease and premature mortality [40] and can counteract the effects of the sedentary nature of work life. The Booster Break experience can be a catalyst for adopting a healthier lifestyle.

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Conflict of interest statement

None declared.

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