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ORIGINAL RESEARCH ARTICLE

Securing your Own Mask before Assisting Others: Effects of a Supervisor Training Intervention on Supervisors and Employees

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Abstract

Training interventions that target supervisors as a mechanism to initiate change in employee health, well-being, and work outcomes are increasingly common, but research has largely neglected to evaluate the impact that these interventions have on supervisors themselves. Relying on conservation of resources theory (Hobfoll 1989, 2001), this study sought to determine the effects that a supervisor-focused intervention had on supervisor and employee work, well-being, and safety outcomes. Participants included 192 U.S. Forest Service (USFS) workers (125 employees and 67 supervisors). Supervisors in the intervention group completed a computer-based training aimed at teaching behaviors that better support employees' needs and subsequently tracked supportive behaviors for two weeks. Results showed that, for employees, the intervention led to significantly lower psychological distress and less concerns about forest safety. For supervisors, the intervention led to higher work-to-family conflict and lower organizational commitment. Furthermore, supervisor reports of job demands at baseline moderated the intervention's effect on supervisor burnout, such that burnout was higher for those supervisors who reported lower job demands at baseline. Overall, consistent with previous research on supervisor training interventions, employees exhibited positive outcomes from the intervention. Detrimental effects of the intervention for supervisors may have been due to added responsibilities from participation in the training. Suggestions to mitigate potential detrimental effects of supervisor intervention participation are discussed.

Keywords Supervisor · Training · Intervention

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Over the past decade, a series of interventions have focused on increasing behaviors that supervisors enact to support employee needs, such as work, family, or safety needs, as a means of creating positive change in employees' experiences. These supervisor-focused interventions have had widespread success in improving employee experiences and outcomes in domains such as well-being (e.g., Ellis et al. 2017; Hammer et al. 2011), health (e.g., Hammer et al. 2019b; Hammer et al. in press; Hansen et al. 2016; Tsutsumi et al., 2005), and safety (e.g., von Thiele Schwarz et al. 2016). Although centered around the guiding concept that supervisor behavior change provides an efficient and effective way to improve employee experiences, the interventions have each been tailored to specific content areas and contexts. Because a one-size-fits-all approach is often not the most effective or practical path when implementing training in organizations, great success has been found in supervisor interventions by tailoring them to match the context and needs of each situation.

The present study focuses on evaluation of a supportive supervisor behavior intervention tailored to the specific needs and context of the Pacific Northwest region (Region 6) of the United States Forest Service (USFS). The intervention, called the Supervisor Training and Team Education Program (STTEP), was adapted from previous training intervention evaluation work by Hammer et al. (2015; 2019). We examine the intervention's effects not only on employees, but also on the experiences of the supervisors who participate. While supportive supervisor behavior interventions have been shown to provide considerable benefits for employees, few studies have examined the effects of supportive supervisor interventions on supervisors themselves (for an exception, see Hammer et al. in press). It is essential that we understand what effects these interventions may have on supervisors because of their inherent reliance on supervisors as a mechanism for change. While there is substantial and ever-mounting evidence that utilizing supervisors to improve employees' experiences of support in the workplace is an effective intervention strategy, supervisor interventions have thus far been implemented without systematic evaluation of effects on supervisors. We expect that training places demands on supervisors' time and resources and in turn, based on conservation of resources theory (Hobfoll 1989), may have negative impacts on work and well-being outcomes for supervisors, while maintaining positive impacts on outcomes for employees.

Study Contributions

This study contributes to current supervisor training intervention research on work and well-being in two ways. First, in addition to examining intervention effects on employees, this study also focuses specifically on the effects that a supportive supervisor behavior intervention has on supervisors themselves. Effects on supervisors are seldom considered in intervention research, but when interventions are designed to utilize the supervisor as the primary mechanism to generate change, effects on supervisors become fundamental to assessing the overall costs and benefits of an intervention. Supervisors are widely recognized for holding key responsibilities and influences within organizations, making them a seemingly ideal target for change efforts, but they are often viewed narrowly in regard to the effects of their supervising, rather than as employees with specific needs and issues of their own. This study seeks to begin to fill

that gap by considering supervisor training effects on supervisors separately from effects on the employees they manage. While such supportive supervisor trainings have been shown to have positive effects on employees' health and well-being (e.g., Hammer et al. 2011), such trainings may have negative effects on the supervisors themselves due to the demands and resource loss that may result from engagement in the training activities. The present study will be the first to investigate such supervisor training effects.

Second, this study contributes to the literature by presenting a quasi-experimental research design that evaluates a previously developed evidence-based supervisor training intervention to improve safety and health of construction workers (i.e., the Safety and Health Improvement Program; SHIP; Hammer et al. 2015) that was adapted and customized for a new context (i.e., U. S. Forest Service workers). Existing literature points out that many evidence-based interventions are never translated into practice in the occupational safety and health field (Dugan and Punnett 2017). We present one example of how an evidence-based intervention may be translated to practice. One of the foremost barriers to translation is that evidence-based interventions may not fit the context of novel settings. However, when an evidence-based intervention is adapted to a new context, concern about fidelity becomes its own barrier, further complication translation practice. Our study seeks to shine light on these barriers and provide an example of a successful translation—and adaptation—effort.

The balance between fidelity and adaptation has been closely considered within the dissemination, implementation, and prevention sciences, where it has come to be known as the "Fidelity-Adaptation Dilemma" (Castro et al. 2004; Elliott and Mihalic 2004), but it is not often discussed in the organizational sciences. High implementation fidelity has been described as one of the best ways to replicate the benefits of successful interventions (Carroll et al. 2007); however, intervention science has also evolved to recognize the need for adaptation to fit specific contexts (Castro and Yasui 2017). Instead of applying an evidence-based intervention in its entire original form, we focus on an approach that addresses this tension between research and practice, seeking to contribute meaningfully to future intervention work by testing the effectiveness of an adaptation from a previously developed and validated training intervention. We evaluate an occupational safety and health-oriented workplace intervention that has been adapted from prior supervisor training (i.e., Hammer et al. 2015) and customized to a new industry (i.e., U.S. Forest Service) and its effects on supervisor and employee outcomes.

The Demands of Supportive Supervisor Behavior Interventions

Among workplace interventions currently being implemented and adapted, one key subset is that of supervisor-focused interventions—the target of the current research. The current study builds on a body of work by Leslie Hammer and her colleagues (e.g., Hammer et al. 2011) that aims to teach supervisors specific behaviors they can enact to better support employees, and followed by the behavioral tracking of such behaviors. This body of work, as well as other lines of research on different methods of supervisor-focused interventions, has demonstrated the effectiveness of supervisor trainings in reaching goals ranging from improving employee health outcomes to enacting policy changes (e.g., Ellis et al. 2017; Spector and Reul 2017). While

supervisor trainings vary substantially in content and methodology, they generally share a focus on their effects on the employees who are supervised by trainees (e.g., Hammer et al. 2011) or their effects on the organization as a whole (e.g., organizational climate; Cuadra-Peralta et al. 2017). When supervisor-focused intervention evaluations do focus on any effects on supervisors themselves, it is in relation to their leadership (e.g., von Thiele Schwarz et al. 2016), ability to support their employees (e.g., Hammer et al. 2011), or their own learning outcomes (e.g., Hammer et al. in press). Although the use of supervisor support interventions has become increasingly common, research has thus far largely failed to examine effects of training demands on supervisors own work and well-being outcomes.

Because of the high degree of responsibility and control supervisors possess—including influence on the success of most any task performed by employees—their productivity and well-being are integral to the success of an organization. The same responsibility and control are the reason that supervisor-focused interventions can be so successful at improving employee outcomes. Supervisors are in a unique position of influence on employees' day-to-day experiences, serving as the medium by which organizational expectations, policies, and procedures are translated to employees. As such, when supervisors' behaviors change, employee outcomes of health, safety and well-being are frequently affected.

Supervisor training interventions often require supervisors to perform a variety of tasks, including computer-based training, face-to-face training, role-playing examples, behavior tracking exercises, and other activities/exercises to learn new information and skills and increase the transfer of what has been learned in training back to use on the job (e.g., Hammer et al. 2011; Odle-Dusseau et al. 2016). Other interventions have brought supervisors and employees together to share interactive discussions, games, and role-playing exercises (e.g., Olson et al. 2015). Ultimately, these interventions have been shown to benefit employees; however, during the intervention period, when change is taking root, intervention-related tasks and activities are likely experienced by participating supervisors as additional job demands, which are associated with negative work and well-being outcomes (DiRenzo et al. 2011; Crawford et al. 2010; Voydanoff 2004).

While not specific to supervisors, Biron et al. (2016) conducted three participatory interventions and found that those interventions that aimed to improve relationships among colleagues led to an increase in job demands and a decrease in social support that approached significance. The authors postulated that the increase in team meetings and team building trainings that were implemented during the intervention may have led to an increase in job demands, in turn exacerbating psychosocial constraints. This is in line with research that has found organizational change to be positively associated with stress—a relationship that was mediated by job demands (Tvedt et al. 2009). While these findings were not specific to supervisor-focused interventions, they suggest that supervisors likely experience increased demands from intervention participation and may have resulting negative outcomes—particularly when increased demands from interventions are layered on top of already high demands from existing job requirements.

One primary target of many supervisor-focused interventions is to improve leadership skills. Although the value of improved leadership for employees and organizations is well established, evidence is mixed regarding effects on leaders themselves.

Improved leadership has been shown by some to benefit leaders (Lanaj et al. 2016). However, other recent evidence has suggested that improving leadership may also come at a cost to supervisor well-being. For instance, Lin et al. (2019) examined the relationship between transformational leadership and leaders' well-being. Over a six-week period, Lin et al. 2019 found that the transformational leadership-oriented behaviors led to increased emotional exhaustion and turnover intentions.

Despite the risk of negatively impacting some supervisor outcomes, potential benefits of supervisor-focused interventions extend to supervisors, as well. For supervisors, participation in interventions provides opportunities to engage in professional development, learn new skills, and improve job-related performance. Supervisor support interventions equip supervisors with new tools, knowledge, and resources to better manage and relate to their employees (Hammer et al. in press; Kelly et al. 2014). Furthermore, when interventions are indeed successful at improving employee health and well-being, supervisors may have less to worry about once those improvements have taken hold, and therefore may endure less stress-inducing demands. Supervisors may also feel more confident in their ability to supervise as they put the knowledge and skills introduced by interventions into practice. However, research is needed to understand the interplay among benefits and risks of engaging supervisors in training to improve their support of employees' needs. The current study seeks to begin closing this gap in the literature.

An Evidence-Based Supervisor Support Intervention

The adapted intervention we examine in the current study stems specifically from the Safety & Health Improvement Program (SHIP), which was developed and tested in a randomized controlled trial with construction workers and consists of four components: a computer-based training for supervisors, a two-week behavior tracking exercise for supervisors, a team effectiveness process including structured group discussions, and regular follow-up (Hammer et al. 2015; Hammer et al. 2019a). The SHIP intervention was developed to reduce work-family stressors (Hammer et al. 2011) and improve safety communications (Zohar and Luria 2003; Zohar and Polachek 2014) with the expectation of impacting worker health, safety, and well-being outcomes. We evaluated the effectiveness of an adaptation of the SHIP intervention within the United States Forest Service (USFS), across four forests in the Pacific Northwest region of the United States, examining effects on both employees and supervisors.

Background and Needs Assessment for Intervention Adaptation

Due to the nature and complexity of their roles, USFS workers face high job demands and a number of health, safety, and well-being concerns. Through a formative research process, we adapted the SHIP intervention to meet the specific context and needs of USFS supervisors and employees, and we named the adapted intervention the Supervisor Training and Team Education Program (STTEP). We conducted a needs assessment, utilizing a mixed methods approach by conducting interviews and online surveys with a random sub-sample of USFS employees and supervisors within each of three forests. We first conducted interviews ($n = 17$) and job shadowing ($n = 7$) with USFS employees to inductively assess employee perceptions of their work climate and to

better understand the potential issues that were highly relevant to employees, based on their work roles. Interviews were conducted over the phone ($M = 60$ min) and job shadowing occurred on the field ($M = 8$ h). In addition, interview questions and job shadowing protocols were based on previous research conducted with USFS personnel (Demsky et al. 2019). Second, we recruited 187 employees to participate in a survey, distributed online via Qualtrics and paper via on-site visits at participating forests. Questions for the survey were based on the findings from the qualitative data collection.

Through this needs assessment, we were able to target specific areas that were most relevant to employees within the USFS for the STTEP intervention. Although several inductive themes emerged from the needs assessment, we focus specifically on four important themes: 1) employees expressed a need for greater supervisor support; 2) employees indicated high levels of work-to-family stress; 3) employees expressed safety- and health-related concerns; and 4) employees divulged experiencing several organization-level constraints, such as conflicting job demands, role ambiguity, and work overload. Although the first three themes were represented in the original SHIP training intervention, the last theme needed further development. Several meta-analyses have demonstrated that role ambiguity is significantly and negatively related to job satisfaction, performance, and work attitudes (e.g., Abramis 1994; Tubre and Collins 2000; Yousef 2000), so these conclusions were anticipated given the lack of role clarity employees reported. Keeping this previous work in mind when interpreting the findings from the needs assessment, we recognized that information relevant to reducing role ambiguity and overload through supervisor support should be included in the STTEP intervention. As such, in adapting the SHIP program, we developed a module designed to address role ambiguity and how supervisors could actively work to reduce this lack of clarity for their employees.

Adapting the SHIP Intervention for USFS Needs

Various changes were needed to the content and design of the SHIP program to effectively create a program tailored for USFS employees and supervisors. Regarding the intervention design, we kept the computer-based format from SHIP to maintain accessibility, given that USFS supervisors work at various locations across the Pacific Northwest. In addition, we removed a component related to team effectiveness from this SHIP training in order to match time constraints we learned about in our formative research and to apply to a wider range of supervisors and the employees they oversee. For instance, although some supervisors lead teams that consist of permanent workers, some supervisors oversee teams mostly comprised of temporary (or seasonal) workers. Furthermore, we adapted the behavior tracking content to the STTEP program to better address the needs of USFS employees.

We also made changes to the content of the STTEP program through this adaptation. Most significantly, we developed a role ambiguity module to address employee reports of inconsistent role clarity and ambiguity across the organization, as mentioned above. This module, modeled after the existing family/personal support module and safety support module, focused on teaching supervisors specific behaviors to reduce role ambiguity. In addition, we updated organization-specific examples and images so that they applied more specifically to USFS employees. Finally, we consolidated some

training content in order to reduce the amount of time participants were required to spend on the training.

Theoretical Background, Hypotheses, and Research Questions

To evaluate and understand the effectiveness of the STTEP intervention, we rely upon conservation of resources (COR) theory (Hobfoll 1989). COR theory proposes that resources are objects, personal characteristics, conditions, or energies that are valued by individuals, and strain is a response to the failure to conserve, protect, or accumulate resources (Hobfoll 1989). Furthermore, COR theory proposes the idea of "loss spirals" and "gain spirals" (Hobfoll 1989; Hobfoll 2001). The concept of loss spirals posits that a lack of resources makes individuals more vulnerable and more likely to experience further loss of resources. Similarly, the idea of gain spirals suggests that individuals who possess resources are more capable of gaining and likely to gain further resources. Indeed, previous intervention studies have demonstrated that employees stand to benefit from a greater supply of resources. For instance, Chen et al. (2009) introduced a "resource workshop" in an information technology firm that increased employees' psychological resources, which buffered employees from work-related strain. Additionally, Hammer et al. (2015) assessed an intervention that trained supervisors to provide additional safety and health-related resources to employees and found a link between supervisory support and reduced blood pressure among employees post-intervention. In line with COR theory, this previous research exhibits how resources are valuable assets to employees and provide opportunity for gain spirals, where resource gain engenders future gain. We thus anticipated that supervisor support training would improve employee outcomes through increased supervisor support and information. We focused in particular on three areas related to the training content: work-related attitudes (i.e., job satisfaction and organizational commitment), well-being (i.e., work-to-family conflict, burnout, and psychological distress), and safety (i.e., concerns about forest safety and forest safety encounters).

Hypothesis 1. The STTEP intervention will increase employee job satisfaction and organizational commitment and decrease employee work-to-family conflict, burnout, psychological distress, concerns about forest safety, and forest safety encounters.

To further evaluate the effectiveness of the STTEP intervention, we relied upon COR theory to explore intervention effects on supervisors themselves—a particularly understudied area of focus in intervention research. Studies have generally supported COR theory by demonstrating that work and family stressors drain resources, thereby leading to decreases in job and life satisfaction, psychological well-being, and physical health (Grandey and Cropanzano 1999). Within COR theory, one key category of resources is energies (Hobfoll 1989). Energies, such as time, money, and knowledge, are valued resources due to their capacity to allow individuals to protect and accumulate other resources. Supervisors must utilize the energies that they possess to meet a variety of responsibilities, including managing their employees, reporting to organizational leaders, and maintaining resources at work and at home. Supervisor trainings may demand that energies usually reserved for dealing with standard responsibilities be

redirected to the training itself and to the associated behaviors expected. This may manifest as increased job demands, an established work stressor (Crawford et al. 2010; Voydanoff 2004). As such, added supervisor responsibilities related to the training may deplete a supervisor's energies, in turn exhausting their ability to effectively manage the work and home domains (van Woerkom et al. 2016). On the other hand, supervisor training may provide supervisors with more resources. For example, supervisors may gain skills that help build their relationship with their employees, which could then lead to benefits like reduced demands at work or additional social support received from their own employees (Viswesvaran et al. 1999). The intervention may therefore beneficially or detrimentally affect supervisors, or both.

Research Question 1. Will the intervention lead to beneficial or detrimental outcomes in supervisors' work (job satisfaction, organizational commitment), well-being (work-to-family conflict, burnout, psychological distress), and safety (concerns about forest safety, forest safety encounters)?

As described above, the experienced effects of resource loss are not merely proportional to the amount of resources lost in one instance. Lack of initial resources not only makes one more vulnerable to subsequent losses, but actively produces future losses through loss spirals (Hobfoll 2001). Job demands that result in a loss of resources thus make it more likely that any additional demand will lead to strain. Van Woerkom et al. (2016) argued that employees who lack resources due to high job demands are more vulnerable to an ever-increasing loss of resources. They found that those employees with higher workloads showed a stronger positive relationship between emotional demands and absenteeism. Based on this existing research, as well as COR theory, we anticipate that those supervisors who report high job demands at baseline will be at greater risk for future resource losses (i.e., loss spirals) following supervisor training. Those with high levels of job demands at baseline may view added responsibility from participation in training as overwhelming or even unfair and may have heightened sensitivity to any resource loss from participation. Resource loss during or following training could lead to further resource loss and related detrimental outcomes.

On the other hand, for those supervisors with low levels of job demands at baseline, the training may have beneficial outcomes or may not lead to a noticeable change in outcomes. In line with the concept of gain spirals (Hobfoll 2001), those supervisors with low baseline job demands likely possess more resources prior to training, resulting in better ability to gain resources from participation. Supervisors with low job demands before the training may be better able to focus on the benefits of the intervention, such as new skills to better support their employees or more positive attitudes toward their roles and responsibilities, and may view the added responsibilities from training participation as neutral or even positive. As such, participation in STTEP is expected to result in more negative outcomes for those supervisors with high baseline job demands than those with low baseline job demands.

Hypothesis 2. The intervention's effect on supervisor well-being and work-related attitude outcomes will be moderated by supervisors' self-reported job demands at baseline, such that those supervisors with higher job

demands at baseline will experience decreased job satisfaction and organizational commitment, as well as increased work-to-family conflict, burnout, psychological distress, concerns about forest safety, and forest safety encounters.

Method

Participants

Participants were U.S. Forest Service (USFS) workers from four forests in a single region of the United States. They were recruited by emails sent by regional- and forest-level safety and health leadership, as well as by in-person recruiting sessions at various districts/locations. A total of 192 USFS supervisors, team leads, and employees were included in the study (125 employees; 67 supervisors and team leads, who will henceforth be called "supervisors"). The majority (70%) of participants were permanently employed by the USFS, with the remainder being seasonal workers. Among the seasonal employees, 33% were in their first season of work with the USFS, while the remaining 66% of seasonal employees were returning.

Participants held a wide variety of roles within the USFS, ranging across a very diverse spectrum of daily job tasks. Jobs included, for example, wildland firefighters, wildlife biologists, foresters, recreation technicians, visitor information, and administrative employees. Nearly half of participants worked primarily indoors (45%), with the remaining working primarily outdoors (33%) or both indoors and outdoors (22%). The average age of participants was 42.27 (SD = 12.67). The majority of participants were male (57%), non-Hispanic white (83%), married (57%), had no children under 18 living in their home (60%), and were not caring for an elder or adult with a disability (96%). A total of 16% were military veterans. The vast majority (83%) had a college or technical degree and most participants had an income either between $71,001 and $132,000 (40%) or $44,001 and $71,000 (21%). Participant demographic information by level and treatment group is presented in Table 1.

Design

The Supervisor Training and Team Education Program (STTEP) intervention targeted issues previously identified in the pilot study conducted in the region of interest within the USFS. A quasi-experimental design was utilized, in which two forests were assigned to receive the intervention and two were designated to the usual practice control group. Forests were not randomized to condition, but rather assigned to condition based on previous exposure to STTEP-related content. That is, two forests had previously participated in the exploratory needs assessment, while the other two forests had not participated in any STTEP-related research. One forest that participated in the needs assessment was assigned to each condition, and one forest that did not participate in the needs assessment was assigned to each condition. Control group supervisors did not receive the intervention at any point during or after the study—a decision made primarily based on the time constraints associated with seasonal work,

Table 1 Sociodemographic background at baseline by condition for employees and supervisors

Employee-Level Variable	Training ($N = 26$–32) Mean (SD) /%	Control ($N = 28$–34) Mean (SD) /%
Age	44.57 (10.28)	46.13 (10.26)
Male	59.4%	52.9%
White	77.4%	90.9%
College graduate or higher	87.5%	97.0%
Married or in a committed relationship	87.1%	85.3%
Number of children at home	1.00 (1.32)	1.71 (.90)
Full-time workers	96.9%	88.2%
BMI	28.86 (4.83)	26.67 (4.57)
Veteran	15.6%	20%
Supervisor-Level Variable	Training ($N = 52$–53) Mean (SD) /%	Control ($N = 51$–58) Mean (SD) /%
Age	46.79 (13.24)	34.77 (11.28)
Male	56.4%	58.6%
White	89.1%	86.2%
College graduate or higher	69.1%	84.5%
Married or in a committed relationship	64.2%	62.1%
Number of children at home	1.45 (.77)	1.52 (.82)
BMI	28.42 (4.96)	26.74 (4.14)
Veteran	20.8%	10.3%

Note: A significant difference was found between employee training and control groups for age, $t(107) = 2.48$, $p < .001$. No significant differences were found between supervisor training and control groups ($p < .05$)

as data collection began at the start of the summer season (a time the organization brings in many seasonal workers).

At the beginning of the study, with support from regional and forest-level leadership, members of our research team traveled to in-person training events throughout participating forests to provide information about the study and collect paper surveys. In-person data collection with paper surveys was particularly important to allow participation of seasonal employees, as seasonal employees did not have USFS email addresses. However, the majority of surveys were collected online using recruitment emails sent by safety managers and USFS supervisors. All follow-up surveys were sent to participants via email and completed online.

For the intervention group, employees completed baseline surveys at stage 1, followed by supervisors completing their baseline surveys and training at stage 2. Finally, both employees and supervisors completed follow-up surveys at stage 3. For the control group, employees and supervisors completed the baseline survey at stage 1, then employees and supervisors completed the follow-up survey at stage 2. The baseline and follow-up surveys for both groups were separated by 3–4 months. Employee surveys were designed to take approximately 30 min, and supervisor surveys were designed to take approximately 20.

Intervention

STTEP was adapted from the Safety & Health Improvement Program (SHIP), which targeted stress, work-life conflict, health and safety practices, job performance, attitudes, and team effectiveness, as described above. The adaptation retained focuses on supervisor training, safety and health, and the work-life interface. A module was added that taught supervisors tactics to help employees decrease role ambiguity, and the training was further tailored to provide ways for supervisors to better support seasonal employees and lone worker employees. A component of SHIP that concentrated on team effectiveness was removed to better fit the needs of the USFS and increase potential for subsequent scalability.

Supervisors in the intervention group received a one-hour computer-based training (cTRAIN, Anger et al. 2001), then completed a two-week behavior-tracking exercise to practice supportive behaviors that they had learned. The computer training consisted of three modules: Family & Personal Support Behaviors, Safety Support Behaviors, and Role Clarity Support Behaviors.

Family & Personal Support Behaviors focused on developing creative strategies for work-life management that are mutually beneficial for the company and employee. This module also covered emotional support strategies, such as expressing empathy and helping employees navigate through family, personal, and work challenges. Finally, supervisors were trained to properly model work-life balance for their employees.

Safety Support Behaviors provided strategies for creating a work environment that encourages safety by promoting communication and safety knowledge among employees. Supervisors learned how they can be safety role models by emphasizing their own commitment to safety. Strategies for providing resources to employees and delivering feedback and encouragement to act in a safe manner were also discussed.

Role Clarity Support Behaviors outlined approaches to ensuring that employees' concerns about their role in the organization are being heard, as well as clarifying what each employee's role is. Supervisors learned about creative ways to manage and enhance employees' performance of their respective roles and provide instrumental support for those roles. This module also demonstrated how supervisors can become effective models of proper role management by exhibiting ways to understand your roles and expectations and how to manage those.

The behavior tracking exercise consisted of two short (2–5 min) online surveys per week for two weeks following the computer-based training. The first survey of each week had supervisors set goals for the week. The second survey of each week had supervisors track the number of family and personal support behaviors, safety support behaviors, and role clarity support behaviors they had performed throughout the week.

Survey Measures

The surveys broadly measured work-related experiences and attitudes and well-being. All measures were coded such that higher scores indicate a higher level of the construct of interest. Below are detailed descriptions of the measures used in this study.

Job Satisfaction Cammann et al. (1983) 3-item measure assessed the degree to which supervisors were satisfied with their job on a global level. Response options ranged from 1 = *strongly disagree* to 5 = *strongly agree* (baseline $\alpha = .91$, follow-up $\alpha = .87$). A sample item is, "In general, you like working at your job."

Organizational Commitment (Meyer et al. 1993). The six items of Meyer et al.'s (1993) measure assessed supervisors' emotional (or affective) relationship with their organization. Response options ranged from 1 = *strongly disagree* to 5 = *strongly agree* (baseline $\alpha = .88$, follow-up $\alpha = .88$). A sample item is, "I feel emotionally attached to this organization."

Work-to-Family Conflict Netemeyer et al.'s (1996) five-item measure was used to assess the degree to which demands at work conflict with demands at home. Response options ranged from 1 = *strongly disagree* to 5 = *strongly agree* (baseline $\alpha = .93$, follow-up $\alpha = .95$). A sample item is, "The amount of time my job takes up makes it difficult to fulfil my family responsibilities."

Burnout The three-item emotional exhaustion subscale from the Shirom-Melamed Questionnaire (Shirom, n.d.; Shirom et al. 2010) was used to assess the extent that employee felt unable to navigate relationships at work due to being emotionally overextended and exhausted. Response options ranged from 1 = *none of the time* to 5 = *all of the time* (baseline $\alpha = .89$, follow-up $\alpha = .84$). A sample time is, "I feel I am not capable of investing emotionally in co-workers."

Psychological Distress A six-item measure was used to capture general levels of psychological distress (Kessler et al. 2002), which is a term often used to describe unpleasant feelings or emotions that may impact daily functioning. Specifically, this scale assesses distress by asking questions related to anxiety and depressive symptoms the person has experienced over the past four weeks. Response options ranged from 1 = *none of the time* to 5 = *all of the time* (baseline $\alpha = .83$, follow-up $\alpha = .88$). A sample item asked, "During the last 30 days, how often did you feel that everything was an effort?"

Forest Safety Concerns and Encounters These two eight-item measures were created during research in the USFS to understand employee experiences and concerns related to their safety, given their job responsibilities. Employees were asked about concerns (e.g., "How worried are you about the possibility of encountering the following?") and encounters (e.g., "How often have you actually encountered the following?"). Response options ranged from 1 = *not at all worried* to 5 = *extremely worried* for safety concern items and from 1 = *never* to 5 = *very often* for encounter items (baseline $\alpha = .77$, follow-up $\alpha = .70$). Safety concerns and encounters included topics like "conflict (verbal or physical) with a coworker or supervisor" and "gunshots within your unit/area."

Job Demands The three items of Karasek's (1979) measure of job demands targeted understanding the psychological consequences of one's work requirements or job (e.g.,

work pressure, emotional demands). Response options ranged from 1 = *strongly disagree* to 5 = *strongly agree* (baseline $\alpha = .80$, follow-up $\alpha = .79$). A sample item is, "My job requires working very hard."

Analyses

We assessed training intervention effects by comparing those from the two forests that were assigned to the intervention group (condition = 1) to those from the two forests that were assigned to the control group (condition = 0). Separate analyses were conducted for employees and supervisors. To maximize statistical power to detect effects of the intervention, we followed the ANCOVA approach recommended by Bodner and Bliese (2018), which controls for baseline values of the dependent variable. The moderated intervention effects in Hypothesis 2 were evaluated by adding job demands and its interaction with the condition indicator to the model for each outcome. Continuous predictors were grand mean centered for each model, and all analyses were conducted in Mplus version 7 (Muthén & Muthén, 1998–Muthén and Muthén 2012).

Results

Employee Outcomes

A total of 125 employees completed the baseline survey (intervention group = 63; control group = 62). Of those, 71 also completed the follow-up survey (intervention group = 34; control group = 37). The only significant difference in demographic variables was that intervention group employees were significantly older than control group employees, $t(107) = 2.48$, $p < .001$. Descriptive statistics of the demographic variables are presented in Table 1, and descriptive statistics of outcome measures at baseline and follow-up are presented in Table 2. Correlations are provided across all employee variables and time points in Table 3.

Following the intervention, employees in the intervention group forests experienced significantly lower psychological distress ($b = -.21$, SE = .11, $p < .05$) and less concerns about forest safety ($b = -.21$, SE = .10, $p < .001$). The intervention's effect on employee forest safety encounters approached significance ($b = -.20$, SE = .11, $p = .08$) and trended in the hypothesized direction, toward fewer forest safety encounters. Results showed no significant effect of the intervention on employee job satisfaction ($b = .04$, SE = .13, $p = .74$), organizational commitment ($b = .07$, SE = .14, $p = .60$), burnout ($b = .04$, SE = .16, $p = .82$), or work-to-family conflict ($b = .05$, SE = .17, $p = .78$). Results of employee intervention effect analyses thus provide partial support for Hypothesis 1 and are presented in Table 5.

Supervisor Outcomes

A total of 67 supervisors completed the baseline survey (intervention group = 32; control group = 35). Of those, 39 also completed the follow-up survey. There were no significant differences in demographic variables between conditions, but supervisors

Table 2 Descriptive statistics for employee and supervisor variables at baseline and follow-up by condition

	Supervisor				Employee			
	Training Condition		Control Condition		Training Condition		Control Condition	
	Baseline $n = 30–32$ *M* (*SD*)	Follow up $n = 18–20$ *M* (*SD*)	Baseline $n = 33–35$ *M* (*SD*)	Follow up $n = 19$ *M* (*SD*)	Baseline $n = 49–63$ *M* (*SD*)	Follow up $n = 27–34$ *M* (*SD*)	Baseline $n = 52–62$ *M* (*SD*)	Follow up $n = 34–37$ *M* (*SD*)
Job Satisfaction	3.95 (.77)	3.88 (.76)	4.05 (.82)	3.84 (.69)	4.07 (.96)	3.98 (.98)	4.29 (.81)	4.10 (.84)
Organizational Commitment	3.52 (.84)	3.25 (.68)	3.69 (.72)	3.71 (.84)	3.53 (.87)	3.46 (.75)	3.57 (.73)	3.46 (.92)
Work-to-Family Conflict	3.42 (.81)	3.48 (.92)	3.27 (.89)	3.15 (.71)	3.03 (1.19)	3.03 (1.12)	2.76 (1.00)	2.96 (1.10)
Burnout	1.97 (.98)	1.95 (1.00)	1.47 (.63)	1.40 (.48)	1.58 (.70)	1.73 (.70)	1.69 (.85)	1.75 (.83)
Psychological Distress	1.92 (.87)	1.81 (.85)	1.69 (.64)	1.56 (.63)	1.88 (.66)	1.75 (.66)	1.75 (.65)	1.89 (.79)
Forest Safety Concerns	1.75 (.86)	1.62 (.64)	1.69 (.57)	1.58 (.55)	1.64 (.64)	1.70 (.66)	1.67 (.59)	1.93 (.62)
Forest Safety Encounters	1.86 (.77)	1.81 (.59)	1.79 (.62)	1.72 (.53)	1.87 (.87)	1.92 (.87)	1.82 (.69)	1.99 (.66)
Job Demands	3.70 (.65)	3.68 (.83)	3.75 (.73)	3.61 (.62)	–	–	–	–

Note: No significant differences between training and control groups at baseline for either employees. Significant difference in supervisor burnout at baseline, $t(48.5) = 2.34$, $p < .05$. Job demands data included only for supervisors (moderator of intervention effects)

Table 3 Correlations among employee variables across time points

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Job Satisfaction (T1)	4.19	.89	–												
2. Job Satisfaction (T2)	4.04	.90	.81**	–											
3. Organizational Commitment (T1)	3.55	.79	.61**	.54**	–										
4. Organizational Commitment (T2)	3.46	.84	.55**	.68**	.73**	–									
5. Burnout (T1)	1.64	.79	−.22*	−.31*	−.34**	−.30*	–								
6. Burnout (T2)	1.74	.76	−.04	−.12	−.07	−.14	.53**	–							
7. Work-to-Family Conflict (T1)	2.90	1.11	−.39**	−.50**	−.30**	−.33**	−.06	−.03	–						
8. Work-to-Family Conflict (T2)	3.00	1.10	−.43**	−.50**	−.39**	−.48**	.23	.19	.76**	–					
9. Psychological Distress (T1)	1.81	.66	−.38**	−.55**	−.31**	−.30*	.30**	.25*	.33**	.42**	–				
10. Psychological Distress (T2)	1.82	.73	−.41**	−.55**	−.42**	−.34**	.33**	.22	.40**	.39**	.80**	–			
11. Forest Safety Concerns (T1)	1.65	.61	.06	−.03	.04	−.12	.06	−.11	.16	.21	.10	−.01	–		
12. Forest Safety Concerns (T2)	1.82	.64	.13	.00	.12	−.11	−.00	.02	.30*	.27*	−.06	.06	.73**	–	
13. Forest Safety Encounters (T1)	1.85	.78	−.04	−.10	−.01	.06	.05	.03	.25**	.12	.11	−.08	.41**	.23	–
14. Forest Safety Encounters (T2)	1.95	.76	−.11	−.12	.12	.13	.02	−.07	.36**	.21	.09	−.01	.43**	.35**	.81**

Note: *$p < .05$, **$p < .01$, Ns = 58–117. T1 = baseline; T2 = follow-up

in the intervention group had significantly higher levels of burnout at baseline than those in the control group, $t(48.5) = 2.34$, $p < .05$. Descriptive statistics of the demographic variables are presented in Table 1, and descriptive statistics of outcome and moderator measures at baseline and follow-up are presented in Table 2. Correlations are provided across all supervisor variables and time points in Table 4.

For supervisors, the intervention led to significantly lower organizational commitment ($b = -.37$, $SE = .14$, $p < .01$) and higher work-to-family conflict ($b = .40$, $SE = .17$, $p < .05$). There were no significant intervention effects on job satisfaction ($b = .00$, $SE = .16$, $p = .99$), burnout ($b = .20$, $SE = .18$, $p = .28$), psychological distress ($b = .10$, $SE = .11$, $p = .39$), or forest safety concerns ($b = .02$, $SE = .10$, $p = .84$) and encounters ($b = .05$, $SE = .14$, $p = .74$). Results of supervisor intervention effect analyses thus showed some detrimental effects of the intervention and some non-effects, all of which contribute to exploration of Research Question 1 and are presented in Table 6.

Job demands at baseline were a significant moderator of the intervention's effect on burnout ($b = -.53$, $SE = .27$, $p = .05$, $\Delta R^2 = .04$) such that those supervisors who reported higher baseline job demands reported lower burnout following the intervention. These results were contrary to Hypothesis 2. Job demands at baseline were not a significant moderator of effects on job satisfaction ($b = -.26$, $SE = .27$ $p = .33$, $\Delta R^2 = .01$), organizational commitment ($b = -.17$, $SE = .23$, $p = .46$, $\Delta R^2 < .01$), work-to-family conflict ($b = -.12$, $SE = .30$, $p = .69$, $\Delta R^2 < .01$), psychological distress ($b = .05$, $SE = .19$, $p = .80$, $\Delta R^2 < .01$), forest safety concerns ($b = .26$, $SE = .17$, $p = .12$, $\Delta R^2 < .01$), or forest safety encounters ($b = .02$, $SE = .24$, $p = .93$, $\Delta R^2 < .01$). Results of moderation effects models are presented in Table 7 and depicted in Fig. 1.

Discussion

In the current research, we assessed whether the implementation of an adapted intervention, modified to address the needs of a specific organization—the United States Forest Service—would lead to significant changes for both employees and supervisors in work outcomes (job satisfaction and organizational commitment), well-being outcomes (work-to-family conflict, burnout, and psychological distress), and safety outcomes (forest safety concerns and encounters). We found that, for employees, the intervention led to significantly lower psychological distress and less concern about forest safety, providing partial support for Hypothesis 1. Although we hypothesized specific and directional intervention effects on employees, we did not specify directionality in our predictions of the intervention's effects on supervisors. Our results reveal that, following the intervention, supervisors reported increased work-to-family conflict and decreased organizational commitment. Finally, we explored whether intervention effects on supervisors were moderated by supervisors' job demands at baseline. Results showed that job demands at baseline significantly moderated the intervention's effect on burnout, but in the opposite direction than predicted in Hypothesis 2, such that supervisors with high job demands at baseline exhibited a decrease in burnout after the intervention while supervisors with low job demands experienced an increase in burnout.

Table 4 Correlations among supervisor variables across time points

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Job Satisfaction (T1)	4.00	.79	–													
2. Job Satisfaction (T2)	3.86	.72	.72**	–												
3. Organizational Commitment (T1)	3.61	.78	.43**	.36*	–											
4. Organizational Commitment (T2)	3.48	.79	.53**	.50**	.81**	–										
5. Burnout (T1)	1.71	.85	−.02	.04	−.15	−.25	–									
6. Burnout (T2)	1.68	.82	.01	.15	−.25	−.26	.74**	–								
7. Work-to-Family Conflict (T1)	3.34	.85	−.23	−.12	.02	.17	−.19	−.16	–							
8. Work-to-Family Conflict (T2)	3.32	.83	−.14	−.14	.10	.02	−.24	−.04	.72**	–						
9. Psychological Distress (T1)	1.80	.76	−.18	−.10	−.30*	−.41*	.29*	.47**	.10	.10	–					
10. Psychological Distress (T2)	1.69	.76	−.12	−.23	−.38*	−.48**	.33*	.40*	−.18	.04	.89**	–				
11. Forest Safety Concerns (T1)	1.72	.72	.03	.03	.04	−.01	.20	.03	−.05	−.17	.47**	.42**	–			
12. Forest Safety Concerns (T2)	1.60	.59	.10	.05	−.03	−.07	.03	−.03	−.13	−.14	.29	.43**	.84**	–		
13. Forest Safety Encounters (T1)	1.82	.69	−.08	−.03	.07	.17	.01	−.02	.24	−.18	.32**	.12	.66**	.52**	–	
14. Forest Safety Encounters (T2)	1.76	.55	−.19	−.22	.01	−.16	−.03	−.16	−.02	−.12	.18	.33*	.54**	.58**	.59**	–
15. Job Demands (T1)	3.73	.69	−.15	−.17	−.13	−.03	.07	−.31	.52**	.00	.00	−.20	−.04	−.14	.09	−.00

Note: *$p < .05$, **$p < .01$, Ns = 37–67

Table 5 Model results of intervention effects on employee outcomes

	DV: Job Satisfaction		DV: Organizational Commitment		DV: Burnout		DV: Work-to-Family Conflict	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Intercept	3.99***	(3.82, 4.17)	3.41***	(3.23, 3.60)	1.72***	(1.51, 1.94)	2.96***	(2.73, 3.19)
Intervention	.04	(−.21, .30)	.07	(−.20, .35)	.04	(−.28, .36)	.05	(−.28, .38)
Baseline of DV	.85***	(.70, 1.00)	.76***	(.58, .93)	.53***	(.32, .74)	.80***	(.64, .96)
Residual variance	.28***	(.19, .37)	.31***	(.20, .42)	.42***	(.28, .57)	.51***	(.34, .67)
Model R^2	.65***		.54***		.28**		.58***	
	DV: Psychological Distress		DV: Forest Safety Concerns		DV: Forest Safety Encounters			
	Est.	95% CI	Est.	95% CI	Est.	95% CI		
Intercept	1.88***	(1.74, 2.02)	1.89***	(1.72, 2.01)	1.97***	(1.82, 2.12)		
Intervention	−.21*	(−.41, .00)	−.41***	(−.62, −.24)	−.20	(−.42, .02)		
Baseline of DV	.93***	(.77, 1.10)	.75***	(.60, .88)	.74***	(.61, .88)		
Residual variance	.18***	(.12, .25)	.15***	(.10, .20)	.18***	(.12, .25)		
Model R^2	.66***		.63***		.68***			

Note: *$p < .05$. **$p < .01$. ***$p < .001$. DV = Dependent variable. Models controlled for baseline levels of outcome variable. All estimates listed represent unstandardized values. All continuous predictors are grand-mean centered. *Ns* = 57–71

Table 6 Model results of intervention effects on supervisor outcomes

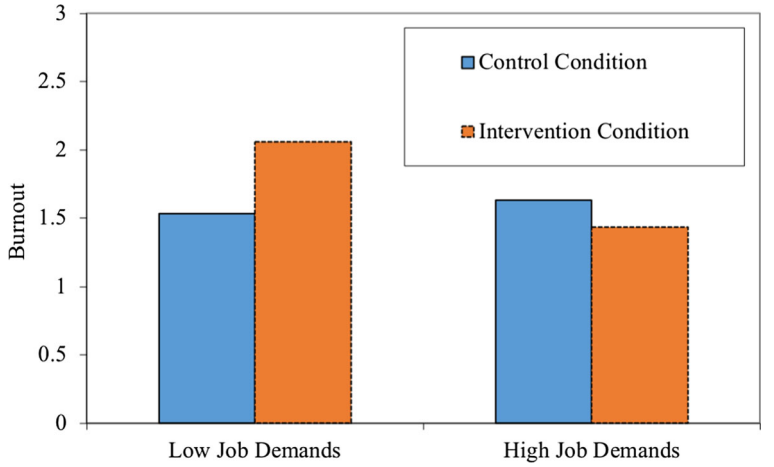
	DV: Job Satisfaction		DV: Organizational Commitment		DV: Burnout		DV: Work-to-Family Conflict	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Intercept	3.90***	(3.68, 4.12)	3.72***	(3.53, 3.90)	1.59***	(1.27, 1.84)	3.17***	(2.93, 3.41)
Intervention	.00	(−.31, .31)	−.37**	(−.64, −.11)	.20	(−.16, .55)	.40*	(.06, .73)
Baseline of DV	.58***	(.41, .75)	.74***	(.58, .90)	.66***	(.45, .86)	.86***	(.62, 1.10)
Residual variance	.24***	(.13, .34)	.17***	(.10, .25)	.29***	(.16, .41)	.28***	(.16, .41)
Model R^2	.52***		.72***		.57***		.58***	
	DV: Psychological Distress		DV: Forest Safety Concerns		DV: Forest Safety Encounters			
	Est.	95% CI	Est.	95% CI	Est.	95% CI		
Intercept	1.68***	(1.52, 1.83)	1.67***	(1.52, 1.81)	1.82***	(1.62, 2.02)		
Intervention	.10	(−.12, .31)	.02	(−.18, .22)	.05	(−.24, .33)		
Baseline of DV	.89***	(.70, 1.04)	.70***	(.55, .84)	.53***	(.30, .77)		
Residual variance	.12***	(.07, .17)	.10***	(.06, .15)	.19***	(.10, .28)		
Model R^2	.79***		.70***		.35**			

Note: *$p < .05$. **$p < .01$. ***$p < .001$. DV = Dependent variable. Models controlled for baseline levels of outcome variable. All estimates listed represent unstandardized values. All continuous predictors are grand-mean centered. *N*s = 38–39

Table 7 Model results of intervention effects on supervisor outcomes as moderated by supervisors' job demands at baseline

	DV: Job Satisfaction		DV: Organizational Commitment		DV: Burnout		DV: Work-to-Family Conflict	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Intercept	3.90***	(3.68, 4.12)	3.72***	(3.53, 3.90)	1.58***	(1.36, 1.81)	3.17***	(2.93, 3.41)
Intervention	−.01	(−.32, .29)	−.38**	(−.65, −.12)	.17	(−.16, .50)	.39*	(.05, .73)
Baseline of DV	.57***	(.40, .75)	.75***	(.59, .91)	.63***	(.44, .82)	.87***	(.60, 1.13)
Job Demands	.10	(−.31, .50)	.05	(−.30, .39)	.07	(−.34, 48)	.03	(−.45, .51)
Intervention × Job Demands	−.26	(−.78, .26)	−.17	(−.61, .28)	−.53*	(−1.06, .00)	−.12	(−.70, .47)
Residual variance	.23***	(.13, .33)	.17***	(.09, .24)	.24***	(.13, .35)	.28***	(.16, .41)
Model R^2	.54***		.72***		.64***		.58***	
	DV: Psychological Distress		DV: Forest Safety Concerns		DV: Forest Safety Encounters			
	Est.	95% CI	Est.	95% CI	Est.	95% CI		
Intercept	1.68***	(1.52, 1.83)	1.67***	(1.54, 1.81)	1.82***	(1.62, 2.02)		
Intervention	.11	(−.10, .32)	.04	(−.15, .24)	.06	(−.22, .34)		
Baseline of DV	.95***	(.79, 1.10)	.73***	(.59, .88)	.56***	(.32, .80)		
Job Demands	.15	(−.12, .43)	−.04	(−.29, .22)	.11	(−.26, .47)		
Intervention × Job Demands	.05	(−.32, .41)	.26	(−.07, .59)	.02	(−.45, .49)		
Residual variance	.11***	(.05, .16)	.09***	(.05, .13)	.19***	(.10, .27)		
Model R^2	.81***		.73***		.37**			

Note: *$p < .05$. **$p < .01$. ***$p < .001$. DV = Dependent variable. Models controlled for baseline levels of outcome variable. All estimates listed represent unstandardized values. All continuous predictors are grand-mean centered. *Ns* = 38–39



Note: Low job demands = 1 SD below the mean, High job demands = 1 SD above the mean.

Fig. 1 Moderated intervention effect of baseline supervisor job demands on supervisor burnout following intervention. Note: Low job demands = 1 SD below the mean, High job demands = 1 SD above the mean

Intervention Effects on Supervisors

Although outcomes of the intervention were neutral or beneficial for employees, outcomes of the intervention for supervisors indicated neutral or detrimental effects. Supervisor-specific results can be understood through the COR theoretical framework (Hobfoll 1989, 2001). First, added responsibilities from the training may have depleted resources, resulting in the two detrimental outcomes observed in participating supervisors: increased work-to-family conflict and decreased organizational commitment. An increase in responsibilities at work can lead to less resources available for use at home, which may manifest as increased work-to-family conflict. Additionally, the adoption of an intervention that puts extra pressure on supervisors for the benefit of their subordinates could reduce the supervisors' feelings of being valued and may even diminish their trust in the organization—two important resources—especially in already resource-limited and high-demands environments, such as large governmental agencies. Because organizational commitment is often predicated on the belief that an organization values all employees and is considerate of workers' needs (Eisenberger et al. 1986), our finding that supervisors experienced decreased organizational commitment post-intervention could represent decreased feelings of value or trust. Supervisors may already have felt overburdened before participating in the intervention. Supervisors who were asked to participate in a training meant to help them better support employees without receiving any additional support for their own needs, may have subsequently felt that their needs and demands were not understood, their existing support of employees was not value or sufficient, or that the organization could not be trusted to meet their needs, any of which could lead supervisors to feel less committed to the organization.

Second, the intervention may also have threatened resources by making the challenges and lack of support that supervisors were already experiencing more salient. Although the training was available to both supervisors and upper management, very

few upper-level leaders participated. Some supervisors may have realized that the behaviors that they were being trained to perform were not behaviors that their own managers were enacting. The training therefore may have illuminated supervisors' own resource deficits, causing negative outcomes. Future research should explore this possibility.

The moderated effect on burnout (Hypothesis 2) was significant but was in the opposite direction than expected—the added responsibilities of the intervention were harmful for those supervisors who had fewer demands at baseline, but positive for those with higher demands at baseline. One explanation for this finding may be that the added demands of the intervention were more salient for those supervisors who started off with lower demands, causing increased burnout. Another possibility is that the demands of the intervention may have added very little, proportionally, for those supervisors who started off with higher demands, allowing them to focus more on the benefits of the intervention and the resources gained therein. We found that job demands at baseline were negatively but not significantly correlated with burnout at follow-up ($r_{Time2} = -.31$). This correlation is typically positive (e.g., Alarcon 2011; Bakker and Demerouti 2017; Nahrgang et al. 2011) in extant literature. While the difference may in some way be related to the intervention's effect on supervisors' burnout at follow-up, given this inconsistency with existing research we surmise that other exogenous forces that were not captured in our intervention may also have influenced the observed relationship between job demands and burnout. Certainly, this difference may also be attributable to a lack of power, given our limited sample size, or to the use of an alternate measure of burnout, as we included Shirom and colleagues' measure (Shirom et al. 2010) instead of the more popular Maslach Burnout Inventory (Maslach et al. 2001). Future research should further explore these possibilities.

Overall, we found that implementing a workplace intervention by means of training supervisors can have positive effects on employees, while also having negative effects on supervisors themselves. This study was unique in its focus on intervention effects on supervisors, and in particular using a COR lens. Our finding that a supervisor support intervention led to some negative effects for supervisors is not only indicative of the difficulty and detail needed to adapt interventions to specific organizations but also the necessity for additional research in this area. STTEP was an intervention created to improve supervisor supportive behaviors specific to the issues faced by USFS employees. Central to the development of this intervention was the infrastructure of the SHIP intervention, which was designed to reduce psychosocial stressors related to work-family conflict and poor safety communication by improving supervisor support (Hammer et al. 2015). Research surrounding effectiveness of supervisor-focused interventions has rarely focused on impacts on participating supervisors, so much more must be understood about the way supervisor-focused interventions impact supervisors before more generalizable conclusions can be confidently made.

Nevertheless, we are hopeful that our results gesture the importance of considering supervisors' well-being in the design and implementation of workplace supervisor training interventions. Many of the effects on supervisors that we tested indicated neutral or nonsignificant outcomes for supervisors, which may in fact be considered *desirable* results, especially in light of the intervention's direct intention to improve employee outcomes. However, because our results also indicated some detrimental effects on supervisors, future intervention research should explicitly consider possible

ways to mitigate potential negative effects. One potential way to mitigate effects on supervisors is to provide them with more resources, such as increased autonomy within the intervention process, or more time allocated to intervention activities. Another potential way to mitigate effects on supervisors is to reduce supervisors' existing job responsibilities prior to conducting trainings or interventions that focus on supervisors as the mechanism of change. Although we found that those supervisors who had higher demands at baseline experienced less burnout on average following the intervention (i.e., results related to Hypothesis 2), reducing demands prior to intervention implementation almost certainly benefits supervisors in other important ways not examined in this study. The demands-control model of stress states that increases in demands lead to strain especially when decision latitude is low (Karasek 1979). As such, providing resources that increase supervisors' control and reduce their demands at work could offset potential negative effects of supervisor-focused interventions. As we argue above, lower overall job demands may make intervention-specific demands more salient, while higher overall job demands may mean that intervention-specific demands are not substantial additions for supervisors. More research should be done in this area to better understand the role of job demands in supervisors' experiences of intervention and training participation.

Another way to improve outcomes for supervisors is to train upper management simultaneously to ensure that supervisors are receiving the support that they are being trained to deliver. Social support systems have been shown to be an important resource with the potential to mitigate the negative effects of high job demands (Pluut et al. 2018), and supervisors' perception of the support they receive from their organization has been shown to moderate their effectiveness as leaders to their subordinates (Erdogan and Enders 2007). Efforts to improve support from upper management may therefore also increase supervisors' ability to effectively implement changes, leading to better outcomes for their employees and for the organization as a whole. Future research should focus on testing these and other potential moderators to determine ways to reduce or eliminate negative effects.

Intervention Adaptation Implications

The current work illustrates that successful intervention adaptations can be useful tools for researchers and practitioners alike. This study answers the call for more research on dissemination and implementation of occupational safety and health interventions (Dugan and Punnett 2017). This study also provides important information on the challenges of supervisor training intervention sustainability if such interventions are experienced negatively.

By adapting STTEP from a previously existing intervention, we were able to benefit from several advantages. One such advantage is that adapting interventions can save significant resources, including time and costs. Evidence-based interventions can be enormously time-consuming and costly to develop, implement, and evaluate, especially when designing and testing a novel intervention. By adapting existing interventions, researchers are able to start with an empirically-tested infrastructure and build upon it to meet the needs of the new context they are interested in changing. Successfully adapting interventions requires a balance between retaining the fidelity of the original

intervention and meeting the specific needs of different organizations, populations, and industries.

Limitations

The current research also has several limitations. The first, and perhaps most important, is that the sample sizes were relatively small. With 67 supervisors and 125 employees, some of whom did not complete the follow-up surveys, our power to detect effects was likely limited. That we were able to detect effects using such small sample sizes speaks to the potential magnitude of change, and future research should continue to strive for larger sample sizes when testing intervention effectiveness. A second limitation was the use of only two time points. Ideally, intervention effectiveness is best evaluated over several different time points, as some effects may develop at different rates depending on how changes trickle through the organization and how long it takes for changes to manifest and take hold. A third limitation was the quasi-experimental design. Forests were not randomized to conditions, but rather assigned based on participation in the preceding needs assessment, with one needs assessment forest and one non-participating forest in each condition. The assignment strategy was chosen with thoughtfulness and intention, but lack of truly random assignment remains a limitation.

Conclusion

In conclusion, the current study showed differential effects of a supervisor support intervention on employees and participating supervisors themselves. While intervention outcomes were positive and beneficial for employees, participating supervisors experienced nonsignificant or detrimental effects. There is great potential in future research about how to mitigate detrimental effects for supervisors. Continued efforts to study impacts on supervisors are essential for informing both research and practice, with the ultimate goal of building interventions that benefit not only front-line employees, but workers across all levels of organizations.

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Data Availability Based on participant confidentiality agreements, full data are not available for public use. However, redacted or de-identified data may be available upon request.

Compliance with Ethical Standards

Conflicts of Interest/Competing Interests None.

Code Availability Analyses were performed in SPSS and Mplus Version 7. Input available upon request.

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