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The Longitudinal Effects of a Family and Sleep Supportive Intervention on Service Member Anger and Resilience

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The Longitudinal Effects of a Family and Sleep Supportive Intervention on Service
Member Anger and Resilience

by

Shalene Joyce Allen

A thesis submitted in partial fulfillment of the
requirements for the degree of

Master of Science
in
Psychology

Thesis Committee:
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Portland State University
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Abstract

The vast majority of workplace intervention research on employee anger and resilience primarily focuses on individual-level strategies for mitigating employee anger and resilience outcomes in the workplace, with no studies having examined these outcomes with tangible occupational health interventions utilizing organizational-level techniques. Thus, the current study extends the literature on how to provide improvements in employee anger and resilience using higher system and organizational change mechanisms by providing evidence-based support for the effectiveness of a Total Worker Health[®] intervention, referred to as the Family and Sleep Supportive Intervention Training (FaSST). This approach employs both health protection and health promotion strategies in improving military service member employee anger and resilience drawing on a sample of 704 full-time service members of the Army and Air National Guard. Using a subset of the data from a clustered randomized controlled trial, results demonstrate the longitudinal effects of a theoretically-driven supportive resource-based intervention method which revealed main effects on decreases in employee anger at 9-months. In addition, results also demonstrated main effects of the TWH[®] intervention on increasing employee resilience at 9-months, with marginally significant main effects of the intervention on increasing employee resilience at 4-months. These results demonstrate effective methods for organizations in supporting employee's psychological health and well-being. Theoretical and practical implications are discussed in the process of examining employee anger and resilience utilizing a TWH[®] integrative approach.

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Chapter 1: Introduction

At some point in time, if left without human intervention, a steaming pot of water will eventually “boil over”, as can employees whose psychological emotions are not well understood, protected, and cared for within the work environment. More specifically, angered employees who reach their breaking point may exhibit unwanted violent behaviors, and research shows workplace violence can have severe consequences. For instance, from a public health standpoint on workplace violence and assault, there were 454 workplace homicides and 20,870 workplace injuries in 2019 alone (National Safety Council, 2021, U.S. Bureau of Labor Statistics, 2019). Detailed estimates of both physical workplace violence and threats of harassment were estimated to cost organizations approximately \$35.4 billion annually (Kaufer & Mattman, 1998; U.S. Merit Systems Protection Board, 2012). As workplace violence costs are difficult to estimate, there has been no such recent updates of costs per incident, however, they are costly, and negative workplace violence outcomes for employees can include turnover, legal retaliation, medical care, absenteeism, and lost productivity time (Gates et al., 2011). Like anger, a recent study found that employees who had experienced occupational violence had lower levels of resilience compared to those employees who had not experienced occupational violence (Rees et al., 2018), which suggests that there is a potential link between employee anger and subsequent violent behavior in addition to the resiliency of workers. Although not all employees who experience anger will commit intentional injury or harmful acts of violence, and not all employees who experience workplace violence as a result of anger will have lowered resiliency, however, a primary

goal of any organization should be to have zero instances of assaults, verbal or otherwise, in their workplaces and to strive for positive resilience outcomes for their employees as research suggests a safe work environment has the ability to lead to a healthy workplace (Kelloway & Day, 2005). Thus, it is imperative to implement workplace resources as a preventable solution to control anger before it reaches the “boiled over” point of violence, and to promote positive increases in resilience.

When capturing the relationship between anger, aggression, and workplace violence, researchers have suggested it is important to recognize anger before it leads to aggression and subsequent violent behaviors (Allcorn, 1994). Anger has been commonly termed an emotional feeling of hostility whereas aggression typically stems from one expressing their anger. Furthermore, research points to aggressive and hostile behavior as preceding workplace violence occurrences (Glomb, 1998). One of the more troubling aspects of employee breaking points is that some organizations may not be able to see or prevent outbursts from occurring. For example, research proposes that employees who have higher levels of self-control are more likely to have sporadic outbursts of workplace violence (Douglas et al., 2008). Thus, just because organizations cannot see employee experiences of anger on a daily or regular basis does not mean it is silent amongst workers. Regardless, if organizations and supervisors do recognize spouts of employee anger, there may be lack of resources and knowledge to know how to intervene to mitigate its impacts. From a theoretical standpoint, reactions to extreme forms of stress are highly influenced by the resources individuals have to offset losses (Hobfoll et al.,

1996). Thus, it is vital to identify specific resources that may aid in the ability to protect employees from resource loss through improving their resiliency and feelings of anger.

As this thesis examines both employee anger and resilience, why then should anger and resilience be studied together? Early on, researchers have pointed to the importance of capturing anger and aggression as a determinant of analyzing individual psychological resilience. For instance, one of the items from a psychological resilience scale developed by Block and Kremen (1996) was “I get over my anger at someone reasonably quickly”, suggesting that for those individuals unable to get over their anger relatively quickly, their resiliency may suffer as a result. More recently, researchers have begun to rapidly develop and implement a resilience intervention to combat the negative psychological stress responses, such as anger, that workers have experienced due to the COVID-19 global pandemic (Albott et al., 2020). The loss of resources employees can experience encourages the development and implementation of organizational-level interventions. Although separate constructs, there is value in examining both negative (i.e., anger) and positive (i.e., resilience) outcomes that employees can experience and provides information on the types of individual differences that can be enhanced following the implementation of workplace supportive resources. In addition, examining these outcomes allows for a more holistic account of the impactful nature of resources and their ensuing impact they can have on protecting employees from negative health and well-being outcomes.

In the aftermath of trauma and anxiety-ridden related events, such as the occurrences that took place on September 11, 2001, researchers reported employees

experiencing more prominent emotions, such as anger (Mainiero & Gibson, 2003). In a similar fashion, worker resilience has served as an important buffer against negative employee outcomes in lieu of COVID-19's distressing happenings, and researchers have urged the need for development of interventions and increases in psychological support during these times (Awano et al., 2020; Song et al., 2020). To capture a more holistic analysis of the effects of supportive workplace interventions on both positive and negative individual difference outcomes that are prevalent in workers' experiences of traumatic events (i.e., anger and resilience), it is vital to evaluate anger and resilience simultaneously in order to understand the depths of specific actionable resource tools that can protect workers amid tragedy and distress. Specifically, it is imperative to evaluate these resource tools on employee anger and resilience outcomes in high-risk occupations due to the increased stressors and exposure to work-related hazards. For example, high-stress jobs are at a greater risk for experiencing higher prevalence's of psychological strain (Ford et al., 2014), which has been illustrated by more current prevalence's of front-line healthcare workers anxiety, depression, and stress while taking care of patients suffering from COVID-19 (Salari et al., 2020).

The Importance of Improving Employee Anger

Anger, a strong visceral emotion with powerful feelings of displeasure, has been found to be highly prevalent in workplaces and poses a significant concern for employees and organizations (Booth & Mann, 2005; Fitness, 2000). For instance, 1 in 4 employees experience significant anger at work (Gibson & Barsade, 1999) and 7.8% of the adult population in the U.S. has a prevalence for poorly controlled anger (Okuda et al., 2015).

Examining our sample of service member employees specifically, as employee anger has been found to be even more prevalent among military personnel. For instance, in a sample of National Guard service members, Worthen and colleagues (2014) estimated the commonness of self-reported anger to be 53.0% for male service members and 51.3% for female service members, emphasizing the frequency of anger amongst service members. Angry individuals are also more prone to approach rather than avoid their perceived offenders through psychological, physical, or emotional means (Berkowitz & Harmon-Jones, 2004). Therefore, it is important for researchers to explore ways in which to mitigate the impacts of anger for not only the health and well-being of employees and service members, but for their organizations, co-workers, and families.

Several antecedents to anger have been identified, such as job stress, organizational injustices, humiliation, job-related conflicts, unsupportive leadership, lack of communication, abusive supervision, and incivility (Allcorn, 1994; Fitness, 2000; Glomb, 2002; Hammer, Lee, Mohr, & Allen, 2020). Anger has also been linked to a host of negative health, work, and home outcomes, such as increased risk of death, illness, pain, gastrointestinal issues, counterproductive work behaviors, having cold unsupportive family units, psychological distress, violence, theft, poor performance, and decreased job satisfaction (Glomb, 2002; Hammer et al., 2020; Moreo, Cain, & Chang, 2020; Repetti, Taylor, & Seeman, 2002; Spector and Fox, 2002; Suinn, 2001; Vandervoort, Ragland, & Syme, 1996). Although a vast majority of the anger literature has focused on the antecedents and outcomes of anger expression at work (Domagalski & Steelman, 2005; Gibson & Callister, 2010; Glomb, 2002), there is a paucity of research in exploring

evidence-based interventions that could mitigate the effects of anger in the workplace (Hammer et al., 2020). It is important to note, that although recent scholars have attempted to peel back the positive sides of anger to form balanced views of its impacts on organizations, for example, seeing positive prosocial outcomes of anger stemming from employees being motivated to remove obstacles or injustices in order to achieve one's goals, these positive outcomes of anger are only found under very favorable conditions (e.g., organizational culture of thresholds for anger being large; Geddes, Callister, & Gibson, 2020). While it is important to acknowledge these conditions when examining anger at work and advocate for organizations to administer an environment where negative employee emotions such as anger can be validated in more positive ways to produce more favorable employee outcomes (Cropanzano, Johnson, & Lambert, 2020), it is most certainly not the standard norm amongst organizations. Thus, with most anger outcomes in organizations being unfavorable, suppressed, and/or deviant, it remains relevant to explore tangible organizational strategies to mitigate this discrete negative emotion in the workplace. Anger has also been identified in high-risk occupations such as the military domain (e.g., anger being a common obstacle service members and veterans face; Blum, Kelly, Meyer, Carlson, & Hodson, 1984; Worthen et al., 2014). As such, understanding and evaluating actionable tools in which employee anger can be reduced in the workplace, specifically for workers in high-risk occupations, is essential to the overall health and well-being of employees, supervisors, and organizations.

The Importance of Improving Employee Resilience

Resilience is known as a state-like adaptable capacity associated with positive psychological processes and is essential for employees to thrive and survive in stressful working environments (Hartmann, Weiss, Newman, & Hoegl, 2020), positively bounce back from stressful or traumatic events (Masten, Best, & Garmezy, 1990; Masten, 2001; Luthans, 2002), and is a valuable resource for employees to draw upon when faced with adversity (Luthans, Avey, Clapp-Smith, & Li, 2008). Currently, there exists little research about work-related contextual antecedents and outcomes of employee resilience. However, recently researchers have found influences on employee resilience stemming from the work environment such as supportive leadership and supportive organizational cultures (Kuntz, Näswall, & Malinen, 2016), as well as sharing responsibilities and work tasks with colleagues to increase resilience (Burns, Poikkeus, & Aro, 2013). Resilience has also been linked to adult mental health, performance, productivity and overall health and well-being outcomes (Gillispie, Britt, Burnette, & McFadden, 2016; Luthans, Avolio, Walumbwa, & Li, 2005; Siriwardhana, Ali, Roberts, & Stewart, 2014; Taylor & Colvin, 2012). In addition, research on resilience outcomes also suggests that employee resilience is positively related to increased work happiness (Youssef & Luthans, 2007) and openness to organizational change (Wanberg & Banas, 2000). In high-risk populations such as the military, service members are faced with significant increases in stressors and adverse events (i.e., deployment readiness and increased risk of mental health problems; Hoge et al., 2004), as well as alarming challenges such as increased suicide rates compared to their civilian counterparts (Bryan, Jennings, Jobes, & Bradley, 2012).

Research suggests that lower levels of resilience could be a potential risk factor in suicidal behavior (Roy, Sarchiapone, & Carli, 2007), stressing the need for researchers to focus attention on finding practical strategies for how best to improve employee resilience, especially in high-risk occupations where employees are impacted with stressful and adverse events at significantly higher rates.

Integrative Intervention Approach

One way to mitigate the impact of these health and well-being outcomes (i.e., anger and resilience) is through the use and implementation of organizational-level occupational health interventions (Nielsen, Randall, Holten, & González, 2010). One type of such occupational health intervention is implementing supportive supervisor training where supervisors are trained on specific and actionable behaviors and best practices for providing support to their employees (Hammer, Brady, & Perry, 2020; Taylor, 2008). While these supportive supervisor-level interventions have focused primarily on intervening at the supervisor levels, little to no research has examined these interventions at both the supervisor and employee levels combined to combat employee anger and resilience. Evaluating a targeted integrative approach intervening with supportive workplace practices on both the employee and supervisor/management levels have been found to be an effective strategy for improving employee health (Goetzel et al., 2010). Notably, research in the occupational health and safety realms have only recently begun examining the benefits of integrated approaches over the past few years and a thorough review of such approaches suggest the need to evaluate these methods in order to provide empirical supportive evidence for their promising effects (Cooklin et al.,

2017). Therefore, this current study examines an integrative intervention approach involving intervening at the supervisor and employees.

The role of supervisors. Supervisors make a unique contribution to organizations, with many day-to-day responsibilities occurring simultaneously that have a grave impact on employee physical and psychological outcomes (e.g., employee learning and performance, employee innovation, and employee emotional exhaustion; Janssen, 2005; Kohli, Shervani, & Challagalla, 1998; Lloyd, Boer, Keller, & Voelpel, 2015) and specifically, in high-risk occupations where supervisor leadership behavior is crucial in preventing burnout of their employees due to their increased work-related stressors and strains (Russell, 2014). General supervisor duties typically include overseeing production, managing employee work and relations, training employees, and communicating effectively about work-related issues or improvements. Supervisors are typically seen as linchpins between higher up organizational management and their employees and thus, are a crucial component of organizational study on the impacts and behaviors they elicit in their employees. Despite the impact supervisors have on their employees, supervisors are only part of the equation in the larger organizational makeup. The second piece to the puzzle is to examine and intervene at the employee level.

The role of employees. Employee health, well-being, and satisfaction are essential for organizational effectiveness and success (Gilbreath & Montesino, 2006; Gregory, 2011). Employees who are not well supported within this framework have been shown to lose creativity, time, effort, and focus, as well as commitment and loyalty to their workplaces (Porath & Pearson, 2010). Specifically, it is important in high-risk

occupations where the prevalence of danger is more apparent (Hammer et al., 2020), as is the risk for employees experiencing negative emotional outcomes such as increased anger and poor resilience. Subsequently, it is essential to evaluate integrative occupational health intervention approaches that focus on incorporating more than one health-related intervention component in order to tackle specific employee health and well-being challenges they might experience while on the job as well as provide useable resource tools workers can draw from in times of distress.

Total Worker Health[®] Approach

Therefore, one way to strengthen these organizational-level occupational health interventions is to take a Total Worker Health[®] approach (NIOSH, 2020), involving not only occupational health protection but also individual health promotion strategies. More recently, researchers have suggested scholars incorporate TWH integrative strategies in order to enhance intervention effectiveness further. For instance, with regard to sleep health, recommendations for intervening beyond one aspect to include facets of individual-level training in conjunction with managerial-level training for improving worker sleep health provides a comprehensive plan of action for protecting workers (Crain et al., 2019). In this study, the TWH intervention that was evaluated focuses on a behavioral health leadership training (*health protection*) for supervisors as well as individualized sleep feedback (*health promotion*) for supervisors and employees. Implementing a TWH intervention approach at the employee and supervisory levels combined allows for a more holistic evaluation when examining employee health and well-being outcomes. Although there has been a recent rise in interest of TWH strategies

to mitigate adverse health consequences for workers, this is not a new concept. In fact, over the years, researchers have urged scholars and practitioners to examine these multifaceted and comprehensive approaches for tackling organizational and employee challenges with regards to work-family conflicts (Hammer & Sauter, 2013). Indeed, systems-levels approaches in conquering organizational issues have grown recently in light of COVID-19. For example, Dennerlein and colleagues (2020), using a TWH framework, discussed important recommendations for supporting essential employees during the pandemic (e.g., a couple recommendations included instituting leader support through action as well as using participatory approaches to involve employees in system efforts in order to contribute more positively to improving employee well-being while also generating improvements on a larger systems-level scale).

While there have been recent studies showing promising evaluations of the effectiveness of TWH interventions for improving worker well-being, for example, proposing well-being benefits for lone workers (e.g., improvements in life satisfaction; Olson et al., 2015) and advancing worker health amongst construction crews (e.g., increased frequency of exercise, health behaviors, and support; Anger et al., 2018), there exists no currently known research evaluating the effectiveness of these integrated approaches on the emotional aspects of employee health and well-being, namely, anger and resilience. With the ability to explore the effectiveness of a TWH intervention approach on service member employee anger and resilience longitudinally, organizations will be better able to tailor and implement these integrated interventions to best fit their specific needs.

Primary Contributions

The current study provides three primary contributions to the organizational science literature. First, the current study is the first to my knowledge to examine the effects of a TWH intervention on an understudied set of outcomes, namely employee anger and resilience. The few intervention studies aimed at mitigating anger in the workplace have mainly targeted employee individual levels (Eslamian, Fard, Tavakol, & Yazdani, 2010; Hargrave, Hiatt, Dannenbaum, & Shaffer, 2008; Linkh & Sonnek, 2003; Zhao, 2017). For example, one anger management program implemented employee group-based telephone conference calls for one hour twice per week. This program included developing coping skills, participant interactive workbooks and relaxation training, which showed significant improvements in employee anger post-treatment (Hargrave et al., 2008). Similarly, most workplace interventions or programs targeted at reducing anger in the workplace have focused on employee strategies to mitigating their own anger (Eslamian et al., 2010; Linkh & Sonnek, 2003; Zhao, 2017) rather than organizational strategies to reduce employee anger. Like anger, much of the workplace resilience intervention literature has primarily focused on intervening at the individual-level. These interventions have been implemented in group settings using a combination of coping strategies, mindfulness techniques, and cognitive perspectives with integrative workshop sessions for employees (Arnetz et al., 2009; Burton et al., 2010; Carr et al., 2013; Hesketh et al., 2019; Jennings et al., 2013; Joyce et al., 2018; Liossis et al., 2009; McCraty & Atkinson, 2012; Millear et al., 2008; Pidgeon et al., 2014; Pipe et al., 2012; Rogerson et al., 2016; Sood et al., 2011; Waite & Richardson, 2003). Only a few

intervention studies have intervened on the manager/supervisor levels using cognitive therapy techniques and coaching sessions (Abbott et al., 2009; Grant, Curtayne, & Burton, 2009; Sherlock-Storey et al., 2013). Researchers urge scholars to focus on organizational strategies and resources to mitigate employee resilience (Kuntz, Malinen, & Näswall, 2017; Robertson, Cooper, Sarkar, & Curran, 2015; Tonkin, Malinen, Näswall, & Kuntz, 2018). Thus, this study contributes to the literature by examining the effects of an organizational-level intervention incorporating TWH techniques for both supervisors and employees to improve anger and resilience outcomes amongst service members.

Second, this study answers the call for future research on the conditions under which supervisor supportive interventions are most effective, which in turn, leads to better understanding of the role supervisors play in the health and well-being of their employees (Hammer, Brady, & Perry, 2020; Straub, Vinkenburg, Kleef, & Hofmans, 2018; Tafvelin, Stenling, Lundmark, & Westerberg, 2019), as well as identifying influential characteristics that could strengthen the success and effectiveness of these intervention effects on employee emotional health and well-being outcomes. Thus, it is not only the case that researchers seek to explore how these supportive workplace interventions are implemented, but there is a need to identify distinct conditions/organizational contextual factors that increase the effectiveness of these interventions in order to better tailor them for organizations to increase long-term support and highlight the specific needs of their employees (Hammer, Truxillo, Bodner, Pytlovany, & Richman, 2019; Hammer, Kossek, Anger, Bodner, & Zimmerman, 2011). In general, with workplace intervention research being a rare occurrence (Anger et al., 2015;

Scharf et al., 2008), the second primary contribution of this study is to understand the conditions and context that impacts training intervention effectiveness for improving employee anger and resilience.

Finally, the current study contributes to the organizational science literature for military service members and other employees in similar high-risk occupations suffering from related high-stress environmental experiences. Service members experience a host of negative health outcomes due to their challenging and unpredictable schedules as well as the stress they endure before, during, and after deployments (Hoge et al., 2004). In addition, soldiers in the military have been found to suffer from a range of health-related challenges such as mental health struggles, PTSD, musculoskeletal problems, and increased alcohol dependency/use (Lee, O'Neill, Denning, Mohr & Hammer, 2020; Mohr, McCabe, Haverly, Hammer, & Carlson, 2018; Williamson, Diehle, Dunn, Jones, & Greenberg, 2019). Exploring how to improve psychological and emotional outcomes for service member employees through tangible workplace resources, provides service members with valuable evidence-based resource tools that they can then take into practice, reflect on, and carry out within their units.

In summary, evaluating the effects of a longitudinal resource-based TWH intervention with health protection and promotion components, will better inform researchers and practitioners of the empirical and evidence-based findings on how to mitigate anger and resilience in high-risk industries, such as the military, as well as finding key supervisory resource buffers that may protect service members against the negative effects of high anger and low resilience. Assessing these effects in a high-risk

population allows for further investigation into the realm of high-risk workplace interventions and informs change to benefit both employees and organizations.

Current Study

The current study examines the longitudinal effects of a TWH intervention, namely, the Family and Sleep Supportive Training intervention (FaSST) for supervisors and employees, part of a larger scale study referred to as MESH (i.e., the Military Employee Sleep and Health study), on two primary service member employee outcomes of anger and resilience, while also assessing the moderating effects of service member perceptions of leadership workplace resources (i.e., Family Supportive Supervisor Behaviors, Sleep Leadership, and General Supervisor Support). The study draws upon Conservation of Resources (COR) theory as a framework for exploring the FaSST intervention effects. Past intervention work and a description of FaSST are provided. Three overarching hypotheses are addressed targeting intervention effects on employee anger and resilience, additionally examining FSSB, sleep leadership, and GSS as moderators of the interventions' effectiveness on service member anger and resilience. The methods used to conduct this study will then be presented, followed by study results and overall findings. In addition, a comprehensive discussion of summary of findings including theoretical and practical implications, contributions towards research advancement, as well as limitations and discussion on future research directions will be examined.

The Family and Sleep Supportive Training Intervention (FaSST)

The occupational health intervention described in this study is referred to as the FaSST (Family and Sleep Supportive Training intervention). FaSST involves a Total Worker Health[®] organizational-level intervention strategy for supervisors and employees to facilitate more positive outcomes for workers via a behavioral health leadership training for supervisors (*health protection*) as well as individualized employee sleep feedback (*health promotion*) for both supervisors and employees. The intervention was hypothesized to provide long-term benefits to service members' overall health and well-being by delivering resource gains through improved sleep health, mental and physical health, safety, and work-family experiences. This current study examined two primary service member employee emotional health and well-being outcomes (i.e., anger and resilience).

Theoretical Framework

This study draws upon Conservation of Resources (COR) theory (Hobfoll, 1989) to provide a framework for understanding how service member employee resource depletion is protected by an increase in valuable resources (i.e., health protection and health promotion mechanisms), as well as exploring the moderated intervention effects of supportive leadership resources on service member resource depletion. COR theory posits that individuals are motivated to protect, retain, and obtain resources and any loss of these resources predicates an individual threat (Hobfoll, 1989). The focal point of COR theory refers to resources, such as *conditions* (e.g., marriage or job status), *objects* (e.g., home or car), *personal resource characteristics* (e.g., self-esteem or skill mastery),

and *energies* (e.g., knowledge or money) to the extent individuals' value and thus strive to protect, retain, foster, and obtain (Hobfoll, 2001). Hobfoll and Shirom (2000) suggest how psychological distress can lead to a loss of resources, while resources that individuals value serve as a protective factor within this stress process.

Specifically, in line with COR theory, this study focuses on the resources of social support. Social support resources can extend from several places both within and beyond the work domain (e.g., one's supervisor, coworker, organization, spouse/partner, customer, family member, etc.). Social support resources are external resources other than what individuals contain centrally themselves and can be used by individuals to increase gains through conditions, objects, personal characteristics, and/or energy resources (Hobfoll & Shirom, 2000). Hobfoll (1990) suggests that individuals will aim to maintain their social support resources to meet their needs and by holding a viable resource pool, individuals can both strengthen and preserve their resources. In a similar fashion, individuals who are in a state of perpetual resource loss may employ the resources they have left in order to have a chance at rebuilding their resource reservoirs (Hobfoll, 1989; Halbesleben et al., 2014). As Hobfoll describes in social support resource theory (1990), individuals are motivated to obtain social support resources in order to better balance out their self-identity, and a large account of the resource's individuals use in mitigating their stress stem from social resources. Thus, individuals are inherently motivated to protect these social resources as they serve as a protective place for them to restore. More recently, Hobfoll (2018) has highlighted the need for researchers to address specific forms of resource social support beyond the broad and more general

recommendations of providing suggestions such as “increased support” or “offer more support”.

This study addresses Hobfoll’s (2018) recommendation for providing more descriptive and specific forms of social support resources and for testing COR theory in organizational TWH interventions focused on improvements in overall worker health. Specifically, this study draws on the resources of social support through a TWH and organizational-level intervention approach (i.e., health protection in the form of supervisor support training and health promotion in the form of personalized sleep feedback education to participants). Using the COR theory lens, for instance, if a service member employee receives increased family and sleep support from their direct supervisor, they may be better able to juggle family or other personal demands and are thus able to protect, maintain, or foster new resource gains such as emotional stability, resilience, work security and self-esteem. Furthermore, if a service member receives increased social support from their organization in the form of supervisor support and sleep effectiveness feedback (i.e., the TWH intervention) they may be better able to manage their sleep health which in turn may allow individuals to acquire new resources or protect their current resources, such as increasing personal resources through increased stress resistance, creating a better work-life balance, improving self-efficacy, increased sleep, better management of their work roles, and boosting ones’ self-evaluation and locus of control.

As mentioned previously, service member employees have been placed in a position to lose resources at more rapid rates, and Hobfoll and Shirom (2000) provide

support for those who have increased difficulty to cope amidst tragedy. They suggest that these individuals typically have less resources to invest from the beginning and therefore, after traumatic loss, these individuals are more likely to experience PTSD or depression. As a result, it is imperative to intervene and integrate health promotion efforts to protect these individuals from further resource loss and/or continued loss spirals.

The Role of Anger at Work

Anger, a strong antagonistic emotion when perceptions of intentional wrongdoing are felt toward someone or something (American Psychological Association, 2020), is a vital component to research for several reasons: **1)** the increase in the U.S. labor force (projected 5.5% increase from 2018-2028 for workers 16 years of age and older) and increase in the overall age diversity of the labor force working beyond previously established retirement ages (projected 15.3% increase from 2018-2028 for workers aged 55 and older; U.S. Bureau of Labor Statistics, 2019) signals the potential possibility of increased frequency of anger occurrences at work due to the projected increases in organizational populations of the labor force; **2)** the negative physical (e.g., increased pain, increased risk of death, higher susceptibility to illnesses, compromised immune system, and increased risk of health problems ranging from arthritis to cancer; Johnson & Broman, 1987; Suinn, 2001) and psychological (e.g., anger intensifies for those who experience posttraumatic stress disorder (PTSD) and major depressive disorder (MDD) and is associated with higher levels of stress; Gonzalez, Novaco, Reger, & Gahm, 2016; Maan Diong et al., 2005; Novaco & Chemtob, 2002) manifestations stemming from workplace anger; **3)** anger being an emotionally charged and activated state that can

trigger violent behaviors (Novaco, Ramm, & Black, 2004) and is common amongst adults (e.g., experiencing anger several times per week to several times per day; Averill, 1983); 4) and lack of research literature examining evidence-based interventions or trainings to reduce anger at work, and specifically, the lack of anger being examined in high-risk industries such as the military domains where increased risk for anger is more prevalent (Blum et al., 1984; Pew Research Center 2011; Taft, Creech, & Kachadourian, 2012). To understand employee anger as an outcome explored in this current study, it is important to examine prior literature on the antecedents and outcomes to employee anger at work, specifically focusing on lack of organizational support resources and supervisor support in high-risk occupations.

Antecedents and outcomes of employee anger at work. Thus far, qualitative interview data suggests that employees experience anger when they face a hectic pace at work and increased job stress (Glomb, 2002). An important finding to consider seeing as how job stress is higher for those in high-risk industries where there is an increase in danger and physical demands (e.g., the work environment for juvenile correctional officers was evaluated as more stressful compared to a normative sample; Auerbach, Quick, & Pegg, 2003). Further research suggests that when employees perceive their organization as being low in organizational social support, anger increased (O'Neill, Vandenberg, DeJoy, & Wilson, 2009). These findings suggest the importance for organizational and social support resources, e.g., if employees perceive their organization as being supportive to where their organization is adopting TWH frameworks and implementing health protection and promotion strategies in the form of supportive

trainings and effective educational feedback reports, employee anger may decrease as a direct result of the introduction of these resource gains. Similarly, previous findings have demonstrated anger and frustration to be the most common outcomes of nurses who deal with difficult patients and may be influenced by outside factors such as lack of environmental and situational support around formal training on how to deal with difficult patients (Podrasky & Sexton, 1988). Recent research has also shown that fair, helpful, and supportive supervisory behavior leads to employees who are less likely to exhibit anger outbursts (Ford, Wang, Jin, & Eisenberger, 2018), making a claim for supportive workplace interventions to be administered to supervisors as a strategy for addressing employee workplace anger through targeting their direct supervisors (Hammer et al., 2020). An exhaustive search in the literature examining employee perceptions of supervisor support as an antecedent of employee anger was found to be nonexistent. Although there was no known research to date examining employee ratings of enacted supervisor support as an antecedent to improvements in employee anger, qualitative interview findings suggest lack of support from managers and lack of good supervision (i.e., being disorganized or ignorant to employee work) are key contributors to employee anger (Booth & Mann, 2005).

Why then are employees angry to begin with beyond poor organizational practices? Theories related to anger, for instance the frustration-aggression theory, posits that you cannot have the incident of aggressive behavior without frustration being present. Similarly, when frustration is present, aggression will always follow (Dollard et al., 1939). These instances are dependent on the perceptions of individuals to perceive a

situation, act, or cue as inherently frustrating to themselves. The event of this frustration can then interfere with individual goals, and over time, can accumulate in acting on aggressive impulses (Dollard et al., 1939). For instance, if employees perceive that they are continuously lacking in supportive resources and organizations continue to employ poor organizational practices, then employee anger may exacerbate due to the accumulation of frustration. As we are examining this study in a military sample, it is also important to look at other causal factors that can perpetuate anger in service member employees specifically.

Research shows that there is a significant relationship between anger and posttraumatic stress disorder (PTSD). Olatunji and colleagues (2010) found those who were diagnosed with PTSD had increased difficulty with their anger compared to control conditions. Similarly, a meta-analysis examining the relationship between anger and PTSD showed a substantial relationship between these two constructs, especially among adults who have been exposed to traumatic events (Orth & Wieland, 2006). A more recent finding in a sample of military service members found that PTSD symptoms and suicidal ideation was deemed dependent on anger, suggesting the need to find strategies to reduce anger in the hopes of lessening suicide risk for those veterans experiencing PTSD (Dillon et al., 2020).

I argue, using data from a larger study, that by implementing the TWH intervention with components focusing specifically on health protection resources (i.e., online leadership training focused on FSSB and sleep leadership with follow-up behavior tracking) and health promotion resources (i.e., sleep/cognitive effectiveness feedback for

both supervisors and service member employees), the present study will see decreases in anger outcomes for service members (e.g., anger being found more prevalent in the military domain; Adler, LeardMann, Roenfeldt, Jacobson, & Forbes, 2020).

Drawing on COR theory, the resources provided through the TWH intervention will promote more positive effects on service member anger, as well as provide additional resource conditions for service members through direct social support. A comprehensive evaluation will be provided by examining the intervention's effectiveness on service member employee anger at both 4- and 9-months post-intervention (see Figure 3). This information is vital in understanding evidence-based methods that alleviate the detriments of workplace anger as well as understanding the varying dimensions of anger at work. With the above evidence and theoretical framework, it is hypothesized that:

Hypothesis 1: The Family and Sleep Supportive Intervention will decrease service member anger at the 4- and 9-month follow-up data collection.

The Role of Resilience at Work

Employee resilience, defined as the ability for workers to bounce back after challenges or significant adversity in their everyday lives and with successful adaptation after such challenges (Britt, Shen, Sinclair, Grossman, & Klieger, 2016), represents “a key strategy that helps employees tackle stress, a competitive job market, workplace conflicts, and address challenges on the job” (Center for Workplace Mental Health, 2020). Thus, understanding ways to increase employee resilience is crucial to: *1*) create employee resources by fostering positive work environments and increase employee coping mechanisms to limit the draining physical and psychological adversities found in

low levels of resilience (e.g., attempted suicide and depressive symptoms; Roy, Sarchiapone, & Carli, 2007); **2)** limit the adverse impact of employee adversity with significant workplace challenges and/or stressors (e.g., a key target of navigating research in employee resilience; Britt et al., 2016) by targeting organizations and individuals in high-risk occupations, as they are more susceptible to encountering high-stake losses and stressors on the job (e.g., death, injury, and consequences not only for themselves, but for others and their communities; Bartone & Barry, 2011); **3)** researchers and practitioners to document and outline the meaning of significant adverse events in organizational environments that lead to resilient employees, in order to expand on not only what warrants a significant adverse event, but the impacts it assesses in employee resilience (e.g., poor environmental working conditions such as noise, interruptions, abusive supervision, and time pressures beyond simple documentation of organizational stressors and strains; Britt et al., 2016; Frese & Zapf, 1999); and **4)** answer and fill the current gap in the literature for organizational behavioral researchers to engender effective strategies aimed at increasing employee resilience (King, Newman, & Luthans, 2016). To understand the outcomes of resilience in this current study, it is important to understand the antecedents and outcomes of employee resilience at work, with a heavy focus on lack of organizational support resources and supervisor support in high-risk occupations.

Antecedents and outcomes of employee resilience at work. A key finding in the resilience literature to improve employee resilience suggests the need for organizations to adopt coping strategy resources for their employees, such as having access to social support (e.g., findings from a study of midwives suggested resilience is

facilitated by coping strategies including access to support, self-awareness, and protection to oneself; Hunter & Warren, 2014). A study using a randomized control trial found that when executives of an organization were exposed to a leadership workshop, four times over a ten-week period, coaching significantly increased resilience, goal attainment, workplace well-being, as well as reduced stress and depression. Participants of this study also indicated that the coaching sessions helped them build better management skills and cope with changes within the organization (Grant et al., 2009). Thus, organizations who target supervisors/management to implement change as well as create supportive workplace mechanisms such as coping strategies and social support for employees, may see improved resilience outcomes by targeting the linkages between adverse events and poor resilience, a major discussion in the resilience literature (Britt et al., 2016). For employees to build resilience, researchers suggest building a strong social network is vital to employees' ability to exhibit resilience in both times of calamity and in times of calmness (Bardoel, Pettit, De Cieri, & McMillan, 2014). Although there has been no known research examining abusive supervision or poor leadership behaviors on employee resilience, research suggests implications of positive leadership. For example, empowering leadership was significantly related to resilient employee behaviors and reward leadership styles coupled with optimism significantly predicted employee resilience (Nguyen, Kuntz, Näswall, & Malinen, 2016). In high-risk occupations, such as policing, research has shown how transformational leadership attenuates the relationship between stress and burnout in situations of high stress (Russell, 2014), and extreme stress coupled with the presence of significant adverse events, a common attribute stemming

from military service, is suggested to be a precursor of poor resilience (Bowles & Bates, 2010). This research speaks to the high-stress nature of being in high-risk occupations, and the additional avenues of support needed to combat some of these stress-related issues such as burnout, and adverse workplace events these employees may experience. The literature on employee resilience is quite ambiguous due to the complexity of examining resilience over time. Researchers have suggested the examination of resilience in longitudinal designs to better address the source of contextual factors on resilience, such as social support (Britt et al., 2016).

Beyond rationale for the impact of workplace support and resources on creating resilient employees. Why are some employees more resilient than others? To answer this question, theory and research on traumatic events and resilience need to be explored, as well as associations of underlying PTSD that typically accompanies these devastating occurrences. More recently researchers have begun to look at resiliency in the face of nationwide and global traumatic events, such as 9/11 and the COVID-19 pandemic. As Almedom and Glandon (2007) state, “resilience is not the absence of PTSD”, meaning the complex nature of individual differences in trauma and subsequent responses that make individuals resilient does not mean that PTSD is not present, in fact quite the opposite. Other researchers have pointed towards the buffering effect of high levels of resilience. For example, Lee and colleagues (2014) found high levels of resilience in firefighters protected individuals from traumatic stress and the proliferation of PTSD indicators. Similarly, individual resources, such as trait resilience, social support, and team cohesion, has the potential to protect military service members from severe PTSD

(Zang et al., 2017). Theoretical underpinnings of resilience, for example the resiliency model, point to the disruption of homeostasis within an individual which can be impacted by major life events, adversity, and stressors (Richardson et al., 1990). When individuals go through this disruptive process within themselves, they must initially find ways to reintegrate, and this reintegration process determines that individual's ability to encompass resiliency. Additionally, this reintegration process takes place once that individual starts to subconsciously or consciously adapt and can then lead to various reintegration outcomes including resilient reintegration, reintegration back to homeostasis, reintegration with loss, or dysfunctional reintegration (Richardson et al., 1990; Richardson, 2002). Furthermore, an organizational specific model of resilience was developed in the context of information systems. Within this model individual resilience is dependent upon both organizational-level (e.g., organizational structure, culture, outside factors) and individual-level factors (e.g., coping styles, personality differences, social support) in determining resiliency outcomes (Rioll & Savicki, 2003). Past theory and research on resilience suggest traumatic events, PTSD, workplace resources, and individual resources have the potential to impact employee resilience outcomes.

The current study focuses specifically on a TWH intervention strategy for supervisors and employees. This intervention approach is hypothesized to facilitate more positive outcomes for workers via a behavioral health leadership training for supervisors (*health protection*) as well as individualized employee sleep feedback (*health promotion*). I argue that the FaSST intervention will promote more positive resilience outcomes for service members. Drawing on COR theory, the resources provided through

the FaSST intervention and subsequent social support mechanisms (i.e., health protection via supervisor support training and health promotion via individualized sleep feedback) provide tangible coping strategy resources that directly impact service member resilience. A comprehensive evaluation will be provided by examining the intervention's effectiveness on service member resilience at both 4- and 9-months post-intervention (see Figure 4). This information is vital in understanding evidence-based intervention strategies to alleviate negative workplace outcomes stemming from poor resilience, as well as understanding the varying dimensions of resilience at work. With the above evidence and theoretical framework, it is hypothesized that:

Hypothesis 2: The Family and Sleep Supportive Intervention will increase service member resilience at the 4- and 9-month follow-up data collection.

Moderators of the Family and Sleep Supportive Training Intervention on anger and resilience outcomes. Additionally, this study seeks to examine the overarching question of when certain intervention effects on service member anger and resilience will hold true and under what conditions. Recent research suggests supportive interventions targeting supervisors are most effective when organizations and supervisors within the context are ready for these types of resources, for example, intervention effects at 3- and 9-months post-training were found for veteran employee sleep quality, sleep quantity, and perceived stress only when considering the moderated effects of supervisor attitudes toward veteran employees at baseline (Hammer, Brady, & Perry, 2020). Similarly, other supportive intervention research findings targeting supervisors reveals how a supportive intervention is most effective for veteran employees when veterans

already perceive their supervisor as eliciting higher levels of social support at baseline (Hammer, Wan, Brockwood, Bodner, & Mohr, 2019). Thus, this study introduces and explores specific forms of leadership resources such as Family-Supportive Supervisor Behaviors (FSSB), Sleep Leadership (SL), and General Supervisor Support (GSS), proposing to moderate the interventions' effectiveness on service member employee anger and resilience outcomes.

FSSB as a moderator and a resource. Family-supportive supervisor behaviors encompass four overarching levels of supervisor support including *emotional support* (e.g., supervisors being aware of employee personal lives), *role modeling* behaviors (e.g., supervisors exhibiting how to integrate their work and nonwork through proactive behaviors), *instrumental support* (e.g., supervisors managing employee scheduling conflicts on a daily basis), and *creative work-family management* also known as win-win management (e.g., work redesign and cross-training to help employee burdens of work and family responsibilities; Hammer, Kossek, Yragui, Bodner, & Hanson, 2009). To shed light on the importance of work-family conflict and emotional outcomes such as anger, Llies and colleagues (2012) developed the attributional model of work-family conflict. Within this model work-family conflict leads to causal search and attribution that then leads to emotional reactions such as anger, which ultimately leads to maladaptive behaviors such as aggression (Llies et al., 2012). Earlier researchers have also pointed in the direction of work-family conflict and the association of negative anger outcomes (Burke, 1988). Like anger, work-to-family conflict and family-to-work conflict were negatively related to resilience (Hao et al., 2015). These findings lead to key insights on

how and why employee perceived FSSB might interact with the FaSST intervention to show improvements in employee outcomes, e.g., through the increase or decrease in support resources around work and family life at baseline.

GSS as a moderator and a resource. General supervisor support behaviors include employees being able to rely on their supervisors when things or situations start to get tough on the job, supervisors being willing to listen to employee job-related challenges, and supervisors' general feelings of caring about the well-being of their employees (Yoon & Lim, 1999). Similar to the research findings above, poor work and family experiences, which could be considered a negative well-being outcome for employees, has been linked to poor anger and resilience outcomes. This suggests that initial employee perceptions of GSS might interact with the FaSST intervention depending on the levels of positive or negative well-being support resources employees report receiving from supervisors, which could then show employee improvements in both anger and resilience outcomes.

Past research provides evidence for supervisor support dimensions directly impacting employee anger and resilience. Fitzgerald, Haythornthwaite, Suchday, and Ewart (2003) found that employees who had angry feelings toward their supervisors significantly related to lower levels of supervisor support. Furthermore, recent research shows how supervisor support is associated with higher levels of resilience (Lee, Brown, et al., 2020). Thus, employee perceptions of their supervisors eliciting higher levels of supportive behaviors at baseline, provides valuable information on the levels of gains currently being received by the employees, which in turn, should allow for employees to

maximize on the effects of the health promotion component of FaSST (i.e., individualized sleep feedback) because they already have a positive gain in resources at baseline (i.e., key principles of COR theory in the gain saliency tenet, gains beget further resource gains; Hobfoll, 1989). Similarly, higher levels of employee perceptions of their supervisors evoking these supportive behaviors at baseline, will likely lead to their direct supervisors more apt to adopt the skills learned in the health protection component of FaSST (i.e., interactive online training for leaders) because supervisors already eliciting supportive behaviors are more likely to continue with supportive efforts (Hammer, Brady, & Perry, 2020). Thus, higher ratings of FSSB and GSS from employees at baseline, compared to low FSSB and GSS, should in turn moderate the FaSST intervention promoting more positive outcomes for service member employees (i.e., decreased anger and increased resilience). I suggest employees experiencing higher levels of support will be better able to manage their emotional and psychological health. However, no currently known research has examined FSSB or GSS on anger and resilience outcomes.

Sleep Leadership as a moderator and a resource. Sleep leadership is a recently developed domain-specific leadership resource that aims to tackle sleep related challenges, specifically in high-risk occupations such as the military. Sleep leadership encompasses leader behaviors that set employees up for acquiring better sleep and to support subordinate sleep concerns (Gunia, Sipos, LoPresti, & Adler, 2015). For example, sleep leadership behaviors can range from supporting employees to monitor the temperature of their sleeping environment to encouraging employees to get more sleep

before difficult or challenging tasks. The forefront of sleep leadership was predicted to have a grave impact on overall health, including psychological well-being specifically for those facing high-risk challenges (Gunia et al., 2015). This study focuses on sleep leadership as a resource for military service members, specifically, how sleep leadership can moderate the intervention's effectiveness leading to improved service member outcomes 4- and 9-months post-intervention.

Although sleep leadership is a relatively new construct, research suggests the beneficial effects of supervisors who elicit sleep leadership behaviors (i.e., higher sleep leadership ratings were found to be associated with less sleep disturbances and sleep impairments among service member employees; Sianoja et al., 2020). Similar research shows how a one-hour supervisor training intervention in sleep leadership showed improvements in leader sleep problems, sleep knowledge and sleep attitudes compared to the control condition. Unit members in the intervention condition were also more likely to report better sleep health than the waitlist control group (Adler, Bliese, LoPresti, McDonald, & Merrill, 2020). Drawing on the gain saliency tenet of COR theory, employee perceptions of their supervisors eliciting higher levels of sleep leadership behaviors at baseline, provides valuable information on the levels of gains currently being received by the employees, which in turn, should allow for employees to maximize on the effects of the health promotion component of FaSST (i.e., individualized sleep feedback) because they already have a positive gain in sleep supportive resources at baseline (i.e., key principles of COR theory in the gain saliency tenet, gains beget further resource gains; Hobfoll, 1989). Similarly, higher levels of employee perceptions of their

supervisors evoking these sleep leadership behaviors at baseline, will likely lead to their direct supervisors more apt to adopt the skills learned in the health protection component of FaSST (i.e., interactive online training for leaders focusing on FSSB and Sleep Leadership) because supervisors already eliciting sleep leadership behaviors may be more inclined to continue with sleep leadership efforts. This gain in resources should in turn moderate the intervention promoting more positive outcomes for service members (i.e., decreased anger and increased resilience). I suggest service member employees who perceive their supervisor eliciting high levels of sleep leadership support behaviors at baseline will be better able to manage their emotional and psychological health. With little research relating sleep leadership to individual psychological outcomes, however, there exists no previous research linking these constructs.

Given COR's basic tenet for individuals to strive, maintain and protect the resources that are valuable to them, the gain paradox principle, the overarching corollaries, combined with the previous research described above, I hypothesize that those employees who perceive their direct supervisor as eliciting more leadership supportive resources at baseline (i.e., FSSB, sleep leadership, and GSS) will be in a better context to maximize on the additional resources from the intervention which in turn will bring about more positive outcomes for service member employee anger at 4- and 9-months post-intervention. Furthermore, those employees who rate their supervisors as having higher FSSB, sleep leadership, and GSS at baseline, their direct supervisor in turn, will be more likely to continue their supportive efforts and maximize on behaviors learned through the interactive online training for leaders and thus, contributing to more

positive outcomes for service members in the form of decreased anger and increased resilience at 4- and 9-months post-intervention (see Figures 5-7). With COR theory and past research evidence in mind, it is hypothesized that:

Hypothesis 3: FSSB, sleep leadership, and GSS will moderate the effects of the Family and Sleep Supportive Intervention on service member anger and resilience at 4- and 9-months following the intervention such that those service members who report high FSSB, sleep leadership, and GSS at baseline will benefit more from the intervention compared to those service members who report low FSSB, sleep leadership, and GSS at baseline.

Chapter 2: Methods

Participants and Study Overview

My study used a subset of the data from the Military Employee Sleep and Health study (MESH). MESH is a Department of Defense-funded study aimed at improving service member health, sleep, and overall well-being, using a cluster randomized controlled trial (RCT) design with a waitlist control group. Participants consisted of full-time military service member employees of the Oregon Army and Air National Guard. Participants were employed from a wide array of positions within the Guard, with most employee participant positions including maintenance, logistics, human resources, finance and supply, and their supervisors. Service member employees were eligible to sign-up if they worked at least 32 hours per week for the Oregon National Guard, thus, excluding those individuals who were Drill Status Guard (DSG) and drilled exclusively on weekends. Researchers chose this population of workers specifically to capture the experiences of employees whose full-time job is to provide support for the day-to-day functioning of the National Guard. For example, staff felt that employees who only worked one weekend a month, i.e., DSG individuals, did not have enough interaction with their supervisors and units to provide more meaningful data to assess the impacts from this study. Data were collected from Army and Air National Guard headquarters and armories across the state of Oregon between August 2017 and May 2020. Army groups completed all study activities in the first half of the study, followed by Air groups. Online survey data was collected at three time points, baseline, 4-months, and 9-months, see Figure 1 for study design overview including targets and timeline.

Regarding demographic information, there were 704 service member employees who completed the baseline survey and were randomized. Participants were on average, primarily White ($n = 565$, 80.3%) Males ($n = 526$, 74.7%) aged 36.2 years old ($SD = 9.08$, $range = 19-69$). Employee participants primarily indicated they were married ($n = 462$, 65.6%), living with a partner ($n = 81$, 11.5%) or in a committed relationship ($n = 22$, 3.1%). Those in a relationship indicated that they had been in their relationship on average for 10.4 years ($SD = 8.4$, $range = 0-47$). There were 398 Air National Guard employees (56.5%) and 306 Army National Guard Employees (43.5%) at baseline. Service member employees indicated they worked on average 42 hours per week ($SD = 5.02$), had been in their current full-time position for approximately 4.7 years ($SD = 5.54$), and in the National Guard for an average of 10.9 years ($SD = 7.35$). See Table 1 for a descriptive breakdown of sociodemographic and military information by condition.

Recruitment and Data Collection

Approximately one month prior to the start of recruitment activities, research staff began working closely with National Guard leadership in the state of Oregon. The research team held meetings with individual leadership units across Oregon to gain approval, brief them on the study processes, overall expectations, and provide additional information, establishing at least one POC from each unit. From this, leadership was asked to send an email out to all full-time unit staff one-month prior to staff on-site visits, with information about the study and a link for service members to sign-up (See Appendix A). An electronic link was sent to the email addresses of participants after they signed up for the study, with a questionnaire sent via the REDCap survey data platform,

as service members were asked to complete the surveys off-work time per federal regulations. Participants were offered a gift card for \$25 for completing each survey (Baseline, 4-months, and 9-months), and \$25 for each 21-day period wearing the actigraphy device (Baseline and 9-months), a total of \$125 for service members completing all waves of the study. Service member partners/spouses were also eligible to participate in the online survey portion of the study, but those data are not presented here. All study participants consented to be part of the study before the survey began.

After the initial recruitment email was sent and to encourage participants to sign-up ahead of time, a second email reminder was sent by unit leadership two weeks prior to staff on-site visits. Staff then visited Army and Air bases across the state of Oregon to deliver the actigraphy devices to service members who had already signed up online, as well as to give an in-person briefing of the study, an overview of actigraphy device wear and care, and to conduct a final push to recruit service members who had not signed up in-person or online. For those who signed up in person, we had service members sign physical consent forms. This interactive two-pronged approach of online recruitment and in-person recruitment helped to increase service member participation. We also provided food to all service members to entice them to sign-up, proving to be an effective approach. All baseline surveys were open for one month, closing before research staff picked up the actigraphy devices. Several reminder phone calls and emails were made to motivate participant survey completion. After the end of the 21-day period of participants wearing the actigraphy devices, research staff picked up the devices and asked each

participant to complete a short questionnaire of their experiences wearing the device and whether they felt the device changed their behavior.

No onsite visit was required for 4-month data collection, and we simply emailed their 4-month survey, with email and/or phone reminders if not completed within a two-week period. At 9-months, we again emailed out the final survey, and MESH research staff was again onsite to deliver the actigraphy devices for the second and final round of actigraphy 21-day data collection, then picking them up again at the end of each 21-day period. Prepaid address boxes for those who knew they would not be present at the pickup date were left. Each participant was asked to identify their direct supervisor on each of the surveys (i.e., clarified as “the person you would contact if you needed to take a day off”) and we then created a list of identified supervisors. The research team also worked closely with service members and unit leaders to collect all remaining actigraphy devices and to complete each online survey.

Randomization

MESH was a randomized controlled trial, as such, service member participants were randomly selected and assigned to either the intervention group (condition = 1) or the waitlist control group (condition = 0). Randomization into groups occurred after baseline data collection (see Figure 2 for consort diagram). Given the organizational structure of the National Guard, 60 military units were paired into 10 groups (i.e., matched groups) with respect to location of the unit, size, type of job, and military branch (i.e., Army and Air) providing a total of 20 groups between Army and Air. Groups were then randomized within their respective branches (i.e., Oregon National Guard Army and

Air units at baseline), with a total of 10 groups in each condition. The service members in the intervention group and their supervisors received in-person sleep feedback approximately one to two months after baseline data collection. Supervisors in the intervention group also received the training link online and were asked to complete the training on work time. The waitlist control group received their sleep feedback after 9-month data collection was complete. Supervisors in the waitlist control group received the option to complete the training after the study was over, and employees in the control group received their sleep feedback reports after the study was complete.

Total Worker Health[®] FaSST Intervention Description & Implementation

The TWH organizational-level intervention comprised two primary activities: 1) an interactive computer-based training for supervisors focused on family and sleep supportive behaviors and sleep leadership with a two-week follow-up behavior tracking exercise (*health protection*), and 2) individualized sleep feedback reports on overall sleep health for those participants who chose to wear the actigraphy device (*health promotion*; See Figure 2 for randomization and intervention overview). Participation was voluntary for those who chose to wear the actigraphy device, however, completion of the training was ‘mandatory’ and sanctioned by the National Guard. Supervisors were directed to complete the training on work time even if they opted out of participation in the voluntary parts of the study.

Health Protection Supervisor Training for leaders. One month following completion of baseline data collection, supervisors randomized to the intervention condition received the training link via their work email, taking them to a secure training

site where they could login and complete the one-hour interactive Family and Sleep Supportive Training for leaders. Roughly one month was allotted for supervisors to complete the training. The time allotment was for both practical and logistical purposes. For example, there were some units that were spread out across Oregon, making recruitment longer for units not in one central location. The unique training link was left open and available for one full month to encourage supervisors to complete the training with added flexibility and time to complete the training while at work. Detailed follow-up protocols were implemented to encourage supervisors to participate in the training, including trained research staff following up via phone and verbally giving information to supervisors about the importance of the online training. Employees who participated in the survey identified their direct supervisor, and in total, there were 215 identified supervisors (intervention condition = 123, control condition = 92). Of the 123 supervisors in the intervention condition who were sent the link to complete the training, 72.6% ($n = 100$) of supervisors in the intervention group completed the training.

The online supervisor training was designed to increase sleep leadership behaviors, family-supportive behaviors, and work-family relationships that supervisors exhibit toward their employees, but specifically designed to provide tangible and practical information for supervisors about how best to support their service member employees. The interactive online training for leaders consisted of two components, the 1-hour online training, and putting what they learned into practice. This second component involved a daily two-week behavior tracking exercise for supervisors to track supportive behaviors including *emotional support* which comprise actions that

demonstrate the service member is valued, *instrumental support* involving actions that help service members manage sleep and work, *win-win management* for recognizing service member work, and *role modeling* which encompass actions that the supervisor displays showing their own balance of work and sleep related challenges (Hammer et al., 2011). This exercise required about 5-minutes per day at the end of each workday for supervisors to track how many times they elicited these four supportive mechanisms to their service member employees.

Health Promotion Personalized Sleep Feedback for supervisors and employees.

Sleep feedback reports, the second part of the intervention, were administered one to two months following baseline data collection to employees and supervisors randomized to the intervention condition who wore their actigraphy devices for at least three consecutive days with a maximum of 21 days of actigraphy information. Individualized sleep feedback reports were developed with OHSU and the Sleep Research Center at the Walter Reed Army Institute of Research (WRAIR), containing detailed daily information on service member sleep. Trained research staff would sit down with each participant first discussing the importance of sleep and how this study measured sleep with a sample Actigraph. MESH used Philips-Respironics Actiwatch 2's to measure total sleep time and wake after sleep onset. Total sleep time and wake after sleep onset was derived using the Actiware software's standard scoring algorithm (Marino et al., 2013). Staff members would then go over each service members sleep patterns where research staff were trained to identify three major components of the sleep report, specifically highlighting *fragmentation* (i.e., the number of nights sleep was interrupted/activity was shown),

duration (the number of nights where sleep was less than 6 hours), and *consistency* of sleep and wake times (the number of mornings/nights where a shift of more than 2 hours was seen from a previous sleep period) as the basis for each feedback session. Next, service members Actigraph were converted to a mental readiness graph for participants to see a visual of their sleep patterns and level of daily functioning, highlighting nights of sleep where the service members mental readiness dipped below green (normal) into the yellow/orange (reduced) and into the red (high-risk). Service members were then given a graph and an average sleep pattern chart of how their sleep compared with others in their randomized unit. After review, we created a summary sheet so any of the trained research staff could take a file, quickly glance at the summary, and provide a thorough, informed, and consistent feedback session.

Finally, at the end of each feedback review, service members were given a recommendations page to choose two goals focusing on improving their sleep and optimizing readiness through several behaviors (bedtime, stress-related, eating/drinking/substance use, and sleep health in work settings behaviors) that would allow them to achieve their overall desired sleep goals of improving sleep quality (less time being awake during sleep periods and shorter amounts of time to fall asleep roughly 15-20 minutes) and sleep quantity (getting 7-9 hours of sleep every night and having consistent bed and wake times). Service members were also allowed to think of other behaviors outside of this list, tailored to them, that would help them achieve their higher desired sleep goals. To help participants stick with their goals and feel a sense of belongingness to their chosen goals, participants were then asked to write down two

behaviors of their choosing to commit and implement over the following two-week period. Research staff informed each participant that a brief follow-up survey would be administered in two weeks to check on the progress of their goals and if they felt their goals helped improve their sleep. Of the 358 employees who were randomized to the intervention condition at baseline and completed the survey, sleep feedback was given to 94.1% of employee participants ($n = 337$).

At the end of each session, research assistants then noted the duration of each feedback session as well as the general level of engagement for each participant. All participants received their copy of the sleep report. We also provided resources for reliable information on sleep health (e.g., [National Sleep Foundation](#)). Additional information on the Family and Sleep Supportive Intervention and downloadable intervention materials can be found online (www.meshstudy.org).

Measures

Dimensions of Anger Reactions. Service members rate the response option that best describes the amount of time they felt this way over the past month with the following five items on a 5-point scale (1 = *none or almost none of the time*, 5 = *all or almost all of the time*): “I found myself getting angry at people or situations,” “When I got angry, I got really mad,” “When I got angry, I stayed angry,” “When I got angry at someone I wanted to hit them,” and “My anger prevented me from getting along with people as well as I’d have liked to” (Forbes et al., 2004). The Cronbach’s alpha for the current study is 0.87 at baseline, 0.87 at 4-months, and 0.87 at 9-months (See Appendix B).

Brief Resilience Scale. Service members rate the extent to which they agree that each statement relates to their own life with the following six items on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*): “I tend to bounce back quickly after hard times,” “I have a hard time making it through stressful events,” “It does not take me long to recover from a stressful event,” “It is hard for me to snap back when something bad happens,” “I usually come through difficult times with little trouble,” and “I tend to take a long time to get over set-backs in my life” (Smith et al., 2008). The Cronbach’s alpha for the current study is 0.88 at baseline, 0.87 at 4-months, and 0.87 at 9-months (See Appendix B).

Family-Supportive Supervisor Behaviors (FSSB, service member ratings).

Service members rated the extent to which they agreed that their direct supervisor exhibited family-supportive supervisor behaviors with the following four items on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*): “Your supervisor makes you feel comfortable talking to him/her about your conflicts between work and non-work,” “Your supervisor demonstrates effective behaviors in how to juggle work and non-work issues,” “Your supervisor works effectively with employees to creatively solve conflicts between work and non-work,” and “Your supervisor organizes the work in your department or unit to jointly benefit employees and the company” (Hammer, Kossek, Bodner, & Crain, 2013). The Cronbach’s alpha for the current study was 0.95 at baseline (See Appendix B).

Sleep Leadership (service member ratings). Service members rated the extent to which they agreed that their direct supervisor exhibited sleep leadership with the following eight items on a 5-point scale (1 = *never*, 5 = *always*): “My supervisor asks

subordinates about their sleeping habits,” “My supervisor encourages subordinates to get adequate sleep,” “My supervisor considers sleep as an important planning factor,” “My supervisor encourages subordinates to nap if needed,” “My supervisor encourages subordinates to catch up on sleep before missions that require long hours,” “My supervisor works to encourage subordinates to have a good sleep environment (quiet, dark, not too hot or cold),” “My supervisor discourages the use of caffeine or nicotine use within several hours before trying to go to sleep,” and “My supervisor encourages subordinates to try to go to sleep on time” (Gunia et al., 2015). The Cronbach’s alpha for the current study was 0.92 at baseline (See Appendix B).

General Supervisor Support (service member ratings). Service members rated the extent to which they agreed with each statement with the following three items on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*): “My supervisor can be relied upon when things get tough on my job,” “My supervisor is willing to listen to my job-related problems,” and “My supervisor really does not care about my well-being,” (Yoon & Lim, 1999). The Cronbach’s alpha for the current study was 0.77 at baseline (See Appendix B).

PTSD Checklist for DSM-5 (service member ratings). Service members rated the extent to which they had been bothered by each problem in the past month with the following four items on a 4-point scale (0 = *not at all*, 4 = *extremely*): “Repeated, disturbing, and unwanted memories of the stressful experience,” “Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations),” “Having strong negative beliefs about yourself, other

people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous),” and “Feeling jumpy or easily startled,” (Price et al., 2016). The Cronbach’s alpha for the current study was 0.84 at baseline (See Appendix B).

Analytical Strategy

To assess the primary hypotheses that the intervention leads to positive service member outcomes (i.e., decreased anger and increased resilience) and is moderated by additional social support resources in the form of leadership support at baseline (FSSB, sleep leadership, and GSS), an intent-to-treat approach was conducted to compare service member outcomes for those assigned to the intervention group (condition = 1) and for those service members assigned to the waitlist control group (condition = 0). The intent-to-treat approach allowed for participants to be compared and analyzed in their original randomized groups. To best address the nesting and clustering of participants, intervention analyses were conducted using multi-level modeling in Mplus version 8 (Muthén & Muthén, 2017). Employees were nested within their original randomized groups using a two-level analysis of covariance approach, which controls for baseline level values of the dependent variable (i.e., anger and resilience). Since this study aimed to assess intervention effects over time, I used recommendations from Bodner and Bliese (2018) for follow-up data points. Main intervention effects on service member anger and resilience were conducted using all available participant data. Missing data values were attended to using full information maximum likelihood (FIML), which is the default when analyzing data in Mplus in order to maximize model estimations of the observed

data. In addition, to assess differences in intervention effects across time points for both anger and resilience, 4- and 9-month models were run with a model comparison approach. The moderated intervention effects of (FSSB, sleep leadership, and GSS) on 4- and 9-month service member outcomes (anger and resilience) were conducted and ran in separate models using all available data from service members at baseline to maximize statistical power to detect intervention effects. The condition variable as the predictor was grand-mean-centered, as was baseline levels of the outcomes, moderator variables, and the control variables. Descriptive and exploratory statistics were conducted with SPSS version 27, and all other analyses were run in Mplus. This analytic approach best addressed the research hypotheses examining the intervention's effectiveness at reducing service member anger and increasing service member resilience at 4- and 9-months. Baseline leadership support variables were examined as moderators to address the third hypothesis of when certain intervention effects might hold true, rather than how or why such effects occurred. These analyses best addressed the specific aims of this study and took into consideration the overall complex study design using a subset of the data from MESH.

Control variables. Based on previous research and theory, three control variables were selected for inclusion due to their suggestive nature of influencing both anger and resilience outcomes in this study, including employee baseline reports of PTSD, baseline levels of the outcomes, and a flag for Coronavirus-19 (COVID-19). Baseline PTSD was used as a control in all analyses and was motivated by past research, e.g., PTSD has been found to be linked to both anger and resilience (Almedom & Glandon, 2007; Green et al.,

2010; Jakupcak et al., 2007). Olatunji and colleagues (2010) found that individuals who were diagnosed with PTSD had a harder time dealing with their anger compared to those in control conditions. Furthermore, meta-analytical findings reported a substantial relationship between anger and PTSD, especially for those adults that have been victim of traumatic events (Orth & Wieland, 2006). Like anger, resilience has been shown to be impacted by traumatic events and linked to levels of PTSD (Almedom & Glandon, 2007). Resilience has also been shown to buffer the impacts of PTSD for individuals (Lee et al., 2014; Zang et al., 2017). Using COR theory as a framework, those individuals who indicated the presence of PTSD at baseline, may have less resources to invest when participating in the intervention, and thus controlling for PTSD is essential to observe the true relationship of the intervention's effectiveness on employee anger and resilience. In addition, there was a flag created for Coronavirus-19's (COVID-19) to assess the impact on only the 9-month employee outcomes. The COVID-19 variable represented those individuals who completed the 9-month survey on or after March 8th, 2020, when the Declaration of State of Emergency was announced where the study was conducted. There were approximately 56 participants in the intervention group who completed their surveys after March 8th, 2020, and thus was controlled for in all 9-month models. As recommendations for using a two-level analysis of covariance approach for determining intervention effects (Bodner & Bliese, 2018), I controlled for baseline levels of anger when running the anger models and baseline resilience when running the resilience models. To assess the relationships of interest more accurately in this study, and for

simplicity, final reported results including tables and figures represents models with the inclusion of the control variables listed above.

Chapter 3: Results

Sample Response

As this study implemented an intent-to-treat approach, analyses were run with all available participant data ($n = 704$). In total, 704 service member employees were randomized at baseline into either the intervention ($n = 358$) or control ($n = 346$) conditions (see Figure 2 for a full Consort diagram). Survey retention rates at 4-months indicated 82.4% for the intervention condition ($n = 295$) and 83.5% for the control condition ($n = 289$). Retention rates at 9-months indicated 76.8% for the intervention condition ($n = 275$) and 79.1% for the control condition ($n = 274$). For all three waves combined, i.e., baseline, 4-month, and 9-month, employee survey retention rates indicated 69.8% for the intervention condition across all three waves ($n = 250$) and 72.0% for the control condition ($n = 249$).

Preliminary Analyses

Before the hypothesized models were ran and tested in Mplus, preliminary analyses were conducted in SPSS to examine and identify missing data, accuracy, potential outliers, and skewness of the variables of interest. After assessment of visual tools (i.e., box plots, frequency distributions, and tables), I then followed up with quantitative assessments (i.e., analysis of percentages) and found no evidence of influential outliers (Aguinis et al., 2013).

After assessment of outliers, the data were examined to determine normality, homoscedasticity, and linearity between study variables. Assessment of descriptive statistics and q-q plots revealed dependent variables and some control variables,

including employee anger, resilience, and PTSD, deviated from normality. However, anger, resilience, and PTSD were transformed to assess if these deviations from normality impacted model interpretations. After modeling with and without the transformed outcome and control variables, it was determined that the results did not differ substantively. Thus, for simplicity of interpretation, the original untransformed values for anger, resilience, and PTSD are reported.

As this study implemented an intent-to-treat approach, where employees were nested within their original randomized groups, Intraclass correlation coefficients (ICCs) were examined at the person-level and group-level to determine the appropriateness of multilevel modeling approach (Bliese, 1998). ICCs ranged from 0.52 – 0.58 for the individual level depending on the outcome specified. Group-level ICCs for employee anger ranged from 0.02 – 0.06 while employee resilience ICCs ranged from .004 – 0.01, which suggests the variation in anger and resilience was in large part, not due to group membership. However, although these variations in model variables at the group-level are small in nature, multilevel modeling was used as a conservative approach to account for the nested structure of the data where participants are nested in their respective groups.

Means across intervention and control conditions for outcomes, control variables, and moderators for baseline, 4-month, and 9-month are presented in Table 2.

Correlations, reliability coefficients, means, and standard deviations are presented in Table 3.

Hypothesis Tests

Main Effects

Hypothesis 1 stated that the intervention would decrease service member anger at the 4- and 9-month follow-up data collection. The main effect of the intervention on service member employee anger at 4-months was not statistically significant ($b = .004$, $SE = .07$, $p = .96$, pseudo $\Delta R^2 = .000$; $d = .01$). The main effect of the intervention on service member employee anger at 9-months was statistically significant ($b = -.16$, $SE = .07$, $p = .026$, pseudo $\Delta R^2 = .025$; $d = .30$), in the expected direction with a small magnitude of effect (Cohen, 1988). Thus, hypothesis 1 was partially supported. These results indicate that the TWH intervention significantly decreased anger 9-months following the intervention, but not 4-months following the intervention. Table 4 reports model results of main intervention effects on service member employee anger at 4- and 9-months.

To explore whether intervention effects differed across time, model constraints were added to constrain effects to be equal over time. Results concluded that intervention effects statistically differed across time at 4- and 9-months for employee anger ($\chi^2 = 12.59$, $df = 2$, $p = .002$), thus the assumed common model with constraints does not fit the data well, and effects in this constrained model are not reported. These differing effects across anger at 4- and 9-months suggest that the intervention effects may take longer to develop in this specific employee outcome, as evident in why anger increased at 4-months before significantly decreasing at 9-months.

Hypothesis 2 stated that the intervention would increase service member employee resilience at the 4- and 9-month follow-up data collection. The main effect of the intervention on service member employee resilience at 4-months was marginally

significant ($b = .09$, $SE = .05$, $p = .06$, pseudo $\Delta R^2 = .004$; $d = .17$). The main effect of the intervention on service member employee resilience at 9-months was statistically significant ($b = .09$, $SE = .04$, $p = .038$, pseudo $\Delta R^2 = .01$; $d = .16$), in the expected direction with a small magnitude of effect (Cohen, 1988). Thus, hypothesis 2 was partially supported. These results indicate that the TWH intervention significantly increased resilience at 9-months following the intervention and approached significance for increases in employee resilience 4-months following the intervention. Table 4 reports model results of main intervention effects on service member employee resilience at 4- and 9-months.

To explore whether intervention effects differed across time, model constraints were added to constrain effects to be equal over time. Results concluded that intervention effects did not statistically differ across time at 4- and 9-months for employee resilience ($\chi^2 = .44$, $df = 2$, $p = .803$), as inherently evident from the marginal significant result of employee resilience at 4-months. Thus, the assumed common model with added constraints does not significantly differ from the hypothesized model where effects are not constrained to be equal. Model fit did not differ substantively across the constrained and hypothesized models, thus, common intervention effects on employee resilience in the constrained model are also reported. Intervention effects on employee resilience at 4-months in the constrained model ($b = .09$, $SE = .04$, $p = .02$, pseudo $\Delta R^2 = .01$; $d = .17$) and 9-months in the constrained model ($b = .09$, $SE = .04$, $p = .02$, pseudo $\Delta R^2 = .003$; $d = .17$) were statistically significant, in the expected direction and with a small effect (Cohen, 1988).

Interaction Effects

Hypothesis 3 stated that FSSB, Sleep Leadership, and General Supervisor Support would moderate the effects of the intervention on service member anger and resilience at 4- and 9-months following the intervention such that those service members who report high FSSB, sleep leadership, and GSS at baseline would benefit more from the intervention compared to those service members who report low FSSB, sleep leadership, and GSS at baseline.

Employee reports of FSSB did not significantly moderate the intervention effect on 4-month anger ($b = -.05$, $SE = .04$, $p = .261$, pseudo $\Delta R^2 = .003$) or 9-month anger ($b = .04$, $SE = .04$, $p = .289$, pseudo $\Delta R^2 = .000$). Results also concluded employee reports of FSSB did not significantly moderate the intervention effect on 4-month resilience ($b = .06$, $SE = .05$, $p = .233$, pseudo $\Delta R^2 = .004$) or 9-month resilience ($b = -.01$, $SE = .06$, $p = .923$, pseudo $\Delta R^2 = .000$). Thus, no interaction effects were found of the intervention and employee reports of FSSB on 4- and 9-month anger or resilience, suggesting. Table 5 reports model results of intervention effects on service member employee anger and resilience as moderated by baseline FSSB.

Employee reports of sleep leadership did not significantly moderate the intervention effect on 4-month anger ($b = .01$, $SE = .07$, $p = .852$, pseudo $\Delta R^2 = .000$) or 9-month anger ($b = .03$, $SE = .04$, $p = .428$, pseudo $\Delta R^2 = .000$). Results also concluded employee reports of SL did not significantly moderate the intervention effect on 4-month resilience ($b = -.06$, $SE = .05$, $p = .261$, pseudo $\Delta R^2 = .004$) or 9-month resilience ($b = -.07$, $SE = .06$, $p = .256$, pseudo $\Delta R^2 = .003$). Thus, no interaction effects were found of

the intervention and employee reports of SL on 4- and 9-month anger or resilience. Table 6 reports model results of intervention effects on service member employee anger and resilience as moderated by baseline SL.

Finally, employee reports of GSS did not significantly moderate the intervention effect on 4-month anger ($b = -.02$, $SE = .05$, $p = .647$, pseudo $\Delta R^2 = .000$) or 9-month anger ($b = .01$, $SE = .05$, $p = .863$, pseudo $\Delta R^2 = .000$). Results also concluded employee reports of GSS did not significantly moderate the intervention effect on 4-month resilience ($b = .06$, $SE = .05$, $p = .233$, pseudo $\Delta R^2 = .004$) or 9-month resilience ($b = .01$, $SE = .05$, $p = .793$, pseudo $\Delta R^2 = .003$). Thus, no interaction effects were found of the intervention and employee reports of GSS on 4- and 9-month anger or resilience. Table 7 reports model results of intervention effects on service member employee anger and resilience as moderated by baseline GSS.

In summary, no moderated intervention effects of leadership support variables at baseline (i.e., FSSB, SL, and GSS) were found for anger or resilience at 4- or 9-months following the intervention. Hypothesis 3 was therefore not supported.

Chapter 4: Discussion

Summary of Findings

The results from this study showed that a TWH organizational-level supportive intervention encompassing both a behavioral health leadership training for supervisors (*health protection*) as well as individualized employee sleep feedback (*health promotion*), directly improved service member anger and resilience. Specifically, results revealed partial support for hypothesis 1 with significant main effects of the intervention on employee anger at 9-months, but not 4-months following the intervention's implementation. Results also revealed partial support for hypothesis 2 with a significant main effect of the intervention on employee resilience at 9-months, and a marginally significant effect of the intervention occurring on resilience at 4-months. Study findings demonstrate the longitudinal effects of a TWH intervention on more distal employee health and well-being outcomes of anger and resilience. Although results did not support hypothesis 3, revealing a lack of baseline leadership support variables (i.e., FSSB, SL, and GSS) as moderators of the interventions effectiveness on employee anger and resilience 4- and 9-months following the intervention, and therefore providing lack of context for when these intervention effects are more favorable, the intervention showed significant main effects that directly improved employee anger and resilience. Thus, this study provides evidence of the longitudinal impactful nature of the efficacy of the intervention to contribute directly to improvements in employee health and well-being, and these effects do not depend on context-specifics, at least in regard to leadership support behavior prior to the implementation of the TWH intervention. Overall, this study

provides several contributions to the organizational science literature and provides strong evidence for previous researcher recommendations on examining employee health and well-being outcomes associated with TWH integrated designs (Hammer & Perry, 2019).

Explanation of Results

Main Effects

Alternative Explanations for Null Findings at 4-month. The lack of main intervention findings on more proximal outcomes of employee anger and resilience at 4-months suggests that occupational health interventions not directly targeting anger and resilience specifically, may take more time to develop. For instance, it may be possible there are other factors occurring before these effects are presented at 9-months. These processes could possibly be explained through employees developing improved sleeping habits as a result of being provided feedback on their sleep and subsequent behaviors. In addition, it may take time for supervisors to improve their leadership supportive behaviors in their units, and therefore, the results and positive employee changes within these units would also take time to develop after employees are able to see and report the improvements of leadership support behaviors following the intervention.

Furthermore, it is quite possible that there are various mechanisms and additional variables that should be explored as mediators prior to analyzing anger and resilience intervention effects at 4-months. For instance, while past research suggests employees who have higher levels of self-control are more likely to have sporadic outbursts of workplace violence (Douglas et al., 2008), it would be advantageous to explore if those individuals higher in self-control are angrier. Theoretically, given that the frustration-

aggression hypothesis proposes that frustration can accumulate over time and lead to individuals acting on aggressive impulses (Dollard et al., 1939), it would be interesting to examine if individuals who undergo frustration accumulation after an event or interaction act on their aggression because of higher self-control that may then contribute to an individual's prevalence for increased anger.

Additionally, it would be favorable to examine organizational-level variables as moderators of the interventions effectiveness on improving employee anger and resilience at 4-months. For example, research has provided an insight into contributing factors to supervisor anger that can have detrimental outcomes for employees as well (Hammer et al., 2020). Thus, it would be advantageous for future research to explore supervisor anger as a moderator of the interventions effectiveness for improving employee anger and resilience at 4-months as well as explore additional mechanisms of organizational injustices or interpersonal injustices that may be contributing to why employees are angry to begin with and how that could then impact intervention effectiveness. Finally, as past research has shown how employees who did not screen positive for PTSD were more likely to benefit from the intervention (i.e., through an increase in positive emotions; Mohr et al., 2021), it would be beneficial for future research to explore the moderating role of PTSD on a TWH intervention involving health protection and promotion components in order to assess the impacts these trainings can have on employee emotional outcomes such as anger for those individuals who do not screen positive for PTSD. Exploring these additional mediators and moderators of the

interventions' effectiveness on improving employee anger and resilience could help explain what may be occurring at 4-months post-intervention.

Interaction Effects

Alternative Explanations for Null Moderated Findings at 4- and 9-months.

Although, the results from this study showed that baseline levels of employee perceptions of FSSB, SL, and GSS did not moderate intervention effects further, there has been numerous works that suggest the importance of the pre-intervention context and trainee readiness in producing such effects, such as having supportive supervisors (Hammer et al., 2019), positive supervisor attitudes towards employees (Hammer & Brady et al., 2020), and allowing employees to have control over their work time (Hammer et al., 2016). While these results are unexpected and perplexing, there may be reasonings behind why these findings might have occurred in this study. For instance, a rationale for the lack of moderated findings, could be that although past employee reports of supervisor support at baseline has shown to enhance intervention effects, where those high in resources (i.e., supervisor support at baseline) beget more resources (i.e., improvements in health, work, and home outcomes), in a sense the rich get richer with resources (Hobfoll, 1989). However, in this study, findings may be revealing that the rich get richer, but those lacking in resources also get richer. In other words, the intervention is effective at varying levels of supervisor support at baseline, and not only those who are high in supportive resources. These processes can also be explained under the COR theory framework. That is, individuals who are lacking in resources (e.g., lower levels of supervisor support at baseline) may make last ditch efforts to employ the resources they

have left if they perceive the introduction of the intervention as a viable resource tool that may aid in the rebuilding of their personal resource reserves (Hobfoll, 1989; Hobfoll et al., 1991; Hobfoll, 2001; Hobfoll, 2009). On the opposite spectrum, individuals who report greater access to supervisor supportive resources (e.g., higher levels of supervisor support at baseline) are in a better position to capitalize on further resource gains to enrich their resource pools (Hobfoll, 1989). Thus, there is a potential for employees, at varying levels of reported supervisor support at baseline (i.e., low, high, and moderate FSSB, SL, and GSS), to both be motivated to acquire the resources provided through the intervention, which would explain why neither FSSB, SL, or GSS at varying levels interacted with the intervention to promote additional increases in employee health and well-being outcomes at 4- or 9-months (i.e., anger and resilience). These theoretical alternative explanations have also been documented in the intervention literature. For instance, some studies revealed that employees who reported poorer perceptions of their supervisors through leader-member exchange (LMX) and lower levels of supervisor support for their personal life at baseline were found to benefit more from the intervention compared to workers who reported high LMX or higher supervisor support at baseline (Hammer & Truxillo et al., 2019; Kelly et al., 2014). Conversely, other intervention studies have revealed moderated intervention effects for employees who reported higher levels of supervisor support at baseline compared to lower levels of supervisor support (Hammer et al., 2016; Hammer & Wan et al., 2019). These conflicting findings help support the notion mentioned earlier that moderating effects might be eradicated because of the intervention being shown to be effective regardless of high or

low levels of supervisor support. Cohen and Wills (1985) further extend these theoretical findings with the main support hypothesis, suggesting an increase in well-being despite current support availability. In addition, the sample in which this intervention was implemented into could provide further explanation for these findings.

Despite the pre-intervention context, military service members are already at an increased risk for poor health and well-being outcomes (Adler et al., 2020; Blum et al., 1984; Bryan et al., 2012), and are then in need of additional resources to offset losses despite the levels of supervisor supportive behaviors they reported at baseline. In other words, military supervisors and employees who undergo the health promotion and protection efforts of the TWH intervention under the organizational-level perspective of training supervisors in how to enact supportive behaviors more effectively, in addition to service member employees participating in their own health behavior efforts, may be more motivating to this sample above and beyond levels of how employees feel supported by their supervisor prior to the intervention. Furthermore, there could be other conditional interactive effects outside of the work environment (e.g., relationship or partner support, personal factors and values) that could provide additional context under when these intervention effects may be promoted further.

Additionally, considering significant main intervention effects were found for employee anger and resilience at 9-months, and a marginally significant intervention effect was found for employee resilience at 4-months, there was a significant relationship found between those employees who received the intervention and direct improvements in their emotional health and well-being outcomes. This is in contrast as to why

moderators are introduced and when results are typically found, e.g., for one subgroup but not another or for weaker relationships between the predictor and dependent variable (Baron & Kenny, 1986). Finally, employees may perceive support and enacted support in various ways. Bolger and colleagues (2000 & 2007) suggest that invisible support, where individuals are not made aware of receiving support, is more beneficial compared to individuals who are aware that support is being made. This is an important distinction in how and why employees may report their supervisors as high in support, but don't benefit more from the intervention than those employees who report low supervisor support behaviors, because those supervisors who were reported high in supervisor support behaviors may not be effectively communicating their support in a satisfactory manner to the employee (e.g., calling out an employee for fixing their mistake). Similarly, employees who report low levels of supervisor support behaviors may have supervisors who enact more invisible support efforts where employees are not made aware of their supportive efforts (e.g., fixing a mistake without drawing the employees' attention to it). These mechanisms can signal as to why leadership behaviors did not significantly moderate the intervention effects further at 4- or 9-months following the intervention for those employees who reported high levels of supervisor support behaviors at baseline. Indicating that supervisors, even those reported to exhibit high levels of support, could be better trained on how to best implement their supportive efforts. Similarly, employees at all varying levels of supervisor support may need additional resources for various reasons as stated earlier. Future research should examine forms of invisible support in workplace

intervention research in a variety of samples to understand its effects on employee outcomes.

Furthermore, researchers have emphasized the difficulties in detecting interaction and moderator effects (McClelland & Judd, 1993; Memon et al., 2019) despite strong theoretical rationale for expecting such effects to occur. Field research is especially difficult to detect moderator effects because of lower residual variances of the moderation term which leads to lower statistical power (McClelland & Judd, 1993). With regards to this study, despite using optimal strategies with analyzing a subset of the data from a random sampling procedure as well as using the full employee sample in the multilevel models, it is quite plausible that this study was not powered to detect moderating effects. Examining a priori power analyses with at least 80% power suggests the current sample size of 704 would need to be increased in order to detect even a small moderating effect in this sample. This is not surprising as research suggests extremely large samples are needed in order to have sufficient statistical power to detect interactions in field research (McClelland & Judd, 1993). This is one possible explanation for the null moderating effects at 4- and 9-months on employee anger and resilience outcomes.

Finally, it is quite possible that ceiling or floor effects could have occurred. For instance, baseline levels of FSSB had a mean of 4.10 for those in the intervention condition, SL had a mean of 2.28, and GSS had a mean of 4.28. Additionally, model outcomes of anger and resilience had a baseline mean of 1.71 and 3.80, respectively. While baseline values of FSSB (4.10) and GSS (4.28) suggests that most participants indicated their supervisors as quite proficient in family-specific and general supervisor

support and baseline values of resilience (3.80) suggests most participants indicated they were already fairly resilient, as higher scores (up to 5) indicate higher perceptions of support and higher levels of resilience, it is possible that ceiling effects could have occurred causing little variation. On the other hand, baseline SL (2.28) values for those in the intervention condition suggests that most participants indicated their supervisors not as proficient in providing support for their sleep health and baseline anger (1.71) values suggests that most participants indicated their anger was fairly low to begin with (both out of 5) indicating that floor effects could have occurred.

The lack of moderated interactions of baseline leadership support variables on the interventions effectiveness at improving anger and resilience at 4- and 9-months suggests there is a greater motivational need for resources occurring in this sample in that the intervention is needed amongst these employees despite the varying levels of supervisor support. As mentioned earlier, individuals with lower reports of supervisor support may have fewer resources and are in a motivated state to acquire additional resources to offset their losses. On the other hand, individuals with higher reports of supervisor support may also be after the acquisition of additional resources in order to build protection of loss in the future (Hobfoll, 1989; Hobfoll, 2011). Therefore, this study provides further insight into the mechanisms behind why leadership support variables may not moderate an integrated intervention with individual and organizational components on more specific individual-level outcomes of anger and resilience due to the possibility of employees being motivated to acquire additional resources beyond the resources that they received prior to the intervention.

Contributions

This study is one of the first to examine the longitudinal effects of an organizational-level TWH workplace intervention on employee emotional health and well-being outcomes of anger and resilience, while also contributing to the extension of research on workplace aggression and potential resources to combat workplace violence occurrences. The vast majority of intervention research on improving anger and resilience have focused on resources provided to the individual, rather than a combination of individual and organizational-level intervention resources in improving these employee outcomes. Recently, researchers have pointed towards the need to evaluate organizational interventions to improve anger (Hammer et al., 2020) and resilience (Kuntz et al., 2017; Robertson et al., 2015; Tonkin et al., 2018). However, these intervention approaches have not been documented in the literature. Therefore, this study provides one of the first organizational systems-level perspectives of intervention evaluation with findings supporting positive improvements of employee anger and resilience over time. Furthermore, this study brings forth evidence-based support for a TWH intervention, focused on supporting employees with individual-level health feedback resources in promoting employee health and organizational-level health protection resources in the form of training supervisors in how to better support their employees' family and sleep health, to improve emotional health and well-being outcomes, namely, anger and resilience.

This study also contributes to the literature by providing evidence of promoting more positive outcomes through decreased anger and increased resilience for those in a

military setting. With unpredictable schedules, endured effects of stress over time, and a host of service-related challenges (Hoge et al., 2004; Lee et al., 2020; Mohr et al., 2018; Williamson et al., 2019), it is imperative to provide evidence-based research to the community and society at large on how service member outcomes can be improved.

Johnson and colleagues (2007) echo this need for discovering ways in which the health of military service members and their families can be enhanced. It is the hopes of this study's findings to help provide evidence-based resources and tools that can enact change for workers on a greater systems-level by disseminating these materials into the communities they have been found to improve. Future studies would benefit from expanding these evidence-based tools into the public to further the promotion of organization and employee health.

Theoretical Implications

One of the key theoretical implications of this study is the longitudinal evidence of an occupational TWH intervention in improving employee understudied health and well-being outcomes, namely anger and resilience. This study advances COR theory by providing ample evidential support for the necessity to implement interventions that focus on resource-driven change at the systems and environment level rather than focusing solely on the individual-level where blame or responsibility is put solely on the employee for mitigating their anger or resilience in which their work-related demands may be contributing to. In addition, health promotion and intervention research using COR theory should be applied to a variety of ecology domains, such as the workplace, in order to fully understand and further define not only how prior (i.e., baseline levels)

resources interact with workplace interventions on employee outcomes, but also provide evidence for the effectiveness of specific and tangible resource-driven interventions. Similarly, evidence in support of the TWH intervention for improving employee anger and resilience, extends the notion that building both personal and social resources through systems-change strategies of health protection and promotion efforts in the form of training supervisors to be more supportive of family and sleep health and employee feedback and sleep monitoring to promote their own personal health lends credence to the availability of providing multiple resources to implement greater change (Hobfoll & Schumm, 2000). Researchers emphasize the complex nature of organizational ecologies in being able to create viable resource pools and reservoir and specifically, for resiliency to be strengthened via occupational interventions, there must be a workplace structure that supports these efforts (Hobfoll, 2011). Furthermore, research has shown how personal and social resource loss increases emotional distress such as anger (Hobfoll et al., 2003; Lane & Hobfoll, 1992), suggesting the importance of protecting and providing employees with personal and social resources that they are able to utilize to promote and protect their health and well-being. This current study provides a specific concrete approach to enhance the workplace environment and structure by providing organizations with supportive tools (i.e., health protection and promotion components). The TWH intervention analyzed in this study provides strong support as an organizationally supportive resource caravan passageway that can lead to the success and sustainment of workplaces through the enrichment of social ecological resources (Hobfoll, 2011).

Additionally, this study addresses more recent challenges of using COR theory within the work environment. Specifically, an organizational environment that institutes broader goals or resources (e.g., provide increased social support) is not in and of itself enough to be as effective at satisfying employee needs. Rather, it is imperative for organizations and intervention researchers to show and support how employees and supervisors can utilize these resources to be most effective (Hobfoll et al., 2018). This study addresses this gap by providing supervisors and employees with specific ways in which they can utilize the TWH intervention resources. For example, supervisors as part of the health protection component of the intervention were trained on how to employ supportive behaviors as well as employees and supervisors utilizing sleep feedback goals to promote healthy sleep habits and set goals in ways that were valued to each of them individually. Overall, this study advances COR theory by addressing the need to examine specific forms of resources and how they interact with one another to impact employee outcomes.

It is very rare to examine significant main effects from intervention research in the occupational health field (Burgess et al., 2020), and it should be noted the TWH intervention analyzed to evaluate its effects on employee anger and resilience in this study was based and grounded in theory from the beginning. The health protection component of the intervention in training supervisors on how to better support employee family and sleep needs and the health promotion component in providing employees feedback about their health behaviors are both heavily based in both the training literature and build upon theoretical social support and resource-based principles (Bell et al., 2017;

Hammer et al., 2019; Kirkpatrick, 1994), which could help explain employee resource gains (i.e., decreased anger and increased resilience) 9-months post-intervention. A 25-year systematic review of occupational health interventions provide insight into some of the reasoning behind why interventions in the past have not proven effective, one of the major reasons is the lack of theoretical rationale present in the design of interventions and in the examination of outcome variables (Burgess et al., 2020). Thus, this study demonstrates the important theoretical implications of occupational health intervention research that is grounded in theory from the beginning and examination of outcomes that are also strongly tied to theory and well defined (i.e., employee anger and resilience).

Practical Implications

The current study has several practical implications for researchers, practitioners, and organizations. First, by evaluating family and sleep supportive interventions using a TWH framework and providing evidence for their improvements in employee health and well-being outcomes (i.e., anger and resilience), gives rise to the importance of incorporating health promotion and protection efforts to strengthen intervention work (NIOSH, 2020). This will aid researchers and practitioners in the development and tailoring of their occupational interventions to provide a combination of health promotion and protection efforts at the supervisory-level and individual-level to initiate a full organizational change perspective to improve the health and well-being of workers. Furthermore, this approach would alleviate some of the burden of solely using individual-level approaches to tackle employee anger and resilience as employees may feel a lack of support from their organization in tackling their health and well-being where their job

may have inadvertently contributed to the exacerbation of those poor outcomes to begin with.

Additionally, the current study provides implications for the health and well-being of service member employees specifically, by improving reports of anger and resilience. As described above, anger is more prevalent in high-risk occupations such as the military (Adler, LeardMann, et al., 2020), and improving psychological resilience of service members has been at the forefront of organizational research efforts to assist the Department of Defense for promoting resilience amongst its members (Meredith et al., 2011). Thus, this research provides evidence into tangible workplace resources that have been shown to improve anger and resilience longitudinally amongst service member employees. This will help not only those service members who suffer from such affects (Blum et al., 1984; Bryan et al., 2012), but will also help civilian organizations know how to mitigate service member employee anger and resilience in the workplace and provide successful strategies on reintegration.

Furthermore, this study provides practical implications and contributions for emphasizing how critical sleep and employee support for work-family stress are in today's workforce. For instance, recent cross-sectional research suggests minority men had reported having poorer sleep quality since the start of the pandemic and 85% of these participants reported they had trouble staying or falling asleep due to worrying about the pandemic (Millar et al., 2020). Similarly, it is imperative in today's workforce to support employees who are balancing multiple demands outside of work, such as parenting responsibilities. For instance, there can be detrimental outcomes through increased

parenting stress and higher conflict with spouses, specifically for those employees who have poor work-family balance (Chung et al., 2020). Therefore, in lieu of the pressing need to support employees in today's occupations, especially with regards to work-family and sleep, this study aids in providing practical and tangible resources to organizations, supervisors, and employees on how to promote and protect workers from occupational stressors and strains. This study further provides evidence of the practical implications for employees to track their own sleep health using wearable devices in order to visually see the impacts on the quality and quantity of their sleeping habits. Employees being able to monitor their own sleeping habits and make adjustments based on research backed recommendations may also help employees feel a sense of control and mastery over their own lives. Furthermore, this study provides practical implications for organizations to have resources available to enhance supervisor support, beyond more broad support mechanisms. Within the training, supervisors are trained on specific family-supportive supervisor behaviors and sleep leadership principles that provide concrete behaviors leaders can straightforwardly utilize. For example, supervisors who encourage and role model behaviors for healthy work-family balance and sleep, set the stage for promoting better habits and conditions amongst their work units. In addition, having supervisors be trained to recognize potential warning signs of employees who might be struggling with their sleep or work-family balance and providing ways in which supervisors are able to help their employees through concrete direction, enhances the organizational makeup and culture for promoting a positive place to work amongst current and future employees.

Finally, this study supplies insight into the methodology of RCT research on assessing individual-level variables. As this study uses a subset of data from the larger RCT, the analytical approach of this study required a complex intent-to-treat design in order to fully account for the clustered structure of the data and in order to conservatively provide evidence of the main effects of this intervention on distal employee outcomes. Despite the rigorous challenges and time in conducting multilevel analyses, it is important to accurately match the methodological approach to the hypotheses in order to advance the evaluation of occupational health interventions on employee health and well-being outcomes (Burgess et al., 2020).

Limitations and Future Directions

Although this study provides several practical and theoretical implications, there are also some limitations. First, while data for this current study comes from a larger study (i.e., MESH), all participants in this study were service member employees working full-time for the National Guard. While many high-risk occupations face similar studied outcomes (e.g., anger and resilience; Bernabé & Botia, 2016; Meffert et al., 2008), it remains unknown whether the resources examined in this study would play similar roles for employees suffering from anger and resilience in other organizations not facing such high-stakes challenges. Additionally, the resources examined in this study might be more valued by service member employees working in high-stress situations where higher levels of support resources are needed to mitigate negative health outcomes compared to those workers in non-military samples who might have varying thresholds for the levels of resources they need to mitigate similar outcomes. Thus, it would be

advantageous for future studies to assess the impacts of longitudinal occupational health interventions, employing the integrated supportive health approach, to assess employee anger and resilience, not only for the evaluation and generalizability of these findings in other samples, but to provide practitioners with evidence-based tools that they can then use, disseminate, and implement into the workplace.

Another limitation, looking at the methodology of the outcome variables should be noted. Anger and resilience outcomes in the larger study MESH, were based on measures that asked participants more generally of their experiences with anger and resilience relevant to their own lives. However, it would be advantageous for future studies to examine daily self-report measures of anger (Ford et al., 2018), and also develop and measure day-to-day employee resilience in order to gain understanding of the daily fluctuations in employee experiences with anger and resilience and measure the covariances of daily or weekly changes in these employee outcomes. Examining daily-level reports of anger and resilience would provide evidence of the stressful nature of employee adaptations after traumatic events and their impact on employee outcomes, i.e., giving rise to the nature of change within and between employees with daily information on when these effects started to occur and the duration of daily effects over weeks or even months. This would further extend recent findings that supervisor support interventions can enhance positive emotions on a daily level (Mohr et al., 2021). Future studies could then examine occupational health intervention effects on anger and resilience over time with this daily diary information and account for more qualitative

reports in addition to quantitative assessments to supply a more holistic account of intervention effects on employee outcomes.

As mentioned earlier, one alternative explanation for the null moderated intervention findings of employee perceptions of leadership support improving anger and resilience, is the lack of statistical power to detect moderating effects due to sample size. It would be advantageous for future studies to examine under what conditions these TWH field interventions are most effective on employee anger and resilience with a larger sample size as research provides insight into the difficulties of detecting moderating and interaction effects that are true moderating effects but are not able to be seen or detected due to insufficient sample size (McClelland & Judd, 1993). Furthermore, it may be beneficial for additional organizational context variables to be examined in future research as potential moderators, given adequate sample size. For instance, considering other avenues of non-work and more informal avenues of support that could contribute to enhancing intervention effects on employee anger and resilience.

Finally, it is important to acknowledge that although this study is not able to account for the partition of the health protection (supervisor support training) and health promotion (individualized sleep feedback) components of the intervention on employee anger and resilience, it is imperative to strengthen the impact of organizational-level TWH interventions by integrating health protection and health promotion components in the evaluation and framework of these interventions (NIOSH, 2020). As is the scope of this thesis in extending the organizational science literature past individual-level intervention approaches to mitigate anger and resilience in the workplace and examine

the effectiveness of employing a full organizational change perspective utilizing a TWH design with integrative health promotion and protection components.

Conclusion

The current study examined the longitudinal effects of a family and sleep supportive organizational-level intervention, utilizing a TWH framework encompassing health protection and promotion efforts, on employee anger and resilience outcomes. Specifically, study results point towards the first study to evaluate and detect the effectiveness of an integrated organizational-level intervention strategy on improving distal outcomes of employee anger and resilience. Although these study results are novel in nature, researchers have insisted taking a dual resource approach in examining employee outcomes proves beneficial above and beyond only one resource component (Freedy & Hobfoll, 1994). In addition, a review of organizationally focused techniques provides evidence to these findings and to organizational-level driven strategies in improving employee-level outcomes by reducing worker stress (LaMontagne et al., 2007). This study also points towards the improvements of more positive service member employee outcomes, such as resilience, in addition to mitigating negative outcomes such as anger in the hopes to shed light on the effectiveness of these intervention approaches in expanding on both the positive and negative aspects of worker emotional health and well-being outcomes. Finally, this study supports the integration of resources at the employee and organizational levels, i.e., organizational-levels are just as important to intervene as the individual-level and as such, urges researchers to expand on these

research findings in future studies to further promote positive improvements in the health and well-being of employees and their families.

Table 1.
Means (SD) and Percentages of Baseline Employee Sociodemographic and Background Information by Condition.

Variable	Intervention (<i>n</i> = 197 - 358)	Control (<i>n</i> = 195 - 346)
Male	37.9%	36.8%
Age	35.94 (8.98)	36.49 (9.18)
Race/Ethnicity		
White	41.3%	39.4%
Latinx or Hispanic	4.6%	4.3%
Black or African American	1.0%	0.4%
Asian	1.0%	0.9%
American Indian or Alaska Native	0.0%	1.0%
Native Hawaiian or Pacific Islander	0.3%	0.9%
More Than One Race	2.7%	2.3%
Married	33.1%	32.4%
Living with Partner	5.6%	6.0%
Length of relationship	10.70 (8.49)	10.05 (8.34)
Number of children	1.64 (1.42)	1.64 (1.48)
Number of children at home at least 3 days per week	1.26 (1.24)	1.21 (1.29)
Completed some college, technical school, or degree	41.6%	40.5%
Hours worked per week	41.71 (5.07)	42.32 (4.96)
Daytime shift	41.8%	40.8%
Job Category		
Active Guard Reserve	25.2%	21.7%
Military Technician	18.1%	22.7%
Years in National Guard	10.57 (7.17)	11.28 (7.52)
Years in current full-time position	4.51 (5.19)	4.91 (5.88)
Combat exposure	57.0%	58.4%
Deployment		
Ever deployed	29.7%	29.9%
Months deployed since 9/11 ^a	11.63 (9.92)	13.17 (10.01)
Duration of last deployment in months ^a	7.28 (4.99)	7.48 (4.63)
Time since last deployment in months ^a	77.64 (51.51)	61.91 (47.11)
Branch		
Army	18.3%	25.1%
Air	32.5%	24.0%

Note: ^a = calculated among individuals who were deployed.

Table 2.

Means and Standard Deviations for Employee Study Variables by Condition Over Time.

Variables	Condition	Baseline	4-month	9-month
<i>Outcomes</i>				
Anger	Intervention {Ns 352, 270, 253}	1.71 (.72)	1.66 (.74)	1.55 (.58)
	Control {Ns 338, 272, 261}	1.68 (.65)	1.64 (.68)	1.67 (.71)
Resilience	Intervention {Ns 352, 270, 251}	3.80 (.73)	3.85 (.67)	3.85 (.67)
	Control {Ns 337, 272, 260}	3.78 (.65)	3.77 (.68)	3.77 (.68)
<i>Control</i>				
PTSD	Intervention {Ns 345, 267, 249}	2.34 (2.99)	2.10 (2.99)	2.30 (3.16)
	Control {Ns 335, 269, 256}	2.08 (2.90)	2.07 (3.02)	1.86 (2.90)
<i>Moderators</i>				
FSSB	Intervention {Ns 358, 286, 267}	4.10 (.97)	4.12 (.91)	4.04 (.96)
	Control {Ns 344, 286, 270}	4.03 (.98)	4.00 (.94)	4.04 (.89)
SL	Intervention {Ns 354, 284, 267}	2.28 (1.03)	2.54 (1.05)	2.50 (1.00)
	Control {Ns 339, 283, 268}	2.18 (.93)	2.31 (.95)	2.31 (.98)
GSS	Intervention {Ns 356, 283, 265}	4.28 (.84)	4.16 (.88)	4.15 (.85)
	Control {Ns 342, 282, 269}	4.24 (.82)	4.18 (.83)	4.14 (.85)

Note. Anger = employee anger as indicated by the Dimensions of Anger Reactions Scale (DARS); Resilience = employee resilience as indicated by the Brief Resilience Scale (BRS); PTSD = Post Traumatic Stress Disorder as indicated by the PTSD checklist for DSM-5; FSSB = Family Supportive Supervisor Behaviors; SL = Sleep Leadership; GSS = General Supervisor Support.

Table 3.
Means, Standard Deviations, and Correlations among study variables.

1	Condition	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12
1	Condition	51% (.50)	-											
2	COVID-19	8% (.27)	.04	-										
3	PTSD (B)	2.21 (2.95)	.04	-.08*	-.84									
4	Anger (B)	1.70 (.69)	.02	-.07	.42**	.87								
5	Anger (4M)	1.65 (.71)	.02	-.06	.40**	.58**	.87							
6	Anger (9M)	1.61 (.65)	-.09*	-.07	.37**	.56**	.57**	.87						
7	Resilience (B)	3.79 (.69)	.01	.03	-.39**	-.39**	-.33**	-.33	.88					
8	Resilience (4M)	3.81 (.68)	.06	.04	-.33**	-.32**	-.40**	-.37**	.61**	.87				
9	Resilience (9M)	3.81 (.68)	.06	.03	-.36**	-.33**	-.33**	-.49**	.58**	.63**	.87			
10	FSSB (B)	4.07 (.97)	.04	-.01	-.12**	-.16**	-.20**	-.10*	.15**	.14**	.12**	.95		
11	SL (B)	2.23 (.98)	.05	.03	-.14**	-.13**	-.10*	-.10*	.09*	.05	.08	.37**	.92	
12	GSS (B)	4.26 (.83)	.02	-.02	-.17**	-.18**	-.23**	-.09*	.14**	.14**	.11*	.72**	.35**	.77

Note. B = baseline variables; 4M = 4-month variables; 9M = 9-month variables; Condition = intervention group coding, 1 = intervention condition, 0 = control condition; COVID-19 = Day State of Emergency declared (March 8th, 2020); PTSD = Post Traumatic Stress Disorder as indicated by the PTSD checklist for DSM-5; Anger = employee anger as indicated by the Dimensions of Anger Reactions Scale (DARS); Resilience = employee resilience as indicated by the Brief Resilience Scale (BRS); FSSB = Family Supportive Supervisor Behaviors; SL = Sleep Leadership; GSS = General Supervisor Support; Beginning of row three indicates reliability coefficients; Nesting of participants within their respective clusters is not accounted for in the above significance tests. Ns range = 511-704. * $p < .05$. ** $p < .01$.

Table 4.
Model Results of Main Intervention Effects on Service Member Employee Anger & Resilience.

Variable	DV: Anger (4-months)			DV: Anger (9-months)			DV: Resilience (4-months)			DV: Resilience (9-months)		
	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI
Intercept	1.65***	.04	[1.58, 1.72]	1.61***	.04	[1.53, 1.68]	3.81***	.02	[3.77, 3.86]	3.81***	.03	[3.75, 3.87]
Intervention	.00	.07	[-.13, .14]	-.16*	.07	[-.30, -.02]	.09	.05	[-.00, .18]	.09*	.04	[.01, .17]
Baseline of DV	.51***	.06	[.40, .63]	.47***	.07	[.34, .60]	.56***	.04	[.49, .63]	.52***	.05	[.43, .62]
Baseline PTSD	.04**	.01	[.02, .06]	.03***	.01	[.02, .05]	-.02**	.01	[-.04, -.01]	-.04**	.01	[-.06, -.01]
COVID-19				.03	.09	[-.14, .21]				-.02	.14	[-.30, .27]
Residual variance	.31***	.03	[.25, .38]	.26***	.03	[.20, .32]	.28***	.02	[.24, .32]	.29***	.02	[.25, .34]
Intercept variance	.01	.01	[-.01, .03]	.02	.01	[.00, .03]	.00	.00	[-.00, .00]	.00	.01	[-.02, .02]
Model R^2 (total)	.00			.03			.00			.01		

Note. DV = dependent variable. All models controlled for baseline levels of the outcome variable and PTSD at baseline. COVID-19 was controlled for only in the 9-month models. All estimates represent unstandardized values. Predictors, baseline levels of the outcomes, and control variables were grand-mean centered.

N 's range = 504-536.

* $p < .05$. ** $p < .01$ *** $p < .001$.

Table 5.
Model Results of Intervention Effects on Service Member Employee Anger & Resilience as Moderated by Baseline FSSB.

Variable	DV: Anger (4-months)			DV: Anger (9-months)			DV: Resilience (4-months)			DV: Resilience (9-months)		
	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI
Intercept	1.65***	.04	[1.58, 1.72]	1.60***	.04	[1.53, 1.67]	3.81***	.02	[3.77, 3.86]	3.81***	.03	[3.75, 3.87]
Intervention	.01	.07	[-.13, .14]	-.16*	.07	[-.30, -.02]	.09	.05	[-.01, .18]	.09*	.04	[.00, .17]
Baseline of DV	.50***	.06	[.38, .62]	.47***	.07	[.34, .60]	.55***	.04	[.48, .63]	.52***	.05	[.42, .61]
FSSB	-.09***	.02	[-.13, -.04]	-.00	.02	[-.04, .04]	.03	.02	[-.02, .08]	.02	.03	[-.04, .08]
Intervention X FSSB	-.05	.04	[-.13, .04]	.04	.04	[-.04, .12]	.06	.05	[-.04, .16]	-.01	.06	[-.12, .11]
Baseline PTSD	.03**	.01	[.01, .05]	.03***	.01	[.02, .05]	-.02*	.01	[-.04, -.01]	-.04**	.01	[-.06, -.01]
COVID-19				.03	.09	[-.14, .20]				-.02	.14	[-.29, .26]
Residual variance	.30***	.03	[.24, .37]	.26***	.03	[.20, .32]	.28***	.02	[.23, .32]	.30***	.02	[.25, .34]
Intercept variance	.01	.01	[-.01, .03]	.02	.01	[-.00, .03]	.00	.00	[-.00, .00]	.00	.01	[-.02, .02]
Model R ² (total)	.00			.00			.00			.00		

Note. DV = dependent variable. FSSB = moderator. All models controlled for baseline levels of the outcome variable and PTSD at baseline. COVID-19 was controlled for only in the 9-month models. All estimates represent unstandardized values. Predictors, moderators, control variables, and baseline levels of the outcomes were grand-mean centered (intervention coded as 1, control coded as 0). *N*s range = 504-536.
 p* < .05. *p* < .01 ****p* < .001.

Table 6.
Model Results of Intervention Effects on Service Member Employee Anger & Resilience as Moderated by Baseline SL.

Variable	DV: Anger (4-months)			DV: Anger (9-months)			DV: Resilience (4-months)			DV: Resilience (9-months)		
	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI
Intercept	1.66***	.04	[1.58, 1.73]	1.61***	.04	[1.54, 1.68]	3.81***	.02	[3.77, 3.86]	3.81***	.06	[3.70, 3.92]
Intervention	.00	.07	[-.14, .15]	-.16*	.07	[-.30, -.02]	.09	.05	[-.01, .18]	.09*	.04	[.01, .17]
Baseline of DV	.51***	.06	[.40, .62]	.47***	.07	[.34, .60]	.57***	.04	[.50, .64]	.52***	.05	[.42, .62]
SL	-.01	.03	[-.07, .05]	-.00	.02	[-.04, .04]	-.01	.03	[-.06, .05]	.01	.03	[-.04, .06]
Intervention X SL	.01	.07	[-.12, .15]	.03	.04	[-.05, .12]	-.06	.05	[-.17, .05]	-.07	.06	[-.19, .05]
Baseline PTSD	.04**	.01	[.02, .06]	.03***	.01	[.01, .05]	-.02*	.01	[-.04, -.01]	-.04**	.01	[-.06, -.01]
COVID-19				.04	.09	[-.13, .21]				-.04	.04	[-.12, .05]
Residual variance	.31***	.03	[.25, .38]	.26***	.03	[.20, .33]	.27***	.02	[.24, .31]	.29***	.02	[.24, .33]
Intercept variance	.01	.01	[-.01, .03]	.02	.01	[-.00, .03]	.00	.00	[-.00, .00]	.00	.04	[-.07, .07]
Model R ² (total)	.00			.00			.00			.00		

Note. DV = dependent variable. Sleep Leadership = moderator. All models controlled for baseline levels of the outcome variable and PTSD at baseline. COVID-19 was controlled for only in the 9-month models. All estimates represent unstandardized values. Predictors, moderators, control variables, and baseline levels of the outcomes were grand-mean centered (intervention coded as 1, control coded as 0). *N*s range = 496-528.

p* < .05. *p* < .01 ****p* < .001.

Table 7.
 Model Results of Intervention Effects on Service Member Employee Anger & Resilience as Moderated by
 Baseline GSS.

Variable	DV: Anger (4-months)			DV: Anger (9-months)			DV: Resilience (4-months)			DV: Resilience (9-months)		
	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI	Est.	SE	95% CI
Intercept	1.65***	.04	[1.58, 1.72]	1.60***	.04	[1.52, 1.67]	3.81***	.02	[3.77, 3.86]	3.83***	.03	[3.77, 3.87]
Intervention	.02	.07	[-.12, .15]	-.16*	.07	[-.30, -.02]	.09	.05	[-.00, .19]	.09*	.05	[.00, .18]
Baseline of DV	.50***	.06	[.38, .63]	.48***	.07	[.35, .61]	.55***	.04	[.48, .63]	.52***	.05	[.42, .61]
GSS	-.12***	.03	[-.17, -.06]	.02	.02	[-.03, .06]	.04	.02	[-.01, .08]	.01	.03	[-.04, .06]
Intervention X GSS	-.02	.05	[-.11, .07]	.01	.05	[-.08, .1]	.06	.05	[-.04, .16]	.01	.05	[-.08, .10]
Baseline PTSD	.03**	.01	[.01, .05]	.03***	.01	[.01, .05]	-.02*	.01	[-.04, -.01]	-.03**	.01	[-.05, -.01]
COVID-19				.04	.08	[-.12, .20]				-.02	.13	[-.27, .24]
Residual variance	.30***	.03	[.24, .37]	.25***	.03	[.19, .31]	.28***	.02	[.24, .32]	.28***	.02	[.24, .33]
Intercept variance	.01	.01	[-.01, .03]	.02	.01	[.00, .03]	.00	.00	[-.00, .00]	.00	.01	[-.01, .01]
Model R ² (total)	.00			.00			.00			.00		

Note. DV = dependent variable. General Supervisor Support = moderator. All models controlled for baseline levels of the outcome variable and PTSD at baseline. COVID-19 was controlled for only in the 9-month models. All estimates represent unstandardized values. Predictors, moderators, control variables, and baseline levels of the outcomes were grand-mean centered (intervention coded as 1, control coded as 0). Ns range = 500-532.

* $p < .05$. ** $p < .01$ *** $p < .001$.

Figure 1.
Military Employee Sleep & Health (MESH) Study Design: Timing and Activities.

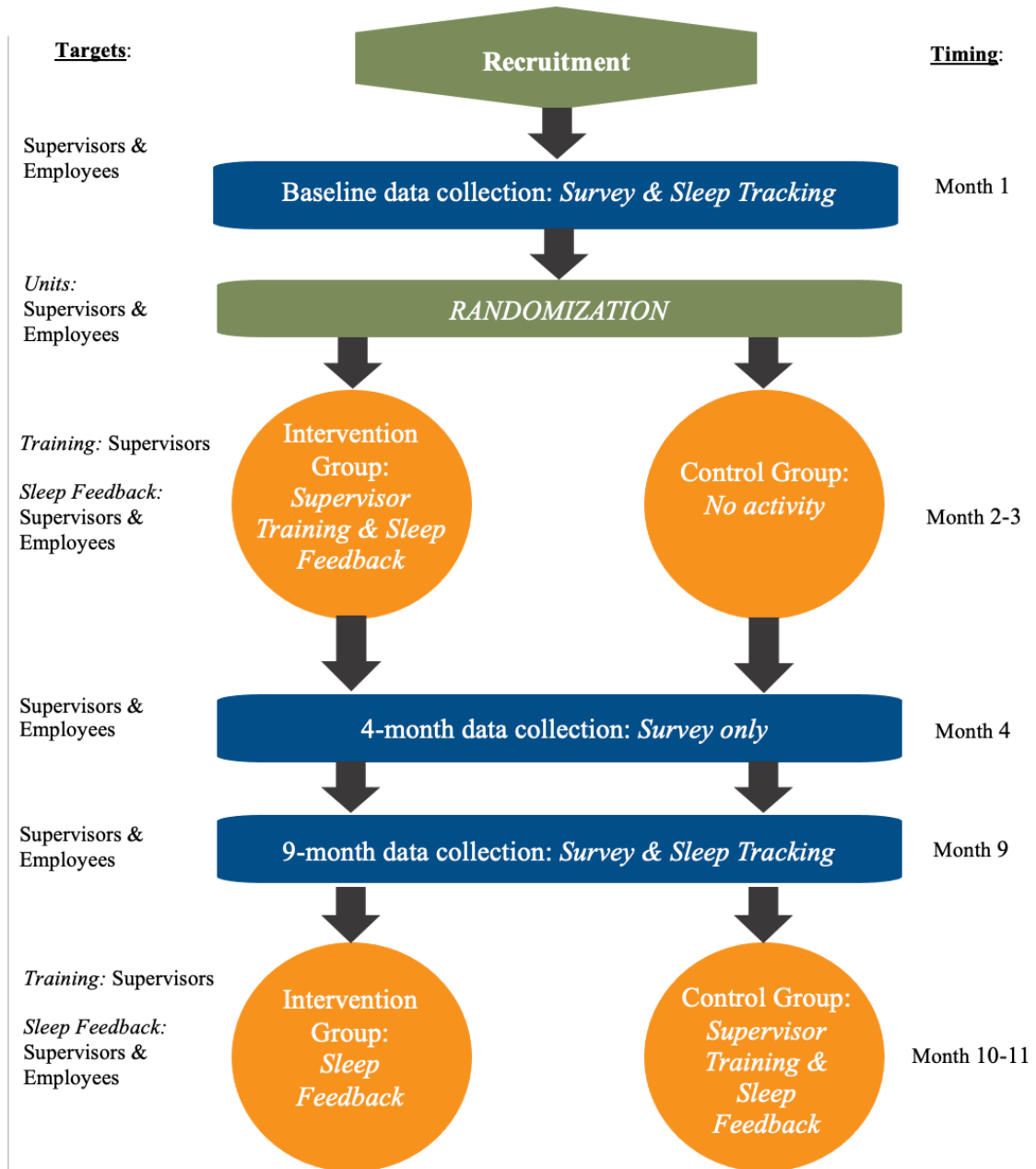
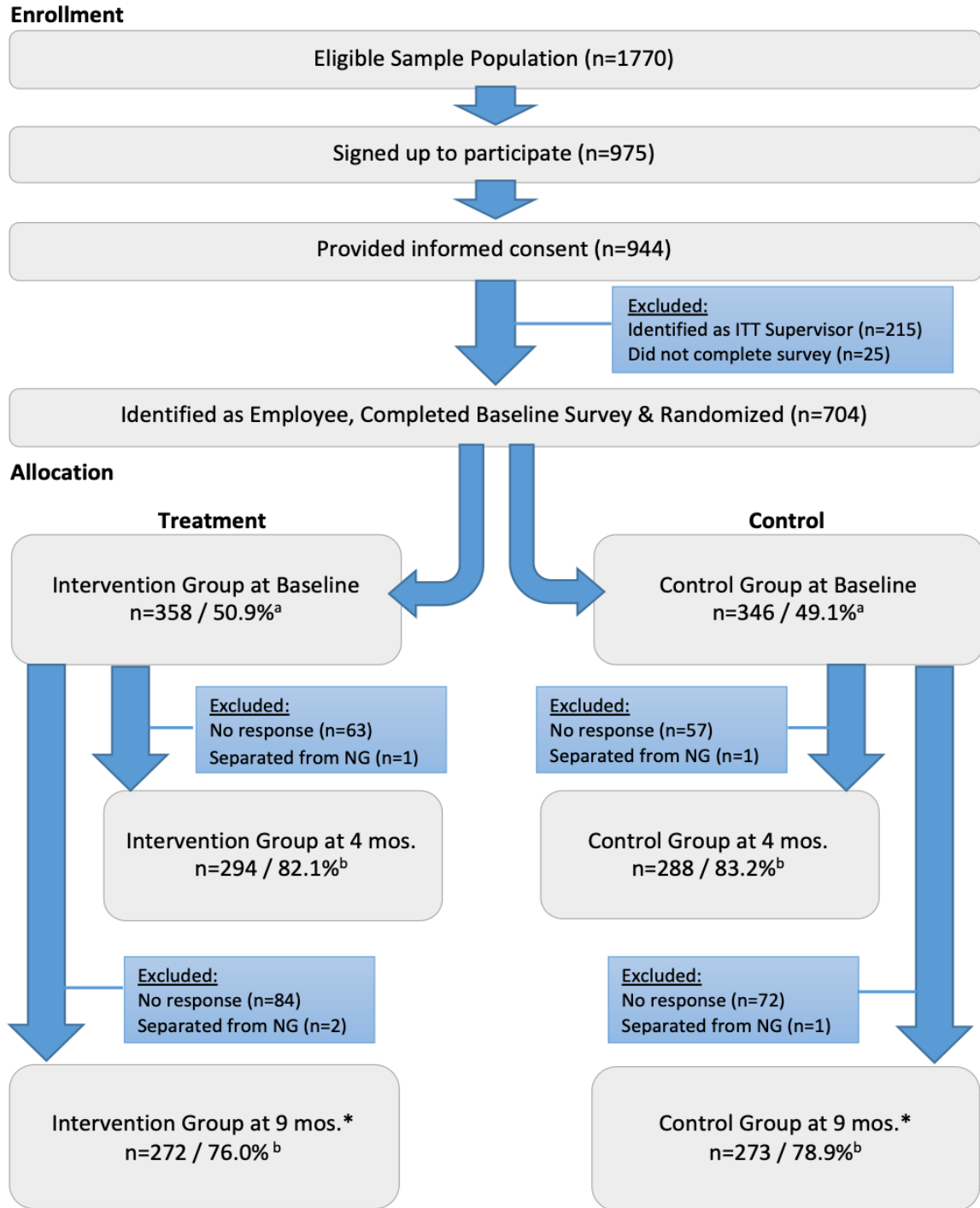


Figure 2.
MESH Study Consort Diagram for Employee Survey Sample.



Note: ^a = entire sample at baseline; ^b = condition at baseline; * = 9-month surveys sent regardless of 4-month participation status.

Figure 3.
Conceptual Model for Hypothesis 1 with Model Results.

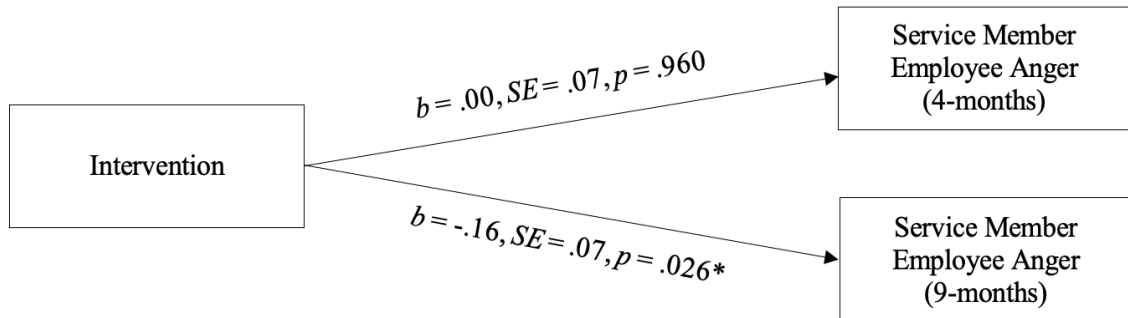


Figure 4.
Conceptual Model for Hypothesis 2 with Model Results.

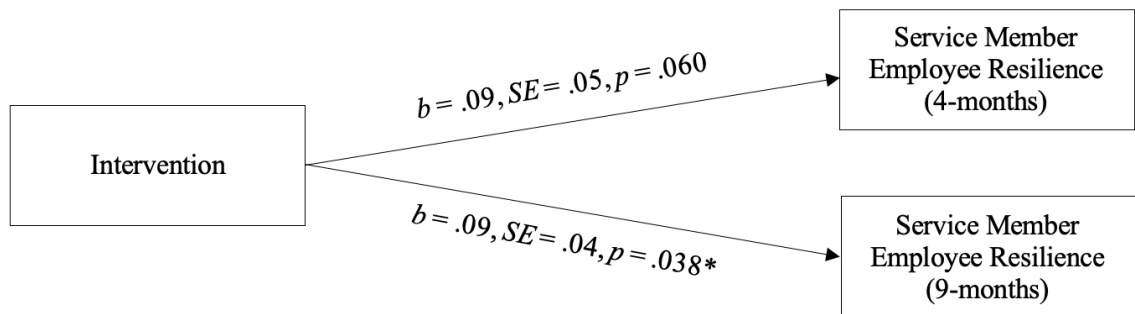


Figure 5.
Conceptual Models for Hypothesis 3 with FSSB as the moderator.

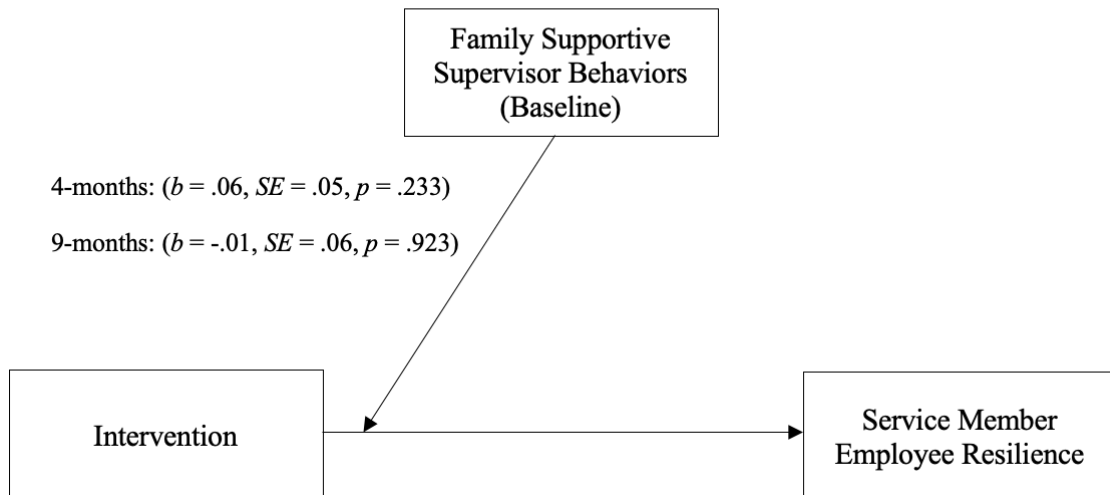
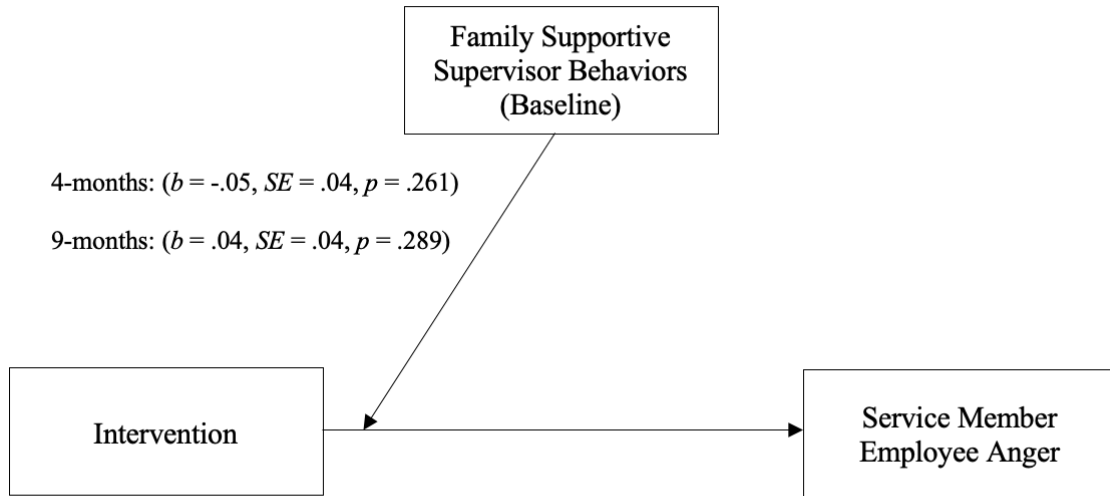


Figure 6.
Conceptual Models for Hypothesis 3 with SL as the moderator.

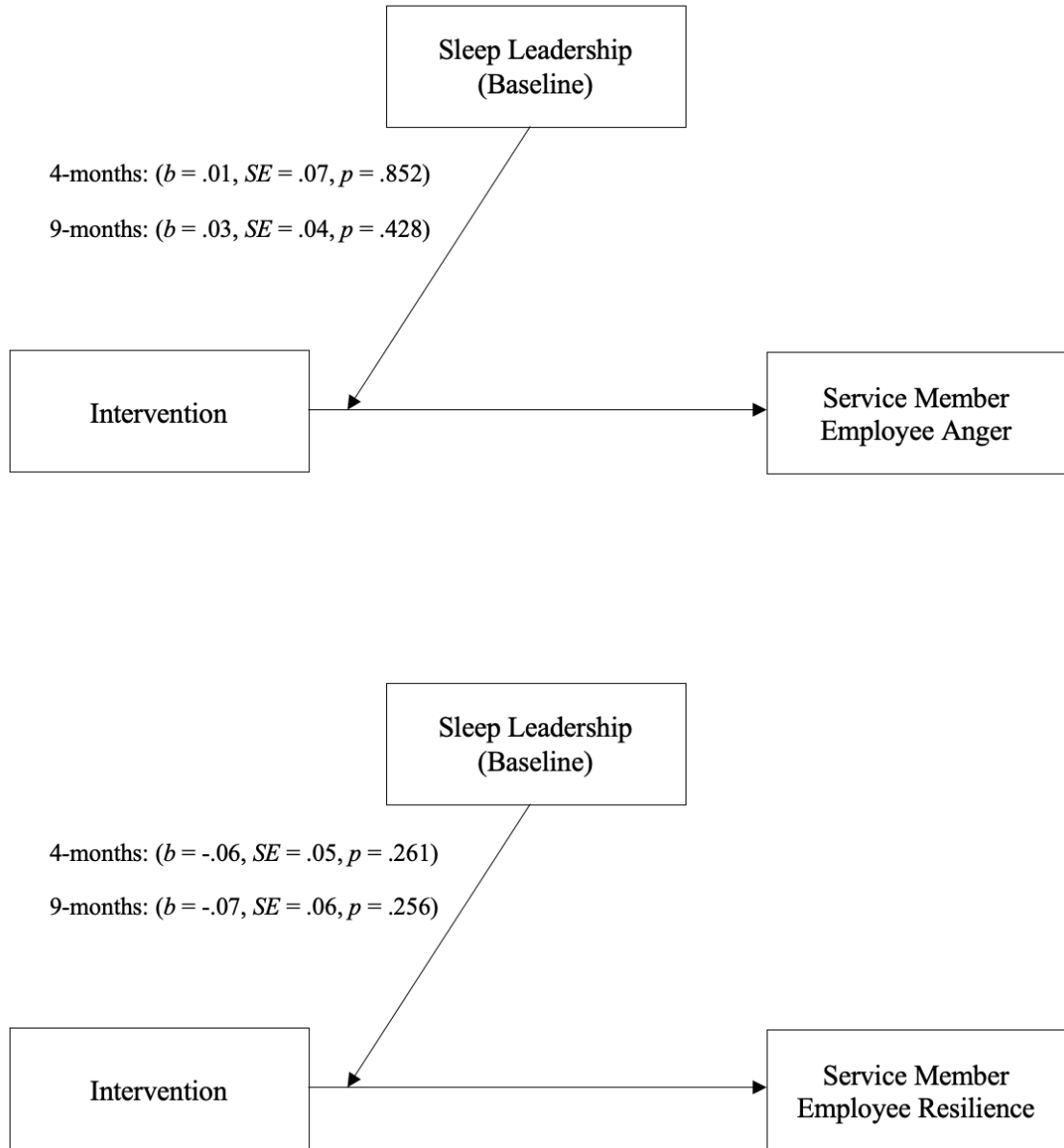


Figure 7.
Conceptual Models for Hypothesis 3 with GSS as the moderator.

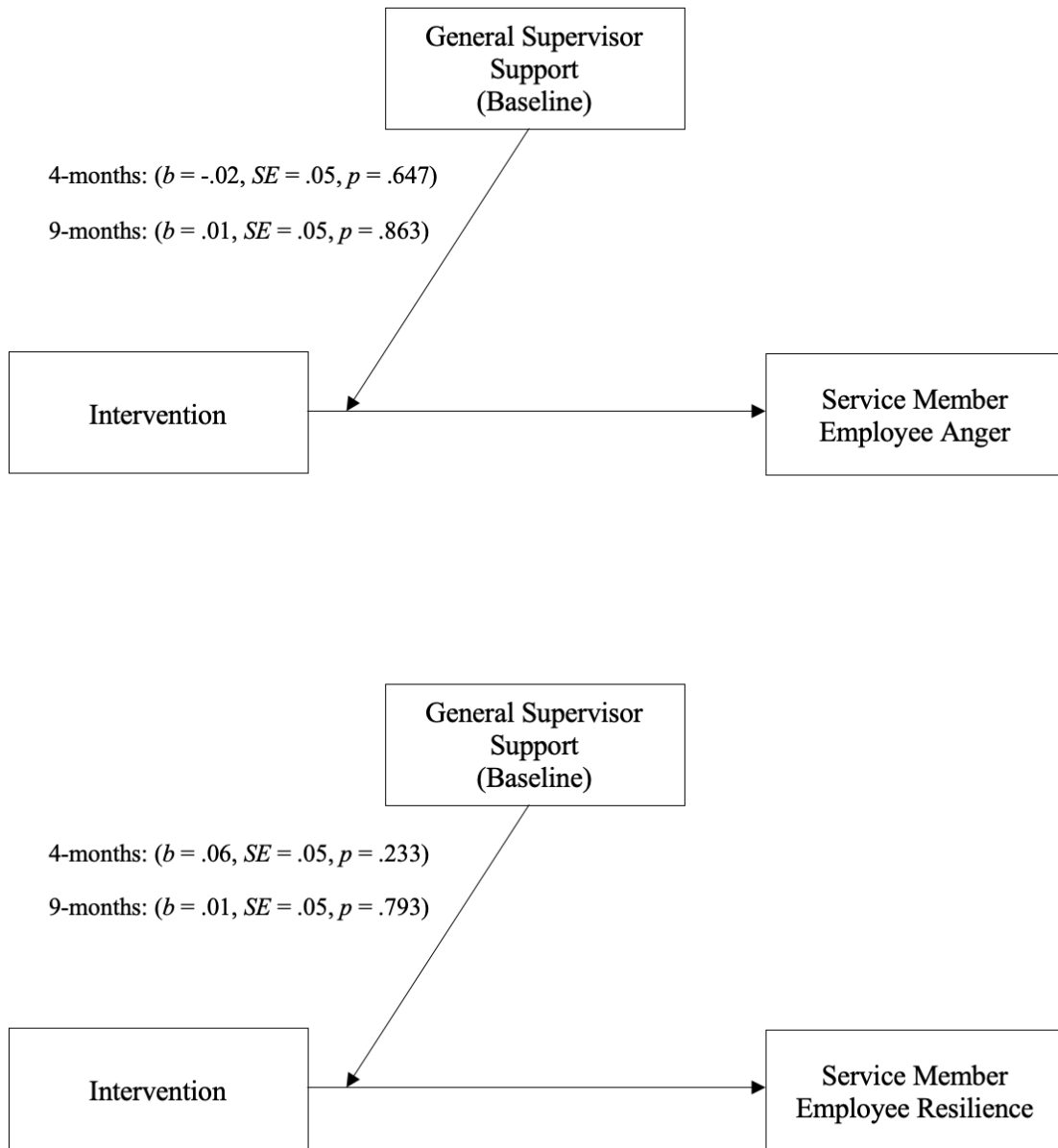
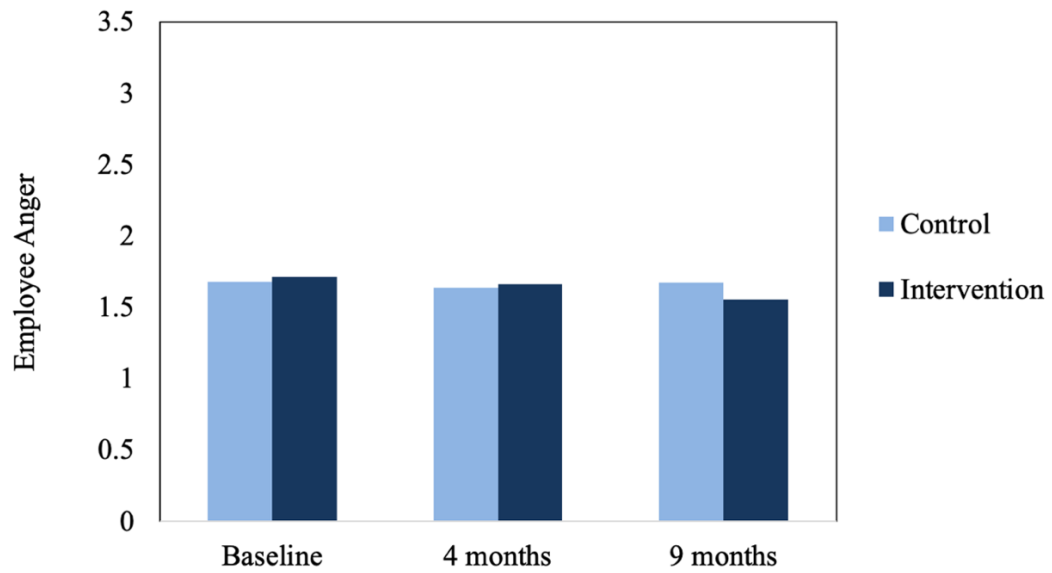


Figure 8.

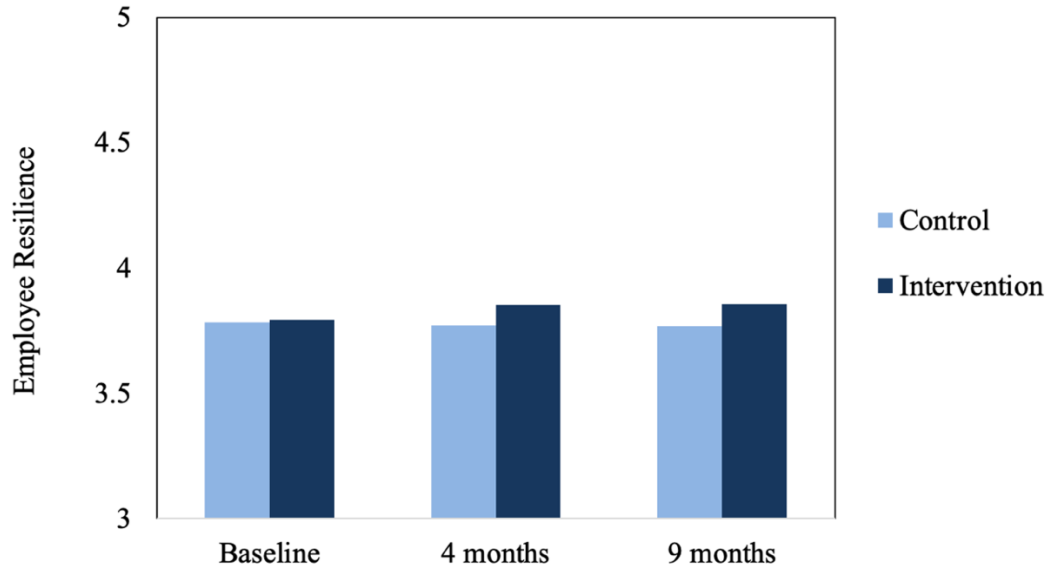
Graph of Main Intervention Effects on Employee Anger Over Time.



Note. Graph of means. Figure does not account for clusters. Significant effect of the intervention on Anger at 9-months. Effects were found to differ over time.

Figure 9.

Graph of Main Intervention Effect on Employee Resilience Over Time.



Note. Graph of means. Figure does not account for clusters. Significant effect of the intervention on Resilience at 9-months. Marginally significant effect of the intervention on Resilience at 4-months. Effects were not found to differ over time.

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Appendix A

Recruitment E-mail

Leaders,

As we discussed at our meeting, below is the recruitment email to be sent out to all your full-time staff by <DATE>. It includes information about the study, what they'll have to do, and the incentives they will get. There is a link included that will take you to an online sign-up form. Also attached is an FAQ with more detailed information that should go out with the recruitment email.

What I need from you:

- **Please CC me when you send this out**, we try to track the date and time the recruitment emails go out so that we can get data on how long it takes people to sign up/how many sign-up.
- **Please do not make any major modifications to the recruitment email**, as this message has been approved by our Human Subjects Research Review Board.
- **Please be sure to include the FAQ when sending the email to your subordinates**

Keep in mind, the more people who sign up ahead of time online, the quicker and smoother our visit to deliver the Actiwatches will go.

Dear Service Member,

The Oregon National Guard is participating in a DoD funded study by the Oregon Institute of Occupational Health Sciences at OHSU to examine the issues of sleep-related health and work-life stress among our full-time National Guard Soldiers and Airmen and their families. It is called the Oregon Military Employee Sleep and Health Study – or MESH for short.

The MESH Study is part of the larger DoD initiative to improve the sleep health of the force as part of increasing Readiness, decreasing long term losses and costs from preventable negative health outcomes. As such, MESH has the full backing and support of The Adjutant General.

Your unit is now going through the MESH Study. Those who are full-time employees of the Oregon Air National Guard or Army National Guard – Techs, ADOS, AGRs, and civilian contractors – are eligible to sign up for this study. Your participation is critical to the success of this study. Unfortunately, due to the need to measure supervisor/employee interaction, drill status or M-day personnel are not able to participate.

For those working in Maintenance who are required to take off all jewelry items etc. before their shift, they are still able to participate in this study.

What your participation means:

- Take part in **3 online surveys** over the next year, OFF work time (about 30-40 minutes each)
- Wear an activity/sleep tracker, like a “Fitbit”, which records information about your activity and your sleep **twice** - for 3 weeks at each round
- Your participation and information will be kept **confidential** (your supervisors and/or spouses/partners will not see your individual responses)

What you will receive for participating:

- **Earn up to a total of \$125 - \$50 for the first survey and sleep tracking, plus more later**
- Individualized one-on-one feedback on your sleep quality and resources to improve your sleep health

Married or living with a partner? Your spouse/partner is eligible to complete surveys as well for **additional compensation of up to \$75!**

Signing up:

Sign up today by following this link to a confidential form: <SURVEY FORM LINK>

Your first survey will be emailed to you directly, starting on <DATE>. If you indicate on the sign-up form that your spouse/significant other may be interested in participating, we will send them an email from which they can confirm their intent to participate. MESH team personnel will be on site <DATE> to deliver the sleep trackers in person.

Your participation in this portion of the Oregon MESH Study is voluntary but we urge you to be part of this work which we feel will improve the health and readiness of the ORNG.

Want more information?

For more detailed information, please see the attached FAQ. If you have other questions, feel free to email the MESH team at meshstudy@ohsu.edu or call 503-494-3444 (Toll-free number: 1-844-851-9294). You can also check out our website at www.meshstudy.org.

V/R

Oregon MESH Study

meshstudy@ohsu.edu

Office: 503-494-3444, Toll Free: 1-844-851-9294

Appendix B

Study Measures

Dimensions of Anger Reactions (Forbes et al., 2004)

Instructions: Thinking over the past month, please mark the response option that best describes the amount of time you felt that way.

Variable Name	Item Text
Dar1	I found myself getting angry at people or situations.
Dar2	When I got angry, I got really mad.
Dar3	When I got angry, I stayed angry.
Dar4	When I got angry at someone, I wanted to hit them.
Dar5	My anger prevented me from getting along with people as well as I'd have liked to.

1 = None or almost none of the time

2 = A little of the time

3 = Some of the time

4 = Most of the time

5 = All or almost all of the time

Higher scores reflect higher prevalence's of feeling angry.

Brief Resilience Scale (Smith et al., 2008)

Instructions: The following statements describe how individuals cope with problems in life, please indicate the extent to which you agree with each statement as it relates to your own life.

Variable Name	Item Text
Brs1	I tend to bounce back quickly after hard times.
Brs2	I have a hard time making it through stressful events.
Brs3	It does not take me long to recover from a stressful event.
Brs4	It is hard for me to snap back when something bad happens.
Brs5	I usually come through difficult times with little trouble.
Brs6	I tend to take a long time to get over setbacks in my life.

1 = Strongly disagree

2 = Disagree

- 3 = Neutral
 4 = Agree
 5 = Strongly agree

Items Brs2, Brs4, & Brs6 reverse coded.

Higher scores reflect greater resilience.

FSSB-SF (Hammer et al., 2013)

Instructions: The following section contains questions about your experiences with your primary full-time supervisor. Please read each statement carefully and rate the extent to which you agree with each statement based on the scale below. This information you provide will be kept confidential. Your supervisor will not see your survey responses.

Variable Name	Item Text
Fssb1	Your supervisor makes you feel comfortable talking to him/her about your conflicts between work and non-work.
Fssb2	Your supervisor demonstrates effective behaviors in how to juggle work and non-work issues.
Fssb3	Your supervisor works effectively with employees to creatively solve conflicts between work and non-work.
Fssb4	Your supervisor organizes the work in your department or unit to jointly benefit employees and the company.

- 1 = Strongly disagree
 2 = Disagree
 3 = Neither agree nor disagree
 4 = Agree
 5 = Strongly agree

Higher scores reflect greater FSSB.

Sleep Leadership (Gunia et al., 2015)

Instructions: The following section contains questions about your experiences with your primary full-time supervisor. Please read each statement carefully and rate the extent to which you agree with each statement based on the scale below. This information you provide will be kept confidential. Your supervisor will not see your survey responses.

Variable Name	Item Text
Sl_1	Your supervisor asks subordinates about their sleeping habits.

Sl_2	Your supervisor encourages subordinates to get adequate sleep.
Sl_3	Your supervisor considers sleep as an important planning factor.
Sl_4	Your supervisor encourages subordinates to nap if needed.
Sl_5	Your supervisor encourages subordinates to catch up on sleep before missions that require long hours.
Sl_6	Your supervisor works to encourage subordinates to have a good sleep environment (quiet, dark, not too hot, or cold).
Sl_7	Your supervisor discourages the use of caffeine or nicotine use within several hours before trying to go to sleep.
Sl_8	Your supervisor encourages subordinates to try to go to sleep on time.

- 1 = Never
 2 = Seldom
 3 = Sometimes
 4 = Often
 5 = Always

Higher scores reflect greater sleep leadership.

General Supervisor Support (Yoon & Lim, 1999)

Instructions: Still thinking about your primary full-time supervisor at your primary full-time job...

Variable Name	Item Text
Gss1	My supervisor can be relied upon when things get tough on my job.
Gss2	My supervisor is willing to listen to my job-related problems.
Gss3	My supervisor really does not care about my well-being.

- 1 = Strongly disagree
 2 = Disagree
 3 = Neither agree nor disagree
 4 = Agree
 5 = Strongly agree

Items Gss3 were reverse coded.
 Higher scores reflect greater GSS.

PTSD Checklist for DSM-5 (Price et al., 2016)

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience. Please indicate how much you have been bothered by that problem in the past month.

Variable Name	Item Text
Pcl5_1	Repeated, disturbing, and unwanted memories of the stressful experience.
Pcl5_2	Avoid external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations).
Pcl5_3	Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous).
Pcl5_4	Feeling jumpy or easily startled.

0 = Not at all

1 = A little bit

2 = Moderately

3 = Quite a bit

4 = Extremely

Higher scores reflect greater PTSD symptoms.