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Beyond Just Resilience: The Important Role of Work-Family Resources for Military Service Members

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Abstract

The military has allocated extensive resources to improve service member resilience in an effort to decrease the impact of stressors on health and well-being. Previous research has linked resilience to various positive outcomes (e.g., physical and mental health, job satisfaction) and has established that service members face unique and challenging work-family experiences. However, the importance of resilience to work-family experiences remains underexplored. Drawing on conservation of resources theory, this study examines the relationships between resilience (i.e., the ability to bounce back from stressors) and work-family outcomes, and whether organizational work-family resources of work-family climate perceptions and family-supportive supervisor behavior moderate these relationships. Based on a sample of 417 Army National Guard service members from 10 workgroups, and using a multilevel path model, we found that more resilient service members experience lower family-to-work conflict and greater work-to-family enrichment. Further, the relationship between resilience and family-to-work enrichment was significant and stronger for service members who perceive their work climate as family-supportive compared to the relationship for those who do not. Improving resilience in military personnel may help to facilitate positive work-family experiences, but resilience is likely most beneficial when organizational work-family resources (i.e., a familysupportive work climate) are also available.

Keywords Resilience · Work-family · Military · Work-family resources

A well-established body of literature indicates that military service members are subject to significant work-family stressors (e.g., Drummet et al., 2003; Hammer et al., 2005; Hammer et al., 2017; Wan et al., 2018). For instance, military families can experience frequent moves, separations, long duty hours, unpredictable work sched-





ules, and the risk of service-related injury, illness, or death, all of which impact the family domain, and create unique experiences of work-family strain (e.g., Clever & Segal, 2013). Research in the work-family realm has demonstrated that a variety of personal (e.g., traits), organizational (e.g., policies, supervisor support), and contextual resources (e.g., culture, family support) can have a positive influence on work-family outcomes, such as work-family conflict (i.e., when demands in one domain make it difficult to meet demands in the other domain; Edwards & Rothbard, 2000) and work-family enrichment (i.e., when positive experiences in one domain spillover to create positive experiences in the other domain; Greenhaus & Powell, 2006) (e.g., Crain & Stevens, 2018; French et al., 2018; Michel et al., 2011). Considering the potential strain associated with military service, identifying the resources that can improve the interface between work and family roles would prove beneficial for service member well-being, family outcomes, and military performance more broadly.

As the military considers how best to improve the work-family interface for service members, there remain questions regarding which resources are most beneficial. Although some resources (e.g., social support, self-efficacy) are demonstrably related to work-family outcomes in general populations (e.g., Allen et al., 2012; French et al., 2018; McNall et al., 2015), it is important to examine work-family resources and outcomes in military populations given their unique work-family stressors. Specifically, although individual resilience (i.e., the tendency to bounce back from adversity; Smith et al., 2008) is heavily studied and promoted in the military and is considered a critical personal resource for other military outcomes (e.g., post-traumatic stress; Casey, 2011), whether resilience helps service members handle work-family stressors has yet to be explored. Additionally, various resources may be comparatively more or less useful for improving the work-family interface, and researchers have yet to conclusively determine how resources interact with one another to impact work-family outcomes.

Drawing on conservation of resources (COR) theory (Hobfoll, 1989), we examine how resilience (i.e., an individual-level, personal resource) and contextual organizational resources (i.e., family-supportive supervisor behavior and a family-supportive work climate) individually and interactively relate to positive and negative workfamily outcomes for service members. We explore resilience as the predictor and sole personal resource in this study, given the emphasis that has been placed on resilience in military contexts (Griffith & West, 2013; Reivich et al., 2011), and because it is considered an especially critical resource in COR theory (Hobfoll et al., 2015). Furthermore, we explore these research questions with a unique sample of service members of the Army National Guard. These individuals provide support for the day-to-day functioning of the National Guard and fulfill full-time work duties that are different from individuals who are Drill Status Guard and drill exclusively on weekends. As an understudied group, these full-time service members not only engage in consistent work on a regular basis for the military in maintenance, medical, human resources, special tactics, and security roles, but can also be active duty, face deployments, and have combat exposure.

Given the inherent stressors in military work, and the impact this can have on military families, we explore resources that can reduce experiences of strain and foster experiences of enrichment between service members' work and family lives. Military



service typically requires a large amount of family involvement and support in order to fulfill the unique cultural necessity for full commitment to organizational goals (Adler & Sowden, 2018), and the nature of military service can create tension in the family domain (Segal, 1986; Wadsworth & Southwell, 2011). Further, the United States' continuing operations in the Iraq and Afghanistan wars for over a decade have been associated with staggering rates of physical and mental health conditions for not only service members, but also their partners and children (e.g., Fairbank et al., 2018; Mansfield et al., 2010; Ramchand et al., 2015; White et al., 2011). Specifically, the repetitive and extended deployments associated with these most recent wars are considered especially stressful for service members and their families (Gottman et al., 2011). Given these stressors, service members need effective resources to maintain their work-family well-being. We test whether resilience can be this resource and whether contextual resources moderate, and serve to strengthen, the effects of resilience. Ultimately, we aim to provide insight regarding how to improve the workfamily interface for a unique group of military service members and where to direct intervention resources and attention.

Theoretical Framing and Contributions

To inform the current study, we rely on recent work clarifying and extending COR theory. COR theory is often used in the stress and motivation literatures, proposing that people are motivated to seek, acquire, and protect resources (Hobfoll, 1989). Threat of resource loss, actual resource loss, and unfulfilled expected resource gain can all act as stressors and lead to strain outcomes, and COR theory outlines principles regarding how people invest, gain, and lose resources, as well as how they react to those changes (Hobfoll, 1989). Resources were broadly defined in the original theory as objects, conditions, personal characteristics, or energies that an individual considers valuable. However, more recently, scholars have clarified that resources can be conceptualized as anything that is perceived by an individual as being helpful to meet their goals or demands (Halbesleben et al., 2014). Thus, both personal skills or traits and supportive work-family organizational environments can be considered resources when an employee is trying to effectively manage their work and family roles and responsibilities. Individuals with more of these resources should be better equipped to avoid or decrease work-family strain (i.e., work-family conflict) and enhance work-family enrichment.

The personal resource of resilience can help individuals resist stress and has been acknowledged as a particularly critical resource in the COR framework (Halbesleben et al., 2014; Hobfoll, 1989; Hobfoll et al., 2015). Thus, we examine the relationship between resilience and four work-family variables. Work-family conflict and work-family enrichment are distinct constructs and differentially relate to other variables (e.g., McNall et al., 2010), making it important to consider both outcomes. Further, in line with Tedeschi and McNally (2011) examining post-traumatic growth in addition to post-traumatic stress, we examine positive outcomes (i.e., enrichment) of resilience for service members in addition to negative, stressful outcomes (i.e., conflict), which are more frequently studied. Although COR is most often used to understand



the stress process (Hobfoll et al., 2018), it is theoretically important to consider how to facilitate employee wellbeing and thriving in addition to stress alleviation, and practically, studying both outcomes can provide nuance to organizations' practices to improve the work-nonwork experiences of employees. Additionally, work can impact family (work-to-family conflict [WTFC] and work-to-family enrichment [WTFE]), and family can impact work (family-to-work conflict [FTWC] and family-to-work enrichment [FTWE]). Thus, we include both work-to-family and family-to-work constructs as they are theoretically and empirically distinct (e.g., Carlson et al., 2006; Greenhaus & Powell, 2006; Mesmer-Magnus & Viswesvaran, 2005). Further, all four work-family constructs are impacted by resources differently (e.g., Butler et al., 2005; Chen & Powell, 2012; Frone et al., 1992; Voydanoff, 2004a; Voydanoff, 2004b; Wayne et al., 2020) and are uniquely important for predicting employee health, well-being, and job-related outcomes (e.g., Amstad et al., 2011; Gareis et al., 2009; McNall et al., 2010).

Existing research has examined how constructs adjacent to resilience (e.g., positive affect, self-efficacy, psychological capital) relate to work-family outcomes (e.g., Allen et al., 2012; Karatepe & Karadas, 2014; McNall et al., 2015; Morganson et al., 2014), and a couple of studies have examined the relationships between resilience and work-family outcomes, with mixed findings depending on the outcome (Krisor et al., 2015; Wayne et al., 2020). These relationships are not well-established, and to our knowledge, there are no studies examining the relationship between resilience and work-family constructs in a military sample. Given that resilience may be more or less related to one direction (e.g., work-to-family) than the other (e.g., family-to-work), and more or less related to positive, as opposed to negative, work-family experiences, we specifically examine the direct relationship between individual trait resilience and WTFC, FTWC, WTFE, and FTWE in a military sample.

As an extension of COR theory, the current study responds to calls from Hobfoll and colleagues (2018) and Halbesleben and colleagues (2014) to examine interactions between different types or levels of resources (e.g., personal and contextual), and Hobfoll and colleagues (2018) specifically pointed out the importance of studying these resource interactions in the realm of work-family support and benefits. Personal resources, such as resilience, are likely more beneficial in the presence of critical contextual resources provided by the environment, and scholars have also suggested examining contextual factors specifically when studying resilience (e.g., Britt et al., 2016). Importantly, in line with criticisms of the emphasis on resilience (e.g., putting the responsibility on individuals to maintain their physical and mental wellbeing through extreme adversity; Britt et al., 2016; Eidelson et al., 2011; Howell, 2015), we acknowledge the necessity to understand the broader context within which individuals are expected to demonstrate their resilience. According to COR, individuals who have more resources are able to invest the resources they have, which can lead to future resource gains and thus, decreased experiences of strain, compared to those with fewer resources (Halbesleben et al., 2014; Hobfoll, 1989). Thus, we test this tenet of COR using support resources that should allow individuals to express or activate their resilience in the face of stressors or competing demands, leading to better work-family outcomes.



Specifically, we include family-supportive supervisor behavior (FSSB; informal supervisor behaviors that are supportive of employees' nonwork roles and responsibilities, Hammer et al., 2009) and perceptions of a positive work-family climate (i.e., an environment where military members are not expected to make family sacrifices for work; Kossek et al., 2001) as moderators expected to strengthen the relationships between resilience and WFC and WFE. FSSB and perceptions of work-family climate are contextual resources (i.e., located outside of the individual; ten Brummelhuis & Bakker, 2012) and henceforth will be referred to collectively as organizational resources. Both types of organizational resources are related to lower levels of WFC and higher levels of WFE (e.g., Crain & Stevens, 2018; Kossek et al., 2001), and both are expected to act as moderators because personal resources are likely more beneficial in the presence of contextual resources that provide environments more conducive to personal resources being actualized. Importantly, each contextual resource represents a different level of organizational resources (i.e., FSSB comes from the supervisor level and climate comes from the organizational level). COR differentiates between resources at different levels but does not posit specific tenets regarding how these levels of contextual resources might interact with personal resources or relate to outcomes. However, a recent meta-analysis suggests that broader resources (i.e., climate) are more strongly related to global evaluations of WFC, while more concrete and narrow resources (i.e., supervisor support) might be particularly important for day-to-day WFC situations (French et al., 2018). Thus, although both contextual resources are expected to be moderators, we include both because one may be more effective overall or for specific outcomes. Thus, we expand upon existing resource theory by testing the interaction effect of a personal resource (i.e., resilience) and two organizational resources at different levels (i.e., FSSB and work-family climate) on four work-family outcomes.

Resilience

The United States military has invested significant resources in understanding how to enable service members to be more resilient (Casey, 2011). However, resilience has been conceptualized and measured in the literature in a variety of ways, with little consensus for a definition. Windle et al. (2011) reviewed 19 existing measures of resilience and noted that most scales capture the availability of resources that facilitate resilience, and they defined resilience as "the process of negotiating, managing, and adapting to significant sources of stress or trauma" (p. 2). Other scholars have similarly suggested that resilience is comprised of two main components: adversity and positive adaptation (e.g., Fletcher & Sarkar, 2013). However, there still remains a debate regarding whether resilience should be conceptualized as a trait, a process, or an outcome (e.g., Britt et al., 2016; Fletcher & Sarkar, 2013). Because the military is primarily interested in establishing resilience as a personal antecedent to important outcomes, we are more interested in the trait of resilience than we are in the process through which one demonstrates resilience or resilience as an outcome itself.

Smith and colleagues (2008) specifically measure one's general tendency to bounce back from stress and adversity, and the scale they created relates to outcomes



such as anxiety, depression, and positive and negative affect. Some authors suggest that, because resilience is dynamic and flexible as well as dependent on previous experiences, environmental factors, and contextual resources (e.g., Crane & Searle, 2016), it is not a trait (Lee et al., 2013). However, nearly all personality traits have been subject to the same debate (Lewis, 2001), and they are still considered relatively stable and consistent traits within the literature. Thus, in line with other scholars (e.g., Hu et al., 2015; Jacelon, 1997), we consider resilience a trait-like capacity (Kossek & Perrigino, 2016), while recognizing that time, situational factors, and past experience influence one's level of the trait and ability to express the trait. Specifically, we conceptualize resilience as one's general behavioral tendency to respond to adversity by returning to a previous functioning state fairly quickly and easily. Resilience can be considered a personal characteristic resource according to COR theory (Hobfoll, 1989; Hobfoll, 2002), and thus, should theoretically help individuals avoid and manage stressors as well as recover from strain.

Previous research has provided evidence that resilience predicts positive physical and mental health outcomes, including physical symptoms (e.g., headaches), pain, fatigue, well-being, positive and negative affect, anxiety, and depression (e.g., Hu et al., 2015; Smith et al., 2008). Additionally, resilience is associated with work-related outcomes, such as job satisfaction and organizational commitment (Youssef & Luthans, 2007), as well as performance (Robertson et al., 2015), in non-military samples. Given these promising results across different outcomes, scholars have called for future research linking resilience with novel outcomes, including work-family experiences (e.g., Kossek & Perrigino, 2016).

Criticisms of a Limited Focus on Resilience

The military's focus on resilience has been subject to scrutiny, however. Scholars and psychologists have suggested that the encouragement of service members to persevere through adversity may have negative consequences within the context of military service, such as quick decisions or violent acts in challenging circumstances (Eidelson et al., 2011). Others have suggested that a focus on resilience removes responsibility from the military and places the onus on service members to maintain their own mental health in the face of wartime involvement (e.g., Britt et al., 2016; Howell, 2015). We agree with these scholars and argue that an exclusive focus on individual-level resources (e.g., resilience) is limiting because it suggests that service members are solely responsible for managing their work-family stressors. When service members are unable to do so and they experience negative work-family outcomes, the focus on resilience suggests that this inability and these outcomes are due to personal failure as opposed to an organizational, structural, or systematic failure. Thus, in addition to examining how resilience relates to WFC and WFE, we also assess two broader organizational resources.



Organizational Resources for Work-Family Outcomes

Specifically, we consider the role of important work-family organizational resources that the military can provide to complement resilience trainings that tend to focus on the individual. In contrast to the resource of resilience that must be generated by the individual, these work-family resources are supplied by the environment (i.e., contextual resources according to COR; Hobfoll, 2002). In the current study, we focus on FSSB and perceptions of work-family climate. FSSB is defined as the informal actions of supervisors which acknowledge employees' nonwork lives and support employees in effectively managing their work and nonwork roles, including emotional support, instrumental support, role modeling, and creatively managing work to allow employees to be effective in multiple roles (Hammer et al., 2009). Perceptions of work-family climate represent the extent to which organizational members perceive they can prioritize their families and not be expected to make family sacrifices for work (Kossek et al., 2001). Although general supervisor support is beneficial for employees and relates to work-family outcomes, family-specific support from supervisors (e.g., FSSB) is more strongly related to WFC than general support (Kossek et al., 2011). Additionally, although supervisors and organizations can provide more formal types of family-related support (e.g., flexible work arrangements, facilitating family and medical leave, family benefits), informal support from supervisors and organizations is often more beneficial for WFC than these formal forms of support (e.g., Behson, 2005; French & Shockley, 2020; Muse & Pichler, 2011).

These broader, organizational resources can uniquely influence work-family outcomes as well as further enhance the anticipated beneficial effects of resilience on work-family outcomes. Both family-supportive supervisors and family-supportive organizations do benefit work-family outcomes (e.g., Crain & Stevens, 2018; French et al., 2018; Kossek et al., 2001; Wayne et al., 2018), and each can have different effects considering that they come from different sources and represent support at different levels of the organization (e.g., Kossek et al., 2011; Michel et al., 2011; Odle-Dusseau et al., 2012). Additionally, in line with COR, certain environments or environmental factors can either foster or hinder individuals' ability to garner or sustain and use resources (Hobfoll et al., 2014). Thus, FSSB and a positive work-family climate can uniquely contribute to work-family outcomes, but they can also provide an environment in which employees can activate their trait resilience to handle workfamily stressors effectively. Alternatively, not having these organizational resources might limit one's ability to demonstrate resilience in ways that would minimize conflict and enhance enrichment. This aligns with similar models, in which a contextual resource moderates the relationship between a personal resource and a well-being or work-family outcome (e.g., Mauno & Rantanen, 2013) and with propositions in theories built upon COR, in which personal and contextual resources interact to benefit work-family outcomes (i.e., the work-home resources model; ten Brummelhuis & Bakker, 2012). This study builds on existing resilience research but acknowledges the limitations of resilience by also assessing the critical organizational factors the military should address when considering work-family issues.



Relationships Between Resilience and Work-Family Outcomes

Work-Family Conflict

According to COR, resources can reduce stressors and experiences of strain (Hobfoll, 1989), and relevant to the current study, personal resources like dispositional traits and affectivity influence experiences of WFC. For example, previous research has demonstrated that those with greater self-efficacy, positive affect, and optimism are less likely to report experiences of WFC (Allen et al., 2012; Beauregard, 2006). Moreover, self-efficacy, positive affect, and optimism are positively and moderately to strongly correlated with resilience (e.g., Martínez-Martí & Ruch, 2017; Youseff & Luthans, 2007, suggesting that individuals with greater resilience may also experience less WFC. Other work has found that individuals with greater psychological capital, of which resilience is one component, similarly experience less WTFC and FTWC (Karatepe & Karadas, 2014). Personal resources, including resilience, likely influence how stressors are appraised, experienced, and coped with (Fletcher & Sakar, 2013), and can protect individuals from work-family related stressors. Importantly, a couple of studies have examined the relationship between resilience and WFC, with both studies generally finding no significant relationship (Krisor et al., 2015; Wayne et al., 2020). This contradicts theorized relationships, and Wayne and colleagues (2020) suggest that resilience is still important for work-family outcomes given one significant relationship with WTFC and the amount of variance it explained in work-life balance satisfaction. Thus, further research is necessary to fully understand these relationships.

Notably, resilience is unique from other personal resources because it specifically enables individuals to effectively manage stressors in both the work and home domain (Jackson et al., 2007; Ong et al., 2006; Smith et al., 2008; Windle, 2011). Indeed, trait resilience is associated with resistance to stress; Ong and colleagues (2006) found that more resilient individuals exhibit a greater ability to regulate emotions and experience less reactivity to daily stressful events. Further, emerging neuroscience research suggests that individuals higher in resilience exhibit brain patterns associated with greater emotion regulation and reduced stress reactivity (van der Werff et al., 2013). In this way, a more resilient service member is likely to navigate and address work-related stressors within the workday that could otherwise conflict with family time, while also managing emotions that arise in response to work-related stressors that could prevent the individual from being fully present, positive, and/or effective as a family member. Alternatively, given that resilient individuals are characterized by their ability to quickly rebound from stress (Smith et al., 2008), these individuals may experience work issues while at home, but are likely to quickly and adeptly handle the issue and return to family-related responsibilities without expending significant time or emotions. More resilient individuals are also likely to address family challenges that arise during work with resourcefulness, quickly managing the issue and returning to work with little distress or worry. In line with work that suggests that resilience protects individuals from the harmful consequences of stressors (Fletcher & Sarkar, 2013), including traumatic experiences (Bensimon, 2012), we expect that resilient individuals are not immune to work or family stressors, but rather



manage the stressors in an effective way, lessening the potential for conflict. Thus, we hypothesize that resilience will be negatively associated with WTFC (*hypothesis 1a*) and FTWC (*hypothesis 1b*).

Hypothesis a: Resilience will be negatively associated with WTFC.

Hypothesis b: Resilience will be negatively associated with FTWC.

Work-Family Enrichment

Although COR generally focuses on how resources affect stress, scholars have started to examine additional outcomes of resources and resource processes, including constructive and beneficial ones (Hobfoll et al., 2018). In our study, we examine the positive outcomes of work-to-family and family-to-work enrichment. Greenhaus and Powell (2006) theorize that the experience of WFE is characterized by resources in one domain generating high performance and positive affect, which can spillover into another domain. Similar to the research on WFC, previous research has indicated that personal resources, such as a positive core self-evaluation and positive affect, are positively related to WFE (McNall et al., 2015; Salehi et al., 2015), and one review suggests that general psychological capital improves one's ability to effectively manage multiple roles, which allows the individual to transfer more positive experiences from one realm to the other (Morganson et al., 2014). These positive personal resources are correlated with resilience (e.g., Martínez-Martí & Ruch, 2017), suggesting that resilience may have similar relationships with WFE. However, the one study to date that has examined this relationship found no significant association with WTFE or FTWE (Wayne et al., 2020). Similar to WFC, further research is needed to understand if this finding is stable across studies, particularly because theory does suggest that resilience should allow an individual to experience greater WFE.

More resilient individuals are better able to regulate emotions in response to stress and are also more likely to experience positive emotions (e.g., Ong et al., 2006). Thus, the resource of resilience, and the favorable behavioral and affective outcomes associated with resilience, should enable experiences of WFE. For instance, service members who are effective at managing stressors, particularly at work, may gain a sense of self-efficacy that can also be realized within the home domain. Resilient service members may also generate positive emotions from beneficial experiences at work that influence their interactions with family members following the workday, or they may develop skills for successfully navigating the workplace that can then be transferred into the home domain (i.e., WTFE; Greenhaus & Powell, 2006). In addition to WTFE, resilient individuals should also experience increased FTWE. For example, in line with research that suggests that resilience and life satisfaction are positively correlated (Martínez-Martí & Ruch, 2017), resilient individuals should be able to capitalize on positive experiences with family members. These positive moods and perspectives can then be transferred into the workplace (Greenhaus & Powell, 2006). Additionally, resilient service members, by tackling stressors head on at home, likely develop important skills (e.g., communication, time management)



that can be utilized in the workplace. Therefore, individuals who are more resilient should also be more likely to experience the enriching benefits of their multiple roles.

Hypothesis a: Resilience will be positively associated with WTFE.

Hypothesis b: Resilience will be positive associated with FTWE.

Moderating Role of Organizational Work-Family Resources

As outlined in COR, individuals with more resources can more readily invest those resources to gain additional resources, allowing them to experience fewer stressors and less strain (Halbesleben et al., 2014; Hobfoll, 1989). Thus, with the presence of organizational resources (i.e., FSSB and a positive work-family climate), individuals are more likely to be able to invest their resilience to manage work-family stressors and avoid work-family strain, thus experiencing less WFC and more WFE than if they have resilience alone, although these interactions are yet to be tested (Halbesleben et al., 2014; Hobfoll et al., 2018). Various forms of family-supportive organizational resources (e.g., supervisor support, family-friendly policies) are negatively related to WFC and positively related to WFE (e.g., Crain & Stevens, 2018; French et al., 2018; Wadsworth & Owens, 2007), and likely play a role in moderating the relationship between personal resources (e.g., resilience) and these work-family outcomes. The influence of personal resources on these outcomes could be constrained or enhanced by the organizational resources available to the service members. For instance, the availability of supervisor support for a service member's family may encourage a resilient service member to ask for help or obtain resources in order to bounce back more quickly and effectively, whereas a lack of supervisor support may discourage a service member from asking for help or obtaining resources and therefore, prolong instances of conflict and stress. Similarly, if one perceives their organization to be supportive of their family, they may feel more agency to handle work-family conflicts and stressors as they see fit (e.g., taking a personal call at work to quickly address a family issue) and then return to work as opposed to ruminating on family issues while at work.

Thus, the relationships between personal resources and work-family outcomes should be strongest under conditions that provide organizational resources. As such, we hypothesized that FSSB and perceptions of work-family climate will moderate the relationship between resilience and WTFC (hypotheses 3a-b) and the relationship between resilience and FTWC (hypotheses 3c-d), such that FSSB and perceptions of work-family climate will enhance the negative relationship between resilience and conflict. Additionally, we hypothesized that FSSB and perceptions of work-family climate will moderate the relationship between resilience and WTFE (hypotheses 4a-b) and the relationship between resilience and FTWE (hypotheses 4c-d), such that FSSB and perceptions of work-family climate will enhance the positive relationship between resilience and enrichment.



Hypothesis *a*: FSSB will moderate the relationship between resilience and WTFC, such that higher levels of FSSB will strengthen the negative relationship between resilience and WTFC.

Hypothesis *b*: Perceptions of work-family climate will moderate the relationship between resilience and WTFC, such that higher levels of climate will strengthen the negative relationship between resilience and WTFC.

Hypothesis *c*: FSSB will moderate the relationship between resilience and FTWC, such that higher levels of FSSB will strengthen the negative relationship between resilience and FTWC.

Hypothesis *d*: Perceptions of work-family climate will moderate the relationship between resilience and FTWC, such that higher levels of climate will strengthen the negative relationship between resilience and FTWC.

Hypothesis *a*: FSSB will moderate the relationship between resilience and WTFE, such that higher levels of FSSB will strengthen the positive relationship between resilience and WTFE.

Hypothesis *b*: Perceptions of work-family climate will moderate the relationship between resilience and WTFE, such that higher levels of climate will strengthen the positive relationship between resilience and WTFE.

Hypothesis c: FSSB will moderate the relationship between resilience and FTWE, such that higher levels of FSSB will strengthen the positive relationship between resilience and FTWE.

Hypothesis *d*: Perceptions of work-family climate will moderate the relationship between resilience and FTWE, such that higher levels of climate will strengthen the positive relationship between resilience and FTWE.

Method

Participants and Procedure

Cross-sectional survey data were collected from Army National Guard headquarters and armories in the Northwestern part of the U.S. as part of a larger Department of Defense-funded study to examine service members' health and work-family experiences. Participants from the National Guard who worked full time (≥ 32 h per week) were recruited through email and enrolled in the study through an online signup link. Potential participants received an automated email to complete their baseline survey online and received \$25 for completing the survey.



Participants were 417 full-time National Guard employees, made up of 59% Active Guard Reserve (AGR) or Active Duty Operational Support (ADOS) and 41% Military Technicians of Title 5 Civilians. Positions primarily included personnel providing support for the day-to-day functioning of the National Guard, such as human resources, finance/supply, logistics, and maintenance. Most of our sample (68%) had been deployed at least once, and of those who had been deployed, most had at least some combat exposure (85%). Participants worked in 10 distinct workgroups, with 21-62 service members (M=41.7, SD=11.71) nested within each group. They were primarily male (75%), married or cohabitating with a partner (78%), and were an average of 37.11 years old (SD=8.43). Race/ethnicity of participants was as follows: White (81.07%), American Indian/Alaska Native (0.97%), Asian (1.94%), Black/African American (1.69%), Native Hawaiian/Pacific Islander (2.18%), Latino/Hispanic (6.55%), and other (5.58%). Participants had between 0 and 6 children living with them at least three days per week (M=1.38, SD=1.30), and 5% of participants reported eldercare responsibilities.

Measures

All measures used a response scale from 1 (*strongly disagree*) to 5 (*strongly agree*), with the exception of the conflict scale, which used a scale from 1 (*almost never*) to 5 (*almost always*). For all scales, higher scores reflect greater degrees of the construct.

Work-Family Conflict

WTFC and FTWC were each measured with three items (Matthews et al., 2010). An example WTFC item is, "I have to miss family activities due to the amount of time I must spend on work responsibilities" and an example FTWC item is, "Because I am often stressed from family responsibilities, I have a hard time concentrating on my work." Cronbach's alphas were 0.75 for WTFC and 0.64 for FTWC.

Work-Family Enrichment

WTFE and FTWE were each measured with three items (Kacmar et al., 2014). One example WTFE item is, "My involvement in my work helps me feel personally fulfilled and this helps me be a better family member" and an example FTWE item is, "My involvement with family puts me in a good mood and this helps me be a better worker." Cronbach's alphas were 0.88 for WTFE and 0.85 for FTWE.

Resilience

Resilience was measured with the 6-item Brief Resilience Scale (BRS; Smith et al., 2008). An example item is, "I tend to bounce back quickly after hard times." Cronbach's alpha for this scale was 0.88.



Perceptions of Work-Family Climate

The family-sacrifices subscale comes from a broader measure of perceptions of work climate for the family role (Kossek et al., 2001). The scale contains three items and refers to the climate specifically within the respondent's work unit, with one example item being, "It is generally accepted that people have to put their families second to their jobs." We reverse-coded this scale so that higher scores would represent perceptions of a better work climate for family. Cronbach's alpha for this scale was 0.87.

Family-Supportive Supervisor Behavior

FSSB was measured with the 4-item FSSB-Short Form scale (Hammer et al., 2013). An example item is, "My supervisor works effectively with employees to creatively solve conflicts between work and non-work." Cronbach's alpha for this scale was 0.95.

Confirmatory Factor Analysis

A multilevel confirmatory factor analysis was conducted with the items from all scales to determine that each measure or dimension (WTFC, FTWC, WTFE, FTWE, resilience, perceptions of work-family climate, FSSB) was distinct. As expected, the seven-factor model fit the data well (χ^2 (254)=491.70, p < .001; CFI=0.96, TLI=0.95, RMSEA=0.05, SRMR=0.05).

Control Variables

Number of children and post-traumatic stress symptoms (PTSS) were included as control variables according to theoretical and empirical relationships with key study variables (e.g., Byron, 2005; Vinokur et al., 2011). PTSS were measured with a four-item DSM 5-based scale (Price et al., 2016). Job type was included because the sample included service members categorized as AGR/ADOS or as Technician/Title 5 Civilian, which differ in their employment level (i.e., state, federal) and have different regulations regarding pay, work hours, retirement, etc.

Results

A multilevel, fully saturated path analysis was conducted in Mplus version 8.4 to test the study hypotheses (a simplified path model with regression coefficients is presented in Fig. 1). Intraclass correlation coefficients (ICCs) were low for WTFC (0.003), WTFE (0.007), and FTWE (0.010), and slightly higher for FTWC (0.023). Thus, the analysis accounts for the nesting of individuals within clusters, although all variables were modeled at the individual level. Variables that were included in interaction terms (resilience, perceptions of work-family climate, and FSSB) were grand-mean centered. Missing data were estimated using full information maximum likelihood (FIML). To evaluate regression coefficients, we examined both stan-



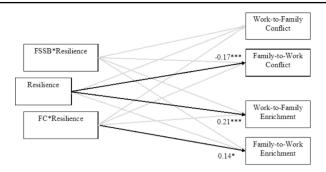


Fig. 1 FSSB = family-supportive supervisor behaviors. FC = perceptions of work-family climate. All hypothesized relationships represented by arrows. The four outcomes were also regressed on FSSB, FC, and control variables (PTSD symptoms, job type, children), but those variables and relationships are not depicted for simplicity. Only statistically significant coefficients are included. * p < .05. *** p < .01. **** p < .001

dardized and unstandardized regression coefficients, standard errors, and p-values. Descriptive statistics and bivariate correlations are displayed in Table 1, and model results are displayed in Table 2.

Direct Effects

Hypotheses 1a and 1b predicted that resilience is negatively associated with WTFC and FTWC, and hypotheses 2a and 2b predicted that resilience is positively associated with WTFE and FTWE. To test hypotheses 1 and 2, we regressed WTFC, FTWC, WTFE, and FTWE on resilience. Results indicate that resilience significantly predicted lower FTWC (b=-0.17, p<.001) and greater WTFE (b=0.21 p<.001), but not WTFC (b=-0.06, p=.29) or FTWE (b=0.13, p=.06). Thus, hypotheses 1b and 2a were supported, but hypotheses 1a and 2b were not supported.

Additionally, although not hypothesized, there were significant associations between perceptions of work-family climate and WTFC (b=-0.45, p<.001), FTWC (b=-0.23, p<.001), and WTFE (b=0.15, p=.002), but not FTWE (b=-0.003, p=.94). There were also significant associations between FSSB and WTFC (b=-0.06, p=.03), FTWC (b=-0.10, p=.004), WTFE (b=0.23, p<.001), and FTWE (b=0.15, p=.005).

Moderation Effects

Hypothesis 3 predicted that the relationship between resilience and the conflict outcomes (WTFC and FTWC) would be moderated by FSSB (3a and 3c) and by perceptions of work-family climate (3b and 3d). Hypothesis 4 predicted that the relationship between resilience and the enrichment outcomes (WTFE and FTWE) would be moderated by FSSB (4a and 4c) and by perceptions of work-family climate (4b and 4d). To test hypothesis 3

and 4, we regressed WTFC, FTWC, WTFE, and FTWE on two interaction terms. FSSB did not significantly interact with resilience to predict WTFC (b=0.01, p=.65), FTWC (b=-0.02, p=.65), WTFE (b=-0.03, p=.44), or FTWE (b=-0.03, p=.61).



Table 1 Descriptive Statistics and Correlations Among Study Variables

Variable	N	M	SD 1	2	3	4	5	9	7	∞	6	10
1. Job Type	417	0.59	0.49 -									
2. Number of Children	410	1.38	1.30 -0.00									
3. PTSD Symptoms	411	2.87	3.32 -0.06	0.10	0.84							
4. Resilience	415	3.80	0.72 0.16	-0.04	-0.38	0.88						
5. FSSB	417	4.01	0.97 -0.01	90.0	-0.12	0.19	0.95					
6. Work-Family Climate Perceptions	415	2.93	1.03 - 0.31	-0.04	-0.21	0.15	0.10	0.87				
7. Work-to-Family Conflict	409	2.69	0.86 0.35	0.18	0.30	-0.18	-0.14	-0.64	0.75			
8. Family-to-Work Conflict	412	1.90	0.72 -0.03	0.20	0.25	-0.29	-0.19	-0.36	0.52	0.64		
9. Work-to-Family Enrichment	414	3.35	0.91 -0.12	-0.01	-0.31	0.28	0.34	0.30	-0.40	-0.31	0.88	
10. Family-to-Work Enrichment	414	3.71	0.79 -0.02	0.03	-0.22	0.18	0.23	0.09	-0.20	-0.26	0.57	0.85
0,	nnician/Tit	le 5 Civil	= Technician/Title 5 Civilian); PTSD Symptoms (scale: 1-16); Resilience (scale: 1-5); FSSB (scale: 1-5); Work-Family Climate (scale:	ptoms (scal	e: 1–16); R	Resilience (scale: 1-5)	Vote. Job Type (1 = AGR/ADOS, 0 = Technician/Title 5 Civilian); PTSD Symptoms (scale: 1-16); Resilience (scale: 1-5); FSSB (scale: 1-5); Work-Family Climate (scale: 1-6); PSSB (scale: 1-5); Work-Family Climate (scale: 1-6); Resilience (scale: 1-6); FSSB (scale: 1-6); Work-Family Climate (scale: 1-6); Resilience (scale: 1-6); FSSB (scale: 1-6); Work-Family Climate (scale: 1-6); Resilience (scale: 1-6); FSSB (scale: 1-6); Work-Family Climate (scale: 1-6); Resilience (scale: 1-6); FSSB (scale: 1-6); Work-Family Climate (scale: 1-6); Resilience (scale: 1-6); FSSB (scale: 1-6); Work-Family Climate (scale: 1-6); Resilience (scale: 1-6); Resilie	ale: 1–5); V	Work-Fami	ly Climat	e (scale

Note. Job Type (1=AGR/ADOS, 0=Technician/Title 5 Civilian); PTSD Symptoms (scale: 1–16); Resilience (scale: 1–5); FSSB (scale: 1–5); Work-Family Climate (scale: 1–5); Work-to-Family Conflict (scale: 1–5); Family-to-Work Conflict (scale: 1–5); Work-to-Family Enrichment (scale: 1–5); Family-to-Work Enrichment (scale: 1–5). Cronbach's alpha reliability coefficients are provided on the diagonals. Correlation values greater than [0.10] are significant at the 0.05 level



Results
Analysis]
2 Path
Table 2

	Work-to-Fan	mily Con	lict	Family-to-Work Conflict	Vork Con	flict	Work-to-Family Enrichment	mily Enric	chment	Family-to	Family-to-Work Enrichmen	richment
Predictor	p	SE	В	q	SE	В	p	SE	В	9	SE	В
Resilience	-0.06	90.0	-0.05	-0.17**	0.04	-0.16	0.21	0.04	0.17	0.13	0.07	0.12
FSSB	*90.0-	0.03	-0.07	-0.10**	0.03	-0.13	0.23	0.05	0.25	0.15**	0.05	0.18
FC	-0.45***	0.04	-0.53	-0.23***	0.04	-0.34	0.15**	0.05	0.17	-0.003	0.05	-0.004
Resilience*FSSB	0.02	0.03	0.01	-0.02	0.05	-0.02	-0.03	0.04	-0.03	-0.03	0.05	-0.03
Resilience*FC	0.01	0.05	0.01	-0.02	0.05	-0.02	0.09	0.09	0.07	0.14*	0.07	0.14
PTSD Symptoms	0.04	0.01	0.16	0.02	0.01	80.0	-0.05**	0.01	-0.18	-0.04*	0.02	-0.16
Job Type	0.33	0.07	0.19	-0.17*	0.07	-0.12	-0.14*	0.07	-0.08	-0.04	90.0	-0.03
Children	0.10***	0.03	0.15	0.11***	0.02	0.19	0.01	0.03	0.02	0.03	0.02	0.05
R^2	0.50***			0.26***			0.25			0.12**		

Note. b = unstandardized coefficient, SE=standard error, B = standardized coefficient. PTSD Symptoms (scale: 1–16). Job Type (1=AGR/ADOS, 0=Technician/Title 5 Civilian). Resilience, family supportive supervisor behavior (FSSB), and perceptions of work-family climate (FC) grand mean centered. *p < .05. **p < .01. ***p < .001



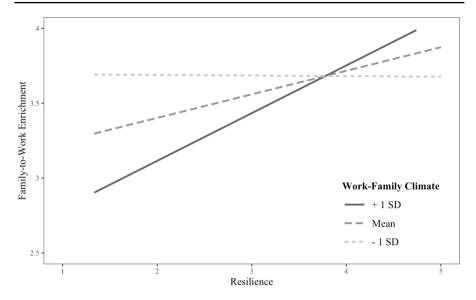


Fig. 2 Interaction between resilience and perceptions of work-family climate on family-to-work enrichment

Thus, we did not find support for hypotheses 3a, 3c, 4a, or 4c. Additionally, perceptions of work-family climate did not moderate the relationships between resilience and either conflict outcome (WTFC: b=0.01, p=.82; FTWC: b=-0.02, p=.79) or WTFE (b=0.09, p=.32). Thus, we did not find support for hypotheses 3b, 3d, or 4b. Perceptions of work-family climate did significantly moderate the relationship between resilience and FTWE (b=0.14, p=.047). Thus, hypothesis 4d was supported. After probing the interaction, when perceptions of climate were high (one standard deviation above the mean; 3.96), resilience was significantly and positively

ported. After probing the interaction, when perceptions of climate were high (one standard deviation above the mean; 3.96), resilience was significantly and positively related to FTWE (b=0.28, p=.02). At the mean of climate perceptions (2.93), resilience was not significantly related to FTWE (b=0.13, p=.06), and when perceptions of climate were low (one standard deviation below the mean; 1.90), resilience was not related to FTWE (b=-0.02, p=.77). See Fig. 2 for a depiction of this interaction.

Discussion

The results of this study indicate that resilience was directly related to two of the four work-family outcomes (i.e., FTWC, WTFE) in the expected directions, suggesting that one's personal ability to bounce back from stressors helps in both managing the extent to which family roles interfere with work roles and reaping the benefits of work experiences when in the family role. However, resilience was not directly related to WTFC or FTWE. WTFC may be considered somewhat inevitable, especially in a military organization, such that a personal resource like resilience is not effective for preventing or reducing experiences of work interfering with family. In comparison, FTWC may be more easily addressed by service members because they have more



individual control over family interference (e.g., can make more individual decisions about when and how to address family responsibilities), such that individual resilience can actually influence its occurrence. The ability of resilience to predict WTFE but not FTWE may be explained by positive experiences from home being more frequent and easier to transfer to work (i.e., resilience is not necessary for this to occur) compared to transferring positive experiences from work to home, which may require more cognitive and emotional energy, in which case resilience would be useful. Particularly in a stressful military environment, resilience might enable service members to derive from work more positive feelings and experiences to transfer to the home environment. The interaction may also explain the lack of a direct relationship between resilience and FTWE, because contextual variables appear to determine the extent to which resilience relates to FTWE. These mixed findings partially contradict recent research, which found that resilience was not related to either enrichment outcome or FTWC, but was related to WTFC and work-life balance satisfaction (Wayne et al., 2020). Thus, this study provides partial support for tenets of COR suggesting that personal resources, like resilience, can help employees prevent some work-family strain and enhance some work-family enrichment. However, our results do not necessarily clarify the relationships between resilience and family-to-work constructs, and we cannot provide evidence that the financial resources allocated to enhancing service members' resilience are likely to widely benefit work-family outcomes.

Regarding the theorized interactions between personal and organizational resources, perceptions of work-family climate strengthened the effects of resilience on FTWE. However, there were no moderating effects of work-family climate perceptions on WTFC, FTWC, nor WTFE. The significant moderating effect of work-family climate perceptions on the relationship between resilience and FTWE illustrates the importance of supportive work-family environments. When employees are expected to make fewer family sacrifices for work (i.e., high work-family climate), personal resilience has a stronger relationship with the transfer of positive experiences from the family role to the work role. Thus, as expected, personal resources (e.g., resilience) can be beneficial, but they are most advantageous in the presence of organizational (e.g., work-family climate) resources. Further, unexpectedly, resilience is only significantly related to enrichment in an above average workfamily climate. When employees perceive that they are expected to make family sacrifices and prioritize their work over family (i.e., perceptions of a poor or average work-family climate), the relationship between resilience and FTWE becomes nonsignificant, suggesting that resilience has no benefit for enrichment unless the climate is positive and supportive.

We propose a possible explanation for why one's personal ability to bounce back from stress may not predict the extent to which someone's family-life enriches their work-life under conditions of a poor work-family climate. If employees are expected to prioritize their work, they may not spend as much time with their family and may not be able to experience as many day-to-day positive family-life experiences. In this case, they may not acquire the positive affect or skills from their home-life that could help enrich their work-life, so personal resilience would be irrelevant to enrichment. However, to fully understand why resilience does not relate to FTWE in poor work-



family climates, future research should involve designs where positive experiences are measured separately in the family domain and the work domain, as opposed to measuring the entire enrichment process as one variable.

The nonsignificant interactions between resilience and FSSB may be due to the level at which the resource is provided. According to the work-home resources model, macro resources are a specific subset of contextual variables that are very broad and structural, such as cultural, social, and economic systems (ten Brummelhuis & Bakker, 2012), and they determine the "extent to which other resources can be used effectively" (p. 548), which should make them moderators of the relationship between personal resources, such as resilience, and work-family outcomes. This was supported by our findings regarding work-family climate perceptions and the family-to-work enrichment outcome. However, although work-family climate could be considered a macro resource, especially in a formal, longstanding organization such as the military, FSSB would be considered a volatile social resource that is more narrowly focused. Thus, we found that macro contextual resources in conjunction with resilience are more beneficial for work-family outcomes than specific social contextual resources. However, it should be noted that supervisor support was directly associated with all four work-family outcomes in this military sample, and thus, is still important despite it not interacting with resilience. These results are largely in line with recent successful supervisor support intervention work in military settings, which found that the effect of the intervention on work and health outcomes was dependent on existing supervisor support (Hammer et al., 2019).

Although not hypothesized, we draw the reader's attention to the effects of FSSB and perceptions of work-family climate on the work-family outcomes. One notable finding is that FSSB is significantly related to all four work-family outcomes, including FTWE, which was not associated with perceptions of work-family climate in this sample. Additionally, when examining the standardized regression coefficients, FSSB was the strongest predictor of both enrichment outcomes, suggesting that supportive supervisors may help service members transfer positive experiences, emotions, and skills across domains. Perceptions of work-family climate was the strongest predictor of both conflict outcomes, suggesting that the broader, macro resource is the most beneficial for reducing interference between domains. This could be partially due to the measure of work-family climate being specific to making "sacrifices," which is more closely aligned to conflict as opposed to enrichment.

In general, these findings are similar to those in recent research (e.g., Wayne et al., 2020), which highlight that broader resources provided by work are the most beneficial for work-family outcomes, compared to personal resources or family resources. This suggests that broader organizational factors should be targeted in addition to resilience and are likely more impactful for improving service member work-family outcomes. These results provide empirical evidence to be considered alongside the existing philosophical and ethical arguments that a focus on resilience within military settings places the onus on the individual, largely removing responsibility from the larger military organization, to maintain the health and well-being of service members and their families (e.g., Britt et al., 2016; Howell, 2015).



Practical Implications

Our results suggest that organizational interventions emphasizing both family-supportive resources and resilience should have a positive impact on employees' work-life experiences. However, organizations like the military should focus first on creating work-family environments that will improve the well-being of service members and their families. Once these broader contextual resources are established, organizations can turn their focus to developing employees' personal resources, like resilience. Although most of the expected moderations were not supported, the moderating effect of climate perceptions for FTWE and the variance in the four work-family variables explained by the organizational resources suggest that the military's exclusive focus on resilience may be an ineffective use of resources without incorporating broader interventions. Before spending time and resources on training individuals to develop their individual resources, interventions should focus on enhancing organizational resources and address situational constraints and affordances that influence how and when personal resources can be expressed and utilized.

Accordingly, a focus on family-friendly environments is critical for future military intervention work. Hammer and colleagues (2005) have highlighted several unit-level and organizational-level interventions for military samples, including flexible work arrangements, enhancing supportive culture (i.e., targeting unit leaders, focusing on child and elder care, communication), and quality childcare arrangements. In line with our moderating results of climate perceptions, it may be particularly useful for military interventions to identify intervention targets within their respective branch or unit that reflect sacrificing family for work (e.g., policies around taking calls from home, long work hours). Additionally, existing resilience-focused trainings could be improved by including a module on organizational resources, including how to access them and how to ask for help (e.g., support from supervisors). Overall, both family-supportive contextual resources and personal resources should benefit military employees' work-family experiences, though we argue that creating family-supportive organizational systems should be prioritized before focusing on personal resource development at the individual level.

Limitations and Directions for Future Research

Future research should continue to assess the direct effects and moderating effects of organizational support resources at varying levels (e.g., coworker, supervisor, organization). Although broader support resources (i.e., climate) have been shown to be more strongly related to WFC than specific support resources (i.e., FSSB; French et al. 2018), perhaps those specific resources are more strongly related to WFE and other positive outcomes than broad resources. In the current sample, for both enrichment outcomes, FSSB was a stronger predictor than perceptions of work-family climate. We do not have a full understanding of which variables and which levels most strongly protect individuals from stressors *and* allow for positive work-family experiences. Perhaps even broader variables, such as federal or state family leave policies, economic systems (e.g., capitalism, democratic socialism), or cultural variables (e.g.,



individualism), would act as more effective moderators of the relationships between resilience and work-family outcomes.

After first testing these relationships with a cross-sectional design, future research should use longitudinal designs to establish temporal relationships and reduce common method bias (Podsakoff et al., 2012). Testing these associations longitudinally would provide a more precise test of the process through which personal resources and organizational resources contribute to resource gain spirals (i.e., resources leading to the gain of additional resources; Hobfoll et al., 2018) and resource caravan passageways (i.e., environments that foster or hinder resource gain and maintenance; Hobfoll et al., 2018) in addition to their influence on work-family outcomes. Additionally, future research can tap into existing interventions (e.g., resilience trainings, FSSB training) to better determine causality in similar models. The measure used in this study taps the characteristic tendency (i.e., trait) of resilience, providing some reassurance that our model is correctly specified (Smith et al., 2008), but longitudinal designs would provide stronger evidence for the proposed phenomenon.

Other future directions involve construct operationalization and sample characteristics. There are concerns regarding the construct validity of resilience (e.g., Windle et al., 2011), as well as questions about its uniqueness and value-added compared to other variables, such as negative affect or neuroticism. Future research should examine similar constructs to resilience and their comparative relationships with workfamily outcomes. Additionally, the FTWC scale had low reliability in our study, which likely attenuated observed relationships between the construct of FTWC and other variables (Schmitt, 1996). Thus, future research should examine these hypotheses with other operationalizations of this variable. Lastly, we conducted this study with a specific sample of service members. Interestingly, although we did not hypothesize this, we did find that active duty service members in our sample reported higher levels of WTFC and lower levels of WTFE compared to those not in active duty. Thus, it is important to consider the unique demands of active duty that create additional challenges for work-family dynamics compared to non-active duty.

Conclusions

Resilience can provide service members with an ability to manage their work and family roles in a way that reduces some aspects of work-family conflict and enhances work-family enrichment. However, organizational resources, such as FSSB and a supportive work-family climate, may create a ceiling for the impact of resilience on work-family outcomes. Additionally, organizational resources or interventions cannot necessarily be interchanged, and the level at which the resource occurs should be carefully considered to achieve specific desired outcomes. Military organizations, and perhaps other types of organizations as well, must go beyond individual resources, such as resilience, and provide organizational support for service members' families and family responsibilities.

Authors' Contributions Leslie Hammer, Todd Bodner, Tori Crain, and Jacquelyn Brady contributed to study design and paper development. Jacqueline Wong performed the data analysis and wrote the first



draft of the manuscript. Tori Crain and Rebecca Brossoit wrote sections of the manuscript, and all authors commented on multiple versions of the manuscript.

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Declaration

Conflicts of Interest/Competing Interests Leslie Hammer has a financial interest in Work Life Help, LLC., a company that may have a commercial interest in the results of this research and technology. This potential conflict of interest has been reviewed and managed by OHSU. The authors declare no other conflicts of interest.

Availability of Data and Material If published, data and material could be made available upon request.

Code Availability If published, code could be made available upon request.

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