Mental Health Outcomes Associated With Profiles of Risk and Resilience Among U.S. Army Spouses

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The current study examined patterns of risk and protective factors among military families and associations with mental health diagnoses among U.S. Army spouses. Spouses ($N = 3,036$) completed a survey of family psychosocial fitness, which informed protective factors including coping, family cohesion, and social support. Survey results were linked with Department of Defense archival data, which provided information on military-specific risks, including relocation, deployments, and reunification, as well as mental health care diagnoses. The three-step method of latent profile analysis identified six profiles, suggesting significant heterogeneity in military families with respect to their access to resources and exposure to risk. The largest profile of families (40.48% of the sample) had limited risk exposure and considerable strengths. Variability in risk and protection across profiles was associated with statistically significant differences in the prevalence of mental health diagnoses among spouses ($\chi^2 = 108.968$, $df = 5$, $p < .001$). The highest prevalence of mental health diagnoses among Army spouses (41.2%) was observed in the profile with the lowest levels of protective factors. Findings point to the importance of evaluating both concurrent risk and protective factors. Increasing access to resources may be a fruitful avenue for prevention among military families that are struggling.

Keywords: military families, military spouses, resilience, mental health, latent profile analysis

The adverse impact of war on military service members has been well documented (e.g., Institute of Medicine, 2013). The negative effects on military families are receiving increased attention. Approximately 50% of U.S. service members are married (U.S. Department of Defense [DoD], 2017), suggesting a significant number of military spouses may be experiencing the consequences of extended exposure to war-related stressors. A recently released National Academy of Sciences, Engineering and Medicine (NASEM) report amplifies the concern about the wellbeing of military families and highlights the need for rigorous research capturing the diversity of military family experiences (NASEM, 2019). Although many military families appear to cope successfully, a subset of spouses may be at increased risk of a wide array of poor outcomes (Ahmadi & Green, 2011; Mansfield et al., 2010). These outcomes are particularly concerning considering the negative impact poor spousal functioning has on military-connected children (Green, Nurius, & Lester, 2013).

Although attention to this topic is increasing, the majority of these studies have focused solely on the impact of deployment experiences (de Burgh, White, Fear, & Iversen, 2011), despite evidence that military spouses experience many concurrent stressors during wartime (Green et al., 2013). Further, there have been increasing calls to explore the many protective aspects of military family life, including access to a broad spectrum of high-quality

formal and informal supports (Easterbrooks, Ginsburg, & Lerner, 2013; Hosek & Wadsworth, 2013). The above-referenced NASEM report emphasizes the importance of a broader focus on the collective experiences of military families that may be either opportunities or challenges depending on the unique perspective of the individual family (NASEM, 2019). The present study addressed these gaps in the literature using latent profile analysis (LPA) to model the effects of multiple stressors and concurrent protective factors on mental health outcomes for U.S. Army spouses.

Theoretical Foundation

Risk Factors

Risk factors are conceptualized as experiences that increase the likelihood of a negative outcome or decrease the likelihood of a positive outcome (Fergus & Zimmerman, 2005; NASEM, 2019, p. 58). Exposure to multiple concurrent risks may have a particularly potent effect on the functioning of military families and military spouses (Evans & Kim, 2010; Lavee, McCubbin, & Patterson, 1985; NASEM, 2019). The experience of concurrent stressors has been associated with poor family adaptation among U.S. Army soldiers and their spouses, over and above the impact of individual stressors (Lavee et al., 1985).

Protective Factors

Though a distinction is sometimes drawn between protective factors, which only operate in the presence of risk, and promotive factors, which are associated with better outcomes whether risk is present or not (Masten & Narayan, 2012), this study explores protective factors as an overarching term capturing a broader category of experiences that decrease the likelihood of a negative outcome or increase the likelihood of a positive outcome (Fergus & Zimmerman, 2005; NASEM, 2019). As discussed in the NASEM report, military families may access protective factors within multiple social ecological levels, including from intrapersonal, familial, and community systems (Green et al., 2013; Lavee et al., 1985; Paley, Lester, & Mogil, 2013).

Resilience

Although studies have consistently found an elevated risk of adverse outcomes among military spouses and children, the majority of these families nevertheless report relatively healthy functioning (e.g., Sullivan et al., 2015). These findings point to the need to consider resilience processes in military family systems. Family resilience encompasses the interactional and systemic processes occurring in family systems that enable families to thrive despite adversity (Walsh, 2003). The *concept of resilience* has been defined as an inherent trait possessed by individuals or family systems, a process of leveraging protective factors to manage risk, or an outcome of that process. The present study defined *family resilience* as a balance of risk and protective factors operating at individual and family levels, allowing a family to maintain positive functioning in the face of adversity (Hawkins et al., 2017; Walsh, 2003). This theoretical orientation suggests the need to consider the simultaneous experience of both risk and protective factors. For example, families with concurrent risk exposure may never-theless avoid adverse outcomes if they have access to sufficient resources. Alternatively, families who report limited protective factors may be more likely to experience adverse outcomes, even in the absence of increased risk.

Risk and Protective Factors Affecting Military Spouses

Risk Factors

Empirical evidence suggests combat deployments are a significant risk factor associated with adverse outcomes for military spouses (de Burgh et al., 2011), which include general distress, depressive and trauma symptoms, and mental health diagnoses (Lester et al., 2010; Mansfield et al., 2010). Cumulative deployment experiences in particular appear to be a potent predictor of outcomes for military spouses (Lara-Cinisomo et al., 2012). Reintegration or reunification is the period following the end of a deployment when the service member returns home. Although there is little consensus on the length of this period and it may be different for each deployment experience, many studies have conceptualized reintegration as lasting 6 months to a year beyond the end of a deployment (Lester et al., 2010; McNulty, 2013; Pincus, House, Christenson, & Adler, 2001). This phase can be accompanied by additional stressors, as families navigate changing roles and responsibilities (McNulty, 2013). Finally, military families experience a relocation, or permanent change of station, every 2 to 3 years on average (Park, 2011). Spouses may struggle to maintain employment as a result of frequent moves (Harrell, Lim, Castaneda, & Golinelli, 2004) and may experience decreases in overall well-being (Burrell, Adams, Durand, & Castro, 2006).

Protective Factors

Protective factors may exist at several social ecological levels, including intrapersonal, family, and community or social network factors (Bowles et al., 2015; Paley et al., 2013). At the intrapersonal level, the use of positive, active coping strategies has been associated with healthy spouse and family outcomes, particularly during military separations (Weins & Boss, 2006). Further, the capacity to articulate a sense of coherence, purpose, or meaning may predict better outcomes for spouses, children, and families (Everson, Darling, & Herzog, 2013; Saltzman et al., 2011). At the familial level, healthy cohesive family functioning, intimate relationship quality, and better communication have been associated with better mental health and lower levels of stress and psychological distress among military spouses (Allen, Rhoades, Stanley, & Markman, 2011; McGuire et al., 2012). Finally, at the community or network level, formal and informal social connections may affect the functioning of both service members and spouses (Bowen & Martin, 2011). Decreased isolation and increased social support, particularly during deployments, have been associated with lower stress among military spouses (Van Winkle & Lipari, 2015). Finally, connection to the military community has also been associated with spouse psychosocial functioning and ultimately with better child outcomes (Conforte et al., 2017).

Outcomes

During wartime, empirical evidence has documented elevated rates of adverse outcomes among military spouses, including gen-

eral distress, disrupted parenting, substance use, secondary traumatization, and mental health diagnoses (Ahmadi & Green, 2011; Mansfield et al., 2010; Renshaw et al., 2011). Although many adverse outcomes have been observed, this study focuses on rates of mental health diagnoses in this population.

The Current Study

The current study used person-centered methods to examine patterns of risk and protective factors and associated military spouse mental health outcomes for two reasons (Masten, 2001; Rosato & Baer, 2012). First, this study conceptualized resilience as a balance between risk and protective factors, requiring a modeling technique that can evaluate these elements concurrently. Second, by defining unique subgroups in this sample, LPA can uncover less common configurations of risk and protection among military families that may be masked using variable-focused modeling (Masten, 2001). Differences in outcomes across these subgroups can then be examined.

Method

Family Global Assessment Tool

This work is a secondary analysis of data obtained through the U.S. Army's Research Facilitation Laboratory. The Army created the Family Global Assessment Tool (GAT) to evaluate the physical, social, emotional, family, and spiritual health of Army families (Peterson, Park, & Castro, 2011). The Family GAT survey is completed via an online portal by Army spouses on a voluntary basis and can be completed as often as the spouse chooses. The Family GAT instrument recently underwent psychometric evaluation, resulting in nine scales with preliminary evidence of good reliability and validity (Sullivan, Hawkins, Gilreath, & Castro, 2019). Of these nine scales, six protective factor scales that have previously been empirically linked to spouse health outcomes were used in these analyses.

Data Linkage

Family GAT data, which provided information on protective factors, were merged with DoD archival data on personnel, transitions, operations, and medical outcomes, which provided information on risk factors. Data were merged in a four-step process, using a cloud-based, virtual enclave in which deidentified data from disparate DoD sources are linked and analyzed (Vie et al., 2015). In Step 1, demographic data on an approved cohort of GAT completers were merged with GAT survey data, using a unique identification number and identifying only first GAT completions. In Step 2, administrative data sets, including personnel records and family demographics were merged. In Step 3, deployment data were merged using a process in which deployments were sorted in chronological order and all deployments for each family dating back to the beginning of 2009 (the earliest date of available deployment data) were retained. Finally, four medical data sets, representing inpatient and outpatient medical records from both military and civilian facilities, were merged. Only visits that occurred within a year following GAT survey completion were retained. Duplicate records were discarded to ensure only one

record of each unique diagnosis for any spouse was retained in the dataset.

Participants

To be included in analyses, Army spouses had to (a) complete a Family GAT survey between 2014 and the end of 2016; (b) provide consent to have their survey responses used for research purposes; and (c) be linked to a soldier using a unique electronic identifier. During our study period, there were 5,786 survey completions. We excluded 2,022 surveys because the participant did not provide consent and an additional 96 surveys that could not be linked to a soldier. The remaining 3,668 surveys were completed by 3,036 distinct individuals; these 3,036 spouses represent our final sample. Secondary analyses were approved by the Army Research, Development and Engineering Center Institutional Review Board and the Institutional Review Board at the University of Southern California.

Measurement

Risk factors. Based on reviewed empirical findings, three military-specific risk factors were included in models. Archival data sets managed by the Defense Manpower Data Center (DMDC) were used to operationalize these variables.

Recent relocation. A dichotomous item reflecting relocation in the year preceding GAT completion was created by comparing the family's arrival dates at permanent duty stations to the date of Family GAT survey completion. If an arrival date was within 365 days before GAT completion, the family was deemed to have moved in the preceding year (yes vs. no).

Cumulative days of deployment. Using DMDC's Contingency Tracking System Deployment (CTSD) data, a continuous variable reflecting cumulative deployment days between the beginning of 2009 and the date of GAT completion was created. All deployment days that occurred up to but not including the date of GAT completion were summed to create this item.

Recent reunification. Using DMDC's CTSD data, a dichotomous item reflecting a recent reunification following deployment was created by comparing deployment end dates with GAT completion dates. If any deployment end date was within 365 days before the spouse took the GAT, the family was deemed to have experienced a recent reunification (yes vs. no).

Protective factors. Six protective factor scales, representing three social ecological levels, were drawn from the GAT. All items had five Likert-type response options. Responses to individual items were recoded such that higher scores indicated positive functioning and averaged to create composite scores. All scales have preliminary evidence of acceptable psychometric properties (Sullivan et al., 2019).

Intrapersonal factors. Three items, including "When bad things happen, I try to see the positive sides," assessed positive coping. Three items, including "I believe the things that I do are worthwhile," assessed meaning-making. Response options ranged from *not like me at all* to *very much like me*. Internal consistency was adequate ($\alpha = .72$) for the positive coping scale and good ($\alpha = .83$) for the meaning-making scale in this sample.

Familial factors. Eight items, including "I feel emotionally distant from my partner," assessed relationship functioning. Three

items, including "My family confides in each other," assessed family cohesion. Response options ranged from *strongly disagree* to *strongly agree*. Internal consistency was excellent ($\alpha = .90$) for the relationship functioning scale and good ($\alpha = .86$) for the family cohesion scale in this sample.

Community factors. Four items, including "If I was sick, I could find someone to help with my daily chores," assessed social support. Response options ranged from *strongly disagree* to *strongly agree*. Five items, including "I participated in community events, activities, or meetings," assessed social connections. Response options ranged from *never* to *most of the time*. Internal consistency was good ($\alpha = .86$) for the social support scale and excellent ($\alpha = .91$) for the social connections scale in this sample.

Covariates. Using data from DMDC's Master Personnel File, three variables were created as covariates: (a) service member race/ethnicity (White/non-White); (b) service member educational attainment (high school or below/some college or above); and (c) service member military rank (enlisted/officer).

Mental health outcomes. Spouses were deemed to have received a mental health diagnosis if they were assigned a mental health-related code from *the International Classification of Diseases* (*ICD*), 9th (*ICD-9*) or 10th revision (*ICD-10*), during a medical visit within 1 year following GAT survey completion. To identify mental health-related codes, this study followed Mansfield et al. (2010), which includes a comprehensive list of *ICD-9* codes for 17 categories of mental health disorders. Because data spanned the transition to *ICD-10*, all codes on this list were converted to *ICD-10* codes and both lists were used to create the outcome variable. Ultimately, the presence of any of these codes was represented with one dichotomous item reflecting receipt of any mental health diagnosis or not in the year following GAT completion.

Analyses

To combine an LPA model with a distal outcome, a three-step method is preferable, which proceeds as follows: (a) an LPA model is specified using indicator variables; (b) a nominal most likely class variable is created and the classification uncertainty rate is calculated; and (c) considering the uncertainty of classification, the most likely class variable is associated with covariates or the outcome variable (Asparouhov & Muthén, 2014). In Step 1, all risk and protective factor variables were entered into the LPA model, using mean scores for protective factors to preserve interpretability and power. An initial one-profile model was compared to models with an increasing number of profiles. Model fit was determined by considering four criteria: (a) low Bayesian information criterion (BIC); (b) significant Lo-Mendell-Rubin likelihood ratio test (LMR-LRT); (c) significant bootstrap likelihood ratio test; and (d) conceptual and theoretical considerations (Nylund, Asparouhov, & Muthén, 2007). When specific model fit statistics indicated different solutions, substantive considerations guided model selection. Steps 2 and 3 were conducted using the AUXILIARY option in Mplus (Asparouhov & Muthén, 2014; Muthén & Muthén, 2012). The R3STEP command was used for covariates and the DCAT command for the distal outcome. SPSS Version 21 was used for data cleaning and descriptive statistics; Mplus Version 7 was used for LPA models (Muthén & Muthén, 2012). Full information maximum likelihood, available in Mplus, was used to handle missing data.

Results

Sample demographics are presented in Table 1. Most service members were male, White, and enlisted. Most spouses were female. The majority of families had two or fewer children. Families were relatively evenly split between those whose oldest child was age 11 or younger and those whose oldest child was 12 or older. Approximately 15% of families had experienced a recent relocation and 7% experienced a recent reunification following a deployment. On average, families reported 139 cumulative days of deployment. Approximately 16% of military spouses received a mental health diagnosis in the year following GAT completion.

LPA Model

Tables 2 and 3 present fit indices for the LPA model and means and conditional probabilities, respectively. Although BIC continued to decrease in the seven-profile solution, a significant LMR-LRT in this solution indicated a preference for the six-profile model. This model was more parsimonious and clear distinctions between classes were evident, so the six-profile solution was chosen as best fitting.

In Profile 1 (moderate protection and moderate risk; 8.50% of the sample), spouses were relatively more likely to have experienced a recent move or reunification compared to low risk profiles and had experienced 340 days of deployment on average. Spouses in this profile endorsed moderate levels of all six protective factors. In Profile 2 (moderate protection and low risk; 21.48%), spouses were unlikely to have experienced a recent move or reunification and mean deployment days were low on average. Spouses in this group endorsed slightly higher levels of protective factors on average compared to Profile 1. In Profile 3 (low protection and low risk; 3.33%), spouses were also relatively unlikely to have experienced a recent relocation or reunification and deployment days were low on average. However, spouses in Profile 3 also reported the lowest mean levels of all six protective factors across groups. In Profile 4 (high protection and low risk; 40.48%), the largest category, spouses were relatively unlikely to have experienced a recent relocation or reunification and mean deployment days were the lowest of any group. Spouses in this profile also reported the highest mean levels of protective factors compared to other groups. In Profile 5 (high protection and moderate risk; 19.66%), spouses reported relatively high levels of protective factors. Spouses in this profile were slightly less likely to have experienced a recent relocation or reunification and had slightly fewer days of deployment on average compared to Profile 1. Finally, in Profile 6 (high protection and high risk, 6.56%), spouses reported relatively high levels of protective factors but were also the most likely to be exposed to risk factors and experienced by far the most cumulative deployment days, at 635 on average, across groups. Figure 1 displays the continuous risk and protective factor indicator variables across latent profiles to facilitate interpretation of these results.

Table 1

Sample Demographics and Latent Profile Indicator Means and Prevalence

Variable	n (%)	M (SD)	Min	Max
Service member age		33.16 (9.65)	17	66
Service member sex				
Male	2,513 (83.1)			
Female	295 (9.8)			
Service member education				
Completed high school or below	1,282 (42.2)			
Completed some college or above	1,459 (48.2)			
Service member rank				
Enlisted	1,959 (64.8)			
Officer	849 (28.1)			
Service member race and ethnicity				
White	1,769 (58.5)			
Black	512 (16.9)			
Asian	95 (3.4)			
American Indian or Alaskan Native	15 (0.5)			
Hawaiian or Pacific Islander	23 (0.8)			
Hispanic	351 (11.6)			
Spouse age		34.45 (8.95)	17	69
Spouse sex				
Male	126 (4.2)			
Female	1,951 (64.5)			
Number of children in the home				
0	541 (17.9)			
1	496 (16.4)			
2	601 (19.9)			
3	331 (10.9)			
4 or more	204 (6.7)			
Age of oldest child				
0–5	390 (12.8)			
6–11	425 (14.0)			
12–19	638 (21.0)			
20 or older	179 (5.9)			
Recent permanent change of station move				
Yes	458 (15.1)			
No	2,567 (84.9)			
Recent reunification				
Yes	208 (6.8)			
No	2,828 (93.0)			
Cumulative days of deployment		138.58 (202.09)	0	1,639
Social connectedness		3.26 (1.09)	1	5
Social support		3.98 (0.89)	1	5
Relationship functioning		4.01 (0.86)	1	5
Family cohesion		4.09 (0.76)	1	5
Meaning making		4.24 (0.86)	1	5
Positive coping		3.77 (0.92)	1	5
Spouse mental health diagnosis				
Yes	470 (15.5)			
No	2,570 (84.5)			

Covariates

Associations between covariates and latent profiles are displayed in Table 4. Families of service members who are White and those who completed at least some college were more likely to be in the moderate protection and moderate risk profile (Profile 2) compared to the high protection and low risk profile (Profile 4). Families of enlisted soldiers were more likely to be in the low protection and low risk profile (Profile 3) and less likely to be in the high protection and moderate risk (Profile 5) and high protection and high risk (Profile 6) profiles compared to the high protection and low risk profile. However, as individual covariates may be positively correlated with some LPA indicator variables and

negatively correlated with others, relationships with overarching profiles may be less meaningful. The lack of a consistent pattern reduces concerns about underlying confounding in the relationships presented below.

Distal Outcomes

Distal outcomes are presented in Table 5. Omnibus chi-square results indicated significant differences in the prevalence of mental health diagnoses across profiles ($\chi^2 = 108.968$, $df = 5$, $p < .001$). Individual chi-square tests evaluated significant differences in the prevalence of mental health diagnoses between two profiles at a time. These results, displayed in Table 5, suggest many differences

Table 2
Model Fit Indexes for LPA Model

Profiles	BIC	LMR-LRT	BLRT	Entropy
1	84,439.822			
2	80,926.896	.0000	.0000	.703
3	80,093.676	.0002	.0000	.664
4	79,483.041	.0002	.0000	.853
5	78,263.129	.0086	.0000	.857
6	**77,833.972**	**.0093**	**.0000**	**.825**
7	77,492.712	.5666	.0000	.823

Note. Best fitting model indicated in bold. BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test; BLRT = bootstrap likelihood ratio test.

in prevalence between individual profiles were also significant. The highest prevalence rates were observed in the low protection and low risk (41.2%) and moderate protection and moderate risk (29.9%) profiles, whereas the lowest prevalence rates were observed in the moderate protection and low risk (8.2%) and high protection and low risk (13.3%) profiles.

Discussion

This study aimed to describe naturally occurring patterns of risk and protective factors affecting U.S. Army spouses and the association of these patterns with the prevalence of mental health diagnoses. Overall, 15.5% of spouses in this sample received a mental health diagnosis during a 1-year period following GAT survey completion. These findings highlight the critical role that both risk and protective factors have in understanding the potential for adverse mental health outcomes among military-connected spouses.

Results suggest significant variation among military families. Analyses identified six groups with different patterns of risk and protective factors. The largest group, accounting for 41% of the sample, was composed of families that reported comparatively little exposure to risk and high levels of protective factors. This

finding echoes recent studies highlighting a small subset of families that exhibit adverse outcomes and a much larger group of families that appear to be coping with stressors successfully (Trail, Meadows, Miles, & Karney, 2017). Further, although there was variability in levels of protective factors across profiles, even the small group of spouses who reported the lowest levels of protective factors (Profile 3) nevertheless appeared to have some intrapersonal, familial, or community resources on which to draw.

Generally, protective factors appeared to vary together, such that families that reported low levels of one protective factor tended to report low levels across all six protective factors evaluated. Recent research using a latent class analysis approach among military families had similar findings (Trail et al., 2017). However, despite this general trend, Army spouses consistently reported lower levels of social connectedness compared to other resources evaluated. This finding is consistent with previous work, which suggests that overall integration into military communities may be low (Burrell, Durand, & Fortado, 2003). This finding may point to an opportunity to target military community integration as one element of a tiered system of supports for military families, as described in the recent NASEM report (2019).

The emergence of Profile 3 (low protection and low risk) and Profile 6 (high protection and high risk) suggest protective factors and risk factors do not necessarily covary in military families, which may distinguish these results from findings in the civilian community. Trail and colleagues (2017) theorized exogenous stressors associated specifically with military service—such as frequent moves or deployment separations—may not be as inherently linked to endogenous resources and vulnerabilities, which are a product of the family system. This decoupling between vulnerabilities and resources, which emerges clearly using person-centered methods, may be a unique feature of military families and suggests that mental health care providers may find family resources that could be useful for prevention or intervention efforts, even among the most risk-exposed families.

Regarding risk, approximately two thirds of this sample were grouped into three profiles with relatively low levels of risk.

Table 3
Means and Conditional Probabilities for Risk and Protective Factor Indicators

Factor	Moderate protection, moderate risk	Moderate protection, low risk	Low protection, low risk	High protection, low risk	High protection, moderate risk	High protection, high risk
Class prevalence	8.50%	21.48%	3.33%	40.48%	19.66%	6.56%
Protective factors						
Social connections	2.30	2.75	1.90	3.91	3.61	3.49
Social support	3.06	3.52	2.57	4.47	4.27	4.09
Relationship functioning	3.22	3.61	2.98	4.35	4.20	4.23
Family cohesion	3.56	3.75	2.96	4.45	4.37	4.29
Meaning making	3.21	3.75	2.37	4.59	4.39	4.23
Coping	2.85	3.46	2.44	4.22	3.95	3.81
Risk factors						
Recent relocation						
No	0.73	0.90	0.86	0.89	0.80	0.72
Yes	0.27	0.10	0.14	0.11	0.20	0.28
Recent reunification						
No	0.81	0.99	0.99	0.99	0.88	0.67
Yes	0.19	0.01	0.01	0.01	0.12	0.33
Total days of deployment	339.65	9.59	8.62	7.71	322.44	634.88

Note. Figures represent means for protective factors and days of deployment, and conditional probabilities for recent relocation and recent reunification.
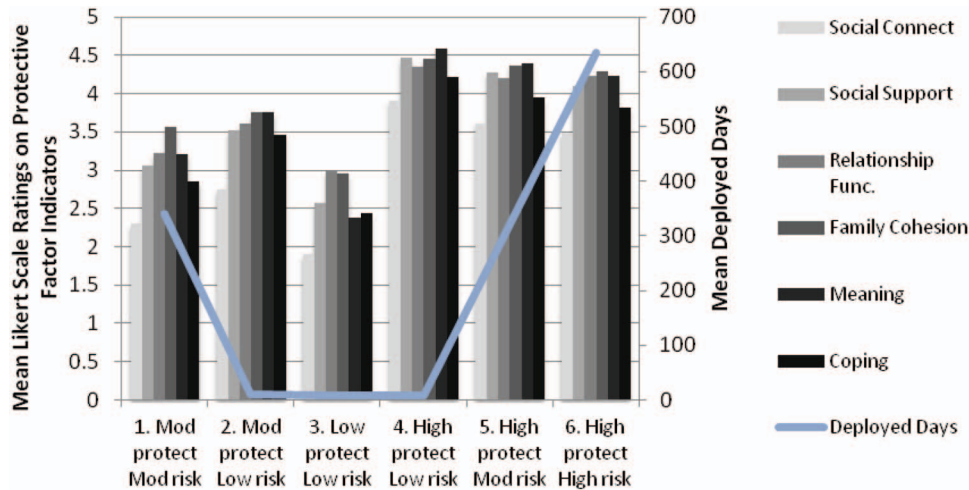
Figure 1. Visual representation of continuous latent profile indicators where bars represent protective factors and line represents mean deployment days. Additional risk factor indicators (experiencing a relocation in the preceding year and experiencing a reunification following a deployment in the preceding year) are not shown, as these variables are represented as conditional probabilities. These risk factors tended to track closely with mean deployment days across profiles. For reference, the prevalence of mental health diagnoses in each profile are as follows: 29.9% in Profile 1, 8.2% in Profile 2, 41.2% in Profile 3, 13.3% in Profile 4, 17.1% in Profile 5, and 25.8% in Profile 6. See the online article for the color version of this figure.

Notably, however, there was some low-level exposure to risk, even in these three profiles. Likely, this low but consistent risk reflects the systemic nature of stressors that accompany military service. The risk factors evaluated in this study are, to a certain degree, an expected part of military life (Burrell et al., 2006). Nevertheless, in the context of current overseas conflicts, many families are experiencing exposure to risk that goes beyond this expected level. These experiences are reflected in the three profiles in which families were more likely to experience a recent move or reunification and had many more cumulative days of deployment. For example, in Profile 6 (high protection and high risk), one third of spouses had experienced a reunification in the preceding year and upward of 600 cumulative days of deployment on average. Although this profile was small, these families may exemplify the high operational tempo that has characterized recent wartime military family life.

The variability in risk and protective factors across profiles was associated with significant differences in rates of mental health diagnoses among Army spouses. The highest rate of mental health diagnoses was observed in Profile 3 (low protection and low risk),

which was characterized by the lowest levels of protective factors but also relatively low levels of risk exposure. Although this was a comparatively small group, more than 41% of spouses received a mental health diagnosis in the year following GAT survey completion. This finding suggests that limited access to protective factors may be driving the relationship with adverse outcomes as much or more than elevated exposure to military-specific risk. If this is the case, clinicians working with military families can aim to support spouses by increasing their coping skills, social connections, relationships, and sense of meaning.

The lowest rates of mental health diagnoses were observed in Profile 4 (high protection and low risk), which was characterized by the highest levels of protective factors and relatively low risk, and Profile 2 (moderate protection and low risk), which was also characterized by relatively low risk but moderate levels of protective factors. Although the lower rates of mental health diagnoses in Profile 4 is not surprising, the finding regarding the moderate protection and low risk category is more nuanced. It is possible this finding suggests an optimal nexus between low exposure to risk and sufficient access to resources. Outcomes in this profile are in

Table 4

Service Member Covariates Associated With Latent Profiles

Covariates	Moderate protection, moderate risk			Moderate protection, low risk			Low protection, low risk			High protection, moderate risk			High protection, high risk		
	OR	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*	*OR*	*LL*	*UL*
Some college (vs. high school)	**1.58**	**1.08**	**2.31**	**0.64**	**0.43**	**0.95**	1.21	0.67	2.19	**1.75**	**1.27**	**2.41**	1.33	0.85	2.09
Enlisted (vs. officer)	1.28	0.83	1.96	0.96	0.60	1.52	**3.64**	**1.42**	**9.35**	**0.65**	**0.46**	**0.90**	**0.62**	**0.39**	**0.97**
White (vs. non-White)	**1.82**	**1.27**	**2.59**	1.04	0.76	1.43	**1.77**	**1.01**	**3.11**	**1.45**	**1.11**	**1.90**	**2.40**	**1.59**	**3.63**

Note. High protection and low risk (Profile 4) was the reference category. *OR* = odds ratio; *LL* = lower limit 95% confidence interval; *UL* = upper limit 95% confidence interval. Significant results indicated in bold. Due to listwise deletion (used only in covariate model), n = 2,710 in these analyses.

Table 5

Latent Profiles Associated With Distal Outcome (Mental Health Diagnosis)

Variable	Outcome % (SE)	1 χ^2	2 χ^2	3 χ^2	4 χ^2	5 χ^2
1. Moderate protection, moderate risk	29.9 (0.028)					
2. Moderate protection, low risk	8.2 (0.008)	55.54***				
3. Low protection, low risk	41.2 (0.071)	2.31	21.01***			
4. High protection, low risk	13.3 (0.015)	27.53***	8.20**	14.64***		
5. High protection, moderate risk	17.1 (0.023)	11.75**	13.17***	11.37**	0.16	
6. High protection, high risk	25.8 (0.035)	0.80	24.22***	3.14	10.98**	3.98*

Note. Degrees of freedom = 1 for all individual chi-square results.
* $p < .05$.   ** $p < .01$.   *** $p < .001$.

contrast with the outcomes for spouses in Profile 1 (moderate protection and moderate risk), which is characterized by similar levels of protective factors as in Profile 2, but more risk exposure. Although only 8.2% of spouses received a mental health diagnosis in Profile 2, 29.9% received a diagnosis in Profile 1. These findings may suggest that when exposure to risk increases, moderate levels of protective factors no longer provide a sufficient balancing effect, which may be associated with increases in adverse outcomes. These results call to mind our definition of resilience as a balance of risk and protective factors. The balance between risk and protection observed in Profile 2 may be emblematic of these resilience processes.

Strengths and Limitations

In addition to the usefulness of LPA described below, this study has a number of strengths. Big data methods, which link data sets from different sources, allowed for a more complex picture of military families. Multiple data sources, including self-report and health records, avoided common method bias, which may plague studies in which military spouses are the only source of information. Finally, access to mental health diagnoses avoided misattribution that can arise from using symptom reporting as an outcome.

Despite these strengths, this study has limitations that should be considered. First, spouses take the GAT on a voluntary basis. Although this is a national sample and the demographics are similar to the population of the Army overall, the voluntary nature of the survey limits generalizability. Also, we must be cautious about selection effects. As GAT data used here were collected between 2014 and 2016, when the high pace of operational deployments was winding down, many of the families in this sample may reflect a hardier group who have chosen to remain in service despite increased stressors during this period of high operational tempo. This may also affect the generalizability of our results. Further, temporality was considered when linking data, but these data are still essentially cross-sectional, so care must be taken when considering causality.

Finally, a particular challenge of big data methods is that data are not originally collected for research so potential variables of interest may not be available. Certain military-specific risk and protective factors, including service member mental health, dwell time between deployments, supportive leadership, and unit cohesion were unavailable and could not be included here. Further, in addition to military-specific risk factors, normative stressors and

protective factors that affect all families may be critical for predicting outcomes (Lucier-Greer, Arnold, Mancini, Ford, & Bryant, 2015). Normative stressors, like socioeconomic status, and prior mental health problems, as well as protective factors like positive parenting were not available. In particular, we were unable to control for prior mental health problems, which may influence the relationships found here. Relatedly, results regarding covariates may be better explored using variable focused methods described below. Finally, DoD archival data sets do not include detailed information about spouses. Although service member race/ethnicity and education were evaluated, corresponding information was not available for their partners. Further, important risk factors like spousal unemployment and depressed earnings were not available.

Future Research Directions

Person-centered techniques like latent profile analysis allow the risks a particular family experiences to remain grouped with the protective factors that same family experiences so that we can understand the concurrent impact of both within a group of similar families. Using LPA, we avoid some of the pitfalls that traditional variable-focused approaches to studying military families may experience. In variable-focused studies, using regression or structural equation modeling for example, statistical findings may overlook less common patterns and may be driven by a smaller group of families with much higher risk exposure and possibly fewer protective factors. These methods may have the unintended consequence of overpathologizing the larger population of military families (Rosato & Baer, 2012). LPA uncovered significant heterogeneity among military families, highlighting the large group of families with relatively little exposure to risk and considerable access to protective factors. These findings have meaningful implications for policy and practice described below.

Resilience scholars advocate a dual-pronged approach in which both person-focused and variable-focused methods are deployed to understand resilience processes within a particular population (Masten, 2001). Future research should consider building on these findings to explore complementary questions using variable-focused methods. For example, some of the protective factors described here, like family cohesion, may actually operate as promotive factors, meaning they are associated with wellbeing regardless of risk exposure. Others may operate like protective factors, in the sense that they operate to improve outcomes only in the presence of risk. Social support may be an example in the

present dataset. A variable-focused approach would allow for an examination of which variables operate as main effects (promotive factors) and which operate as moderators (protective factors), with potentially important conclusions for policy and practice that complement the conclusions presented here. Also, in addition to understanding the collective effects of concurrent risk exposure, as was examined here, it might be of interest to tease out the relative effects of different risk exposures to prioritize targets for intervention. Relatedly, as patterns emerge from the data using LPA, we were unable to explore all configurations of risk and protective factors (e.g., families that experience high risk and low protective factors). Variable-focused models may be more appropriate to shed light on these combinations, which could further highlight the most critical protective factors. Further, it may be interesting to explore the impact of length of service on the experience of concurrent risk and protective factors. Finally, though not possible using the current data, variable-focused methods could also consider the impact of current stressors relative to the impact of stressors, like adverse childhood experiences, that service members and spouses carry with them into military service. Ultimately, by using both approaches, we can continue to gain insight into explanatory process without losing sight of the totality of the military family experience or the diversity within that experience.

Clinical and Policy Implications

Ultimately, the results of this study highlight that military families are heterogeneous in their exposure to risk and access to resources. These findings cast doubt on characterizations of military families as either monolithically pathological or inherently resilient. Mental health professionals serving military families need to be aware of the elevated risk of poor mental health outcomes among military spouses. Recent research has described military spouses as the foundation of resilience processes in their family systems, particularly during wartime, when service members may be absent due to work-related obligations (Green et al., 2013; Riggs & Riggs, 2011). Spouse mental health functioning appears to have cascading adverse effects on children in military families (Allen et al., 2011; Lester et al., 2010; Masten, 2013). Considering this research, efforts to prevent and treat poor mental health outcomes among military spouses are critical not just for the spouses themselves but for the entire family system.

However, clinicians and policymakers must also be careful not to overpathologize, as many families with lower exposure to risk and sufficient resources appear to be faring well. From a policy perspective, family support programs may not be as critical to the wellbeing of this larger group of families. Rather than investing in universal prevention, these resources might be better allocated to targeted prevention and intervention efforts directed specifically to the smaller group of families with higher risk exposure and fewer resources. Clinically, assessing families' access to protective factors, in particular, may be useful to understand the potential for adverse outcomes among spouses and to inform intervention. The presence of risk across groups in this study suggests a certain amount of risk is systemic in military families. Even when risk cannot be avoided altogether, which is likely the case in most military families,

increasing access to protective factors may be a fruitful avenue toward prevention and intervention. Military programs that improve families' internal resources, marital and family functioning, and social connectivity may effectively counteract systemic risk. From a policy perspective, the presence of protective factors at multiple social-ecological levels highlights diverse points of entry for capacity building to better support spouses and families of service members (NASEM, 2019).

References

Ahmadi, H., & Green, S. L. (2011). Screening, brief intervention, and referral to treatment for military spouses experiencing alcohol and substance use disorders: A literature review. *Journal of Clinical Psychology in Medical Settings, 18,* 129–136. http://dx.doi.org/10.1007/s10880-011-9234-7

Allen, E. S., Rhoades, G. K., Stanley, S. M., & Markman, H. J. (2011). On the home front: Stress for recently deployed Army couples. *Family Process, 50,* 235–247. http://dx.doi.org/10.1111/j.1545-5300.2011.01357.x

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling, 21,* 329–341. http://dx.doi.org/10.1080/10705511.2014.915181

Bowen, G. L., & Martin, J. A. (2011). The resiliency model of role performance for service members, veterans, and their families: A focus on social connections and individual assets. *Journal of Human Behavior in the Social Environment, 21,* 162–178. http://dx.doi.org/10.1080/10911359.2011.546198

Bowles, S. V., Pollock, L. D., Moore, M., Wadsworth, S. M., Cato, C., Dekle, J. W., . . . Bates, M. J. (2015). Total force fitness: The military family fitness model. *Military Medicine, 180,* 246–258. http://dx.doi.org/10.7205/MILMED-D-13-00416

Burrell, L. M., Adams, G. A., Durand, D. B., & Castro, C. A. (2006). The impact of military lifestyle demands on well-being, Army, and family outcomes. *Armed Forces and Society, 33,* 43–58. http://dx.doi.org/10.1177/0002764206288804

Burrell, L., Durand, D. B., & Fortado, J. (2003). Military community integration and its effect on well-being and retention. *Armed Forces and Society, 30,* 7–24. http://dx.doi.org/10.1177/0095327X0303000101

Conforte, A. M., Bakalar, J. L., Shank, L. M., Quinlan, J., Stephens, M. B., Sbrocco, T., & Tanofsky-Kraff, M. (2017). Assessing military community support: Relations among perceived military community support, child psychosocial adjustment, and parent psychosocial adjustment. *Military Medicine, 182,* e1871–e1878. http://dx.doi.org/10.7205/MILMED-D-17-00016

de Burgh, H. T., White, C. J., Fear, N. T., & Iversen, A. C. (2011). The impact of deployment to Iraq or Afghanistan on partners and wives of military personnel. *International Review of Psychiatry, 23,* 192–200. http://dx.doi.org/10.3109/09540261.2011.560144

Easterbrooks, M. A., Ginsburg, K., & Lerner, R. M. (2013). Resilience among military youth. *The Future of Children, 23,* 99–120. http://dx.doi.org/10.1353/foc.2013.0014

Evans, G. W., & Kim, P. (2010). Multiple risk exposure as a potential explanatory mechanism for the socioeconomic status-health gradient. *Annals of the New York Academy of Sciences, 1186,* 174–189. http://dx.doi.org/10.1111/j.1749-6632.2009.05336.x

Everson, R. B., Darling, C. A., & Herzog, J. R. (2013). Parenting stress among U.S. Army spouses during combat-related deployments: The role of sense of coherence. *Child & Family Social Work, 18,* 168–178. http://dx.doi.org/10.1111/j.1365-2206.2011.00818.x

Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual*

Review of Public Health, 26, 399–419. http://dx.doi.org/10.1146/annurev.publhealth.26.021304.144357

Green, S., Nurius, P. S., & Lester, P. (2013). Spouse psychological well-being: A keystone to military family health. *Journal of Human Behavior in the Social Environment, 23,* 753–768. http://dx.doi.org/10.1080/10911359.2013.795068

Harrell, M. C., Lim, N., Castaneda, L. W., & Golinelli, D. (2004). *Working around the military: Challenges to military spouse employment and education.* Santa Monica, CA: RAND National Defense Research Institute. Retrieved from https://www.rand.org/content/dam/rand/pubs/monographs/2004/RAND_MG196.pdf

Hawkins, S. A., Sullivan, K. S., Schuyler, A. C., Keeling, M., Kintzle, S., Lester, P. B., & Castro, C. A. (2017). Thinking "big" about research on military families. *Military Behavioral Health, 5,* 335–345. http://dx.doi.org/10.1080/21635781.2017.1343696

Hosek, J., & Wadsworth, S. M. (2013). Economic conditions of military families. *The Future of Children, 23,* 41–59. http://dx.doi.org/10.1353/foc.2013.0009

Institute of Medicine. (2013). *Returning home from Iraq and Afghanistan: Assessment and readjustment needs of veterans, service members, and their families.* Washington, DC: The National Academies Press.

Lara-Cinisomo, S., Chandra, A., Burns, R. M., Jaycox, L. H., Tanielian, T., Ruder, T., & Han, B. (2012). A mixed-method approach to understanding the experiences of non-deployed military caregivers. *Maternal and Child Health Journal, 16,* 374–384. http://dx.doi.org/10.1007/s10995-011-0772-2

Lavee, Y., McCubbin, H. I., & Patterson, J. M. (1985). The double ABCX model of family stress and adaptation: An empirical test by analysis of structural equations with latent variables. *Source Journal of Marriage and Family, 47,* 811–825. http://dx.doi.org/10.2307/352326

Lester, P., Peterson, K., Reeves, J., Knauss, L., Glover, D., Mogil, C., . . . Beardslee, W. (2010). The long war and parental combat deployment: Effects on military children and at-home spouses. *Journal of the American Academy of Child & Adolescent Psychiatry, 49,* 310–320. http://dx.doi.org/10.1097/00004583-201004000-00006

Lucier-Greer, M., Arnold, A. L., Mancini, J. A., Ford, J. L., & Bryant, C. M. (2015). Influences of cumulative risk and protective factors on the adjustment of adolescents in military families. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 64,* 363–377. http://dx.doi.org/10.1111/fare.12123

Mansfield, A. J., Kaufman, J. S., Marshall, S. W., Gaynes, B. N., Morrissey, J. P., & Engel, C. C. (2010). Deployment and the use of mental health services among U.S. Army wives. *The New England Journal of Medicine, 362,* 101–109. http://dx.doi.org/10.1056/NEJMoa0900177

Masten, A. S. (2001). Ordinary magic. Resilience processes in development. *American Psychologist, 56,* 227–238. http://dx.doi.org/10.1037/0003-066X.56.3.227

Masten, A. S. (2013). Competence, risk, and resilience in military families: Conceptual commentary. *Clinical Child and Family Psychology Review, 16,* 278–281. http://dx.doi.org/10.1007/s10567-013-0150-2

Masten, A. S., & Narayan, A. J. (2012). Child development in the context of disaster, war, and terrorism: Pathways of risk and resilience. *Annual Review of Psychology, 63,* 227–257. http://dx.doi.org/10.1146/annurev-psych-120710-100356

McGuire, A., Runge, C., Cosgrove, L., Bredhauer, K., Anderson, R., Waller, M., & Nasveld, P. (2012). *Timor-Leste family study: Summary report.* Brisbane, Australia: Centre for Military and Veterans' Health, University of Queensland.

McNulty, P. A. F. (2013). Adaptability and resiliency of military families during reunification: Results of a longitudinal study. *Federal Practitioner, 30,* 14–22.

Muthén, L. K., & Muthén, B. O. (2012). *Mplus user's guide* (7th ed.). Los Angeles, CA: Author.

National Academies of Sciences, Engineering, and Medicine. (2019). *Strengthening the Military Family Readiness System for a Changing American Society.* Washington, DC: The National Academies Press. http://dx.doi.org/10.17226/25380

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling, 14,* 535–569. http://dx.doi.org/10.1080/10705510701575396

Paley, B., Lester, P., & Mogil, C. (2013). Family systems and ecological perspectives on the impact of deployment on military families. *Clinical Child and Family Psychology Review, 16,* 245–265. http://dx.doi.org/10.1007/s10567-013-0138-y

Park, N. (2011). Military children and families: Strengths and challenges during peace and war. *American Psychologist, 66,* 65–72. http://dx.doi.org/10.1037/a0021249

Peterson, C., Park, N., & Castro, C. A. (2011). Assessment for the U.S. Army Comprehensive Soldier Fitness program: The Global Assessment Tool. *American Psychologist, 66,* 10–18. http://dx.doi.org/10.1037/a0021658

Pincus, S. L., House, R., Christenson, J., & Adler, L. E. (2001). The emotional cycle of deployment: A military family perspective. *U.S. Army Medical Department Journal, 4,* 9–18.

Renshaw, K. D., Allen, E. S., Rhoades, G. K., Blais, R. K., Markman, H. J., & Stanley, S. M. (2011). Distress in spouses of service members with symptoms of combat-related PTSD: Secondary traumatic stress or general psychological distress? *Journal of Family Psychology, 25,* 461–469. http://dx.doi.org/10.1037/a0023994

Riggs, S. A., & Riggs, D. S. (2011). Risk and resilience in military families experiencing deployment: The role of the family attachment network. *Journal of Family Psychology, 25,* 675–687. http://dx.doi.org/10.1037/a0025286

Rosato, N. S., & Baer, J. C. (2012). Latent class analysis: A method for capturing heterogeneity. *Social Work Research, 36,* 61–69. http://dx.doi.org/10.1093/swr/svs006

Saltzman, W. R., Lester, P., Beardslee, W. R., Layne, C. M., Woodward, K., & Nash, W. P. (2011). Mechanisms of risk and resilience in military families: Theoretical and empirical basis of a family-focused resilience enhancement program. *Clinical Child and Family Psychology Review, 14,* 213–230. http://dx.doi.org/10.1007/s10567-011-0096-1

Sullivan, K., Capp, G., Gilreath, T. D., Benbenishty, R., Roziner, I., & Astor, R. A. (2015). Substance abuse and other adverse outcomes for military-connected youth in California: Results from a large-scale normative population survey. *Journal of the American Medical Association Pediatrics, 169,* 922–928. http://dx.doi.org/10.1001/jamapediatrics.2015.1413

Sullivan, K. S., Hawkins, S. A., Gilreath, T. D., & Castro, C. A. (2019). Preliminary psychometrics and potential big data uses of the U.S. Army Family Global Assessment Tool. *Military Behavioral Health, 8,* 74–85.

Trail, T. E., Meadows, S. O., Miles, J. N., & Karney, B. R. (2017). Patterns of vulnerabilities and resources in U.S. Military families. *Journal of Family Issues, 38,* 2128–2149. http://dx.doi.org/10.1177/0192513X15592660

U.S. Department of Defense. (2017). *2016 demographics: Profile of the military community.* Retrieved from http://download.militaryonesource.mil/12038/MOS/Reports/2016-Demographics-Report.pdf

Van Winkle, E. P., & Lipari, R. N. (2015). The impact of multiple deployments and social support on stress levels of women married to active duty servicemen. *Armed Forces and Society, 41,* 395–412. http://dx.doi.org/10.1177/0095327X13500651

Vie, L. L., Scheier, L. M., Lester, P. B., Ho, T. E., Labarthe, D. R., & Seligman, M. E. P. (2015). The person-event data environment: A

military-civilian big data enterprise. *Big Data, 3,* 67–79. http://dx.doi .org/10.1089/big.2014.0055

Walsh, F. (2003). Family resilience: A framework for clinical practice. *Family Process, 42,* 1–18. http://dx.doi.org/10.1111/j.1545-5300.2003 .00001.x

Weins, T. W., & Boss, P. (2006). Maintaining family resiliency before, during, and after military separation. In C. A. Castro, A. B. Adler, & T. W. Britt (Eds.), *Military life: The psychology of serving in peace and* *combat: Vol.* 3. *The military family* (pp. 13–38). Westport, CT: Praeger Security International.