FAMILY PROCESS

# Mental Health Outcomes Associated with Risk and Resilience among Military-Connected Youth

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*The present study aimed to describe patterns of risk and protective factors affecting U.S. Army families and their association with mental health diagnoses among military-connected children. Wartime military service is associated with increased adverse outcomes for military-connected youth, but few studies have explored the impact of concurrent risk and access to protective factors. Using big data methods to link existing datasets, protective factors (e.g., marital and family functioning) were drawn from a voluntary survey completed by 1,630 US Army spouses. Risk factors (e.g., parent mental health, family moves, deployment) were drawn from Department of Defense (DoD) archival data. Rates of mental health diagnoses among youth were derived from DoD healthcare records. Using the three-step method of latent profile analysis, five profiles emerged with variability across risk and protective factors. The largest group (40% of the sample) had considerable protective factors and limited risk exposure. Statistically significant differences in the prevalence of mental health diagnoses among military-connected youth were observed across profiles ($\chi^2 = 30.067$, df = 4, $p < .001$), with the highest rates (31.1% and 30.5%) observed in the two profiles with the lowest protective factors. Findings suggest most military families are faring well and highlight the importance of a thorough assessment that evaluates both the stressors military families face and the strengths they possess.*

*Keywords: Latent Profile Analysis; Mental Health; Military Families*

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In the U.S. Armed Forces, 40% of the 2.1 million military personnel are parents (U.S. Department of Defense, 2018). In the context of ongoing international conflicts, concern about how military-connected children are managing wartime stressors has increased. A growing body of evidence has suggested wartime military service, and the deployment cycle in particular, are associated with increased risk of adverse outcomes for military-connected youth, including distress, mental health diagnoses, substance use, and poor academic achievement (Engel, Gallagher, & Lyle, 2010; Gorman, Eide, & Hisle-Gorman, 2010; Lester et al., 2010; Sullivan et al., 2015). These empirical findings represent a public health concern as poor developmental outcomes can have compounding negative effects into adulthood.

However, rather than any one stressor, it may be multiple risk exposure that determines outcomes for military-connected youth (Lucier-Greer, Arnold, Mancini, Ford, & Bryant, 2015; MacDermid Wadsworth et al., 2016). Further, studies often fail to account for the many strengths of military families, including the wide array of informal and formal supports available to them (Cozza, Lerner, & Haskins, 2014). Although more is known about the impact of individual stressors on military-connected youth outcomes, less attention has focused on the unique constellation of risk and protective factors experienced by this population. Using a latent profile analysis (LPA) approach, the present study addressed this gap in the literature by exploring patterns of concurrent risk and protective factors in U.S. Army families and their association with mental health diagnoses among military-connected children.

## Family Resilience Framework

Risk factors have been defined as conditions that increase the likelihood of an adverse outcome, whereas protective factors decrease this likelihood (Fergus & Zimmerman, 2005). Despite significant risk exposure, many military families appear to fare well, suggesting that resilience processes may be affecting outcomes (Cozza et al., 2014). This study relies on a family resilience perspective (Walsh, 2003), conceptualizing resilience as a balance of risk and protective factors that permits families to maintain or return to previous levels of functioning in response to adversity (Hawkins et al., 2017). Walsh writes of family resilience, "By definition, it focuses on strengths under stress…in overcoming adversity" (Walsh, 2003, p. 5). This framework suggests that (a) risk and protective factors experienced at the family level are likely to influence outcomes for individuals within that family system and (b) exploring resilience requires an approach that simultaneously accounts for both a family's exposure to risk as well as their strengths and access to resources.

## Empirical Evidence of Risk and Protective Factors

### *Risk factors affecting military children*

A number of risk factors have been empirically linked to adverse outcomes for military-connected youth. The deployment cycle has been demonstrated to have negative consequences, including increased depressive symptoms, suicidal ideation, substance use, and lowered academic engagement and achievement (Chandra et al., 2010; Engel et al., 2010; Gilreath et al., 2016). Cumulative experiences of deployment appear to be a particularly strong predictor of negative outcomes (Lester et al., 2010; Mansfield, Kaufman, Engel, & Gaynes, 2011). There is also an association between emotional challenges in military-connected youth and difficulties experienced during reintegration following a deployment (Chandra et al., 2010; Meadows et al., 2017). Qualitative evidence suggests this is a stressful period, often characterized by worry for military-connected youth (Esposito-

Smythers et al., 2011). Family moves, which occur on average every two to three years (Park, 2011), and associated changes in schools may be a risk factor for poor academic and mental health outcomes (Bradshaw, Sudhinaraset, Mmari, Blum, & Hopkins, 2010). Finally, there is clear evidence that poor functioning among service members and spouses can compromise parenting behaviors (Gewirtz, Polusny, DeGarmo, Khaylis, & Erbes, 2010), children's outcomes (Lester et al., 2010), and broader family functioning (Sullivan, Kintzle, Barr, Gilreath, & Castro, 2018). Poor adjustment of the at-home parent, particularly during deployments, is a potent risk factor associated with more adverse outcomes for children in these family systems (Chandra et al., 2010; Lester et al., 2010).

*Protective factors affecting military children*

Although they have been less frequently studied, evidence exists for a number of protective factors that reduce the likelihood of adverse outcomes among military-connected youth. Social support appears to be a critical factor associated with healthy functioning in military families (Cederbaum, Wilcox, Sullivan, Lucas, & Schuyler, 2017). Living on a military base where access may be more immediate to both formal and informal support appears to be associated with fewer negative outcomes (Chandra et al., 2010). Additionally, youth from military families who are more connected to their community and perceive more support from these connections may be less likely to experience adverse outcomes (Conforte et al., 2017). Finally, interrelated family processes, including family cohesion and healthy marital and parenting relationships, are likely protective for youth (Foran, Eckford, Sinclair, & Wright, 2017; Paley, Lester, & Mogil, 2013).

*Outcomes for military children*

Exposure to wartime stressors have been associated with changes in physical health (Barnes, Davis, & Treiber, 2007); greater likelihood of physical injury (Hisle-Gorman et al., 2015); higher prevalence of diagnosed mental health disorders (Gorman et al., 2010; Mansfield et al., 2011); increased depressive symptoms and suicidality (Gilreath et al., 2016); decreased engagement in school and poor academic performance (Bradshaw et al., 2010; Engel et al., 2010); increased recent and lifetime use of substances (Sullivan et al., 2015); experiences of violence and victimization (Sullivan et al., 2015); and disrupted attachment relationships (Holmes, Rauch, & Cozza, 2013). Although many adverse outcomes have been observed in this population, the present study focused on the prevalence of mental health diagnoses among military-connected youth.

## The Current Study

In the present study, our theoretical framework guided both our modeling strategy as well as the particular choice to examine concurrent experiences of risk and protective factors, while prior empirical evidence guided choices concerning which critical risk and protective factors to include in models. Masten (2001) discussed two approaches to resilience-focused studies aimed at understanding variation in adverse outcomes among youth: variable-focused and person-focused. Most previous investigations of risk in military families have taken a variable-focused approach, characterizing relationships between study variables using summary statistics. The present study used a person-centered approach, LPA, for two reasons. First, consistent with a family resilience framework, LPA was chosen to model families' concurrent experience of risk and protective factors, as this approach allows the risks a family experiences to remain grouped with the protective factors that same family experiences. Second, LPA is useful to uncover meaningful heterogeneity and uncommon configurations of risk and protective factors that may be masked using

variable-focused methods (Rosato & Baer, 2012). Once subgroups are identified, we can then explore differences in mental health outcomes across groups.

## METHODS

### Family Global Assessment Tool

With the goal of supporting the psychosocial health of Army soldiers and their families, the Family Global Assessment Tool (GAT) was developed by the US Army based on expert opinion and previously validated measures (Peterson, Park, & Castro, 2011). Spouses were directed to the Family GAT from multiple sources, including their soldier, Family Readiness Group leader, or the Army's Ready and Resilient Campaign (Hawkins et al., 2017). Army spouses access the survey via an online portal. Participation is voluntary, and spouses can complete the instrument as many times as they choose, though only first GAT completions were used in these analyses. Upon completion of the survey, spouses received feedback about their scores and links to further support (Hawkins et al., 2017). Recent psychometric validation of the Family GAT identified 9 scales measuring family strengths and functioning with preliminary evidence of good reliability and validity (Sullivan, Hawkins, Gilreath & Castro, 2020).

### Data Linkage

In a three-step process, Family GAT data were linked to additional, de-identified DoD archival data. All data were stored and linked within the DoD's Person-Event Data Environment (PDE), a cloud-based data storage and analysis tool (Vie et al., 2015). In step 1, Family GAT data collected between 2014 and 2016 were merged with archival personnel and family data files using a unique identification number. In step 2, deployment data dating back to 2009 (the earliest date available) were integrated. Finally, in step 3, medical data, recorded in four datasets for military and civilian inpatient and outpatient facilities, were merged. Merging medical data proceeded in three stages. Initially, medical records for members of the approved cohort and their dependents were identified and retained using their unique identification number. Next, visits for military spouses that occurred in the year *preceding* GAT completion were retained. Finally, visits for military-connected youth that occurred in the year *following* GAT completion were retained. Duplicate records were discarded such that only one record of each unique diagnosis was retained in the dataset.

### Participants

Spouses were the primary respondent for each family and included in the sample if they (a) completed a survey between 2014 and 2016; (b) provided consent to have their data used for research; (c) could be linked to a soldier using a unique electronic identifier; and (d) archival records indicated they had at least one dependent child. The final sample consisted of 1,630 families. Secondary analyses were approved by the Army Research, Development and Engineering Center IRB, and the IRB at the University of Southern California.

### Measurement

*Risk factors*

Four military-specific risk factors, represented by single-item indicators, were included in models. DoD archival data were employed to operationalize these variables.

*Recent relocation*

Each family's duty station arrival dates were compared to the date of GAT completion to create a dichotomous variable (yes/no). Arrival dates that fell within 365 days preceding GAT completion were deemed to reflect a recent relocation.

*Cumulative deployment days*

Difference in days between each deployment's begin and end dates was calculated and all deployment days were summed to create a cumulative, continuous measure of deployment. All deployment days between 2009 and the date of GAT survey completion were included.

*Recent reunification*

Deployment end dates were compared with GAT completion dates to create a dichotomous variable (yes/no). Deployment end dates that fell within 365 days preceding GAT completion were deemed to reflect a recent reunification.

*At-home parent mental health diagnosis*

Using procedures employed by Mansfield et al. (2011), Mansfield et al. (2010), any medical record containing a mental health-related *International Classification of Diseases*, *9th Revision* (ICD-9) or *10th Revision* (ICD-10) diagnosis code was deemed to reflect a mental health diagnosis. Ultimately, the presence of any of these codes in the medical record of a military spouse in the year *preceding* GAT completion was represented with one dichotomous item (yes/no).

*Protective factors*

Four scales drawn from the Family GAT and completed by spouses were included in analyses. All questions had 5-point Likert-type response scales. Responses to individual items were recoded such that higher scores indicated positive functioning. Composite scores were created by averaging responses on individual items.

*Relationship functioning*

Seven items, including "I feel emotionally distant from my partner" assessed relationship functioning. Responses options ranged from *strongly disagree* to *strongly agree*. Items had good internal consistency in this sample ($\alpha = .91$).

*Social support*

Five items (e.g., "If I was sick, I could find someone to help with my daily chores,") assessed at-home parent's social support. Response options ranged from *strongly disagree* to *strongly agree*. Items had good internal consistency in this sample ($\alpha = .86$).

*Social connections*

Five items (e.g., "I have a good relationship with people in my neighborhood,") assessed connectedness of the at-home parent. Response options ranged from *never* to *most of the time*. Items had good internal consistency in this sample ($\alpha = .91$).

*Family cohesion*

Three items (e.g., "my family confides in each other,") assessed family cohesion. Response options ranged from *strongly disagree* to *strongly agree*. Items had good internal consistency in this sample ($\alpha = .85$).

*Covariates*

In order to explore diverse military family experiences (National Academies of Sciences Engineering & Medicine [NASEM], 2019), three variables, also considered in prior studies with this population, (MacDermid Wadsworth et al., 2016; Trail, Meadows, Miles, &

Karney, 2017) were examined as covariates: (a) service member race and 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 outcome*

Using the same procedure to that used to capture the presence of mental health diagnoses for the at-home parent, youth were deemed to have received a mental health diagnosis if they were assigned an ICD-9 or ICD-10 mental health-related code during an inpatient or outpatient medical visit within 1 year *following* GAT completion. The presence of any of these codes was represented with one dichotomous item (yes/no).

### Analyses

The three-step method of associating a LPA model with a distal outcome was used. In Step 1, the LPA model was specified using all risk and protective factor variables simultaneously. Risk factors were represented with single, dichotomous items, while summary scores were employed for protective factors to preserve power. An initial 1-profile solution was compared to successive models with an increasing number of profiles using statistical indicators to determine model fit. Indicators included: (a) low Bayesian information criterion (BIC); (b) significant bootstrap likelihood ratio test (BLRT); and (c) entropy and interpretability of profiles (Nylund, Asparouhov, & Muthén, 2007). In Step 2, a nominal most likely class variable was created, along with a measure of the error in classification. In Step 3, the most likely class variable was associated with the distal outcome while accounting for classification error (Asparouhov & Muthén, 2014). For steps 2 and 3, the AUXILIARY option in Mplus was employed, using the R3STEP command for covariates and DCAT for distal outcomes (Asparouhov & Muthén, 2014; Muthén & Muthén, 2012). SPSS version 21 was used for data cleaning and descriptive statistics; Mplus version 7 was used for LPA models. Full information maximum likelihood, available in Mplus, was employed to handle missing data in LPA models.

## RESULTS

Sample demographics are presented in Table 1. The majority of service members were White, male, and enlisted; most reported completing at least some college. Most of the spouses in the sample were female. Approximately one-third of families reported having one child, one-third reported having two children, and one-third had three or more children. Our sample is representative of the demographics of the Total Force in a number of important ways, including service member race/ethnicity, spouse age and gender, and number of children in the home (U.S. Department of Defense, 2018). In the year preceding GAT completion, the at-home spouse had a mental health diagnosis in approximately 20% of families; 19% of families experienced a move; and 9% of families experienced a reunification following a deployment. On average, families reported 194 cumulative days of deployment. Approximately 18% of children received a mental health diagnosis in the year following GAT survey completion.

### LPA Model

Fit indexes for the LPA model are displayed in Table 2; conditional probabilities and means for LPA indicators by profiles are displayed in Table 3. Though BIC decreased beyond the 5-profile solution, this solution was chosen as best fitting because this model was parsimonious, clinically meaningful, and offered good separation between classes, indicated by an entropy value of .854. Entropy in our final 5-profile solution was similar to

TABLE 1
*Sample Demographics and Latent Profile Indicator Means and Prevalence*

| | ***n* (%)** | ***M* (*SD*)** | **Min** | **Max** |
|---|---|---|---|---|
| Service member age | | 37.07 (7.95) | 17 | 66 |
| Service member sex | | | | |
| Male | 1,497 (91.8) | | | |
| Female | 133 (8.2) | | | |
| Service member education | | | | |
| Completed high school or below | 588 (36.1) | | | |
| Completed some college or above | 1,003 (61.5) | | | |
| Service member rank | | | | |
| Enlisted | 1,021 (62.6) | | | |
| Officer | 609 (37.4) | | | |
| Service member race and ethnicity | | | | |
| White | 1,059 (65.0) | | | |
| Black | 281 (17.2) | | | |
| Asian | 46 (2.8) | | | |
| American Indian or Alaskan Native | 10 (0.6) | | | |
| Hawaiian or Pacific Islander | 16 (1.0) | | | |
| Hispanic | 190 (11.7) | | | |
| Family demographics | | | | |
| Spouse age | | 35.90 (7.98) | 18 | 66 |
| Spouse sex | | | | |
| Male | 79 (4.8) | | | |
| Female | 1,453 (89.1) | | | |
| Number of children in the home | | | | |
| 1 | 501 (30.7) | | | |
| 2 | 595 (36.5) | | | |
| 3 | 333 (20.4) | | | |
| 4 or more | 201 (12.3) | | | |
| 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) | | | |
| At-home parent mental health diagnosis | | | | |
| Yes | 318 (19.5) | | | |
| No | 1,312 (80.5) | | | |
| Recent relocation | | | | |
| Yes | 307 (18.8) | | | |
| No | 1,323 (81.2) | | | |
| Recent reunification | | | | |
| Yes | 144 (8.8) | | | |
| No | 1,486 (91.2) | | | |
| Cumulative days of deployment | | 194.48 (217.96) | 0 | 1,639 |
| Social connectedness | | 3.31 (1.10) | 1 | 5 |
| Social support | | 3.91 (0.88) | 1 | 5 |
| Relationship functioning | | 3.96 (0.87) | 1 | 5 |
| Family cohesion | | 4.14 (0.73) | 1 | 5 |
| Child mental health diagnosis | | | | |
| Yes | 285 (17.5) | | | |
| No | 1,345 (82.5) | | | |

entropy in other latent class/profile models in this population (Oshri et al., 2015; Trail et al., 2017).

Profile 1 (lower protection and low risk) accounted for 12.15% ($N$ = 198) of the sample. Families in profile 1 had a relatively lower probability of experiencing a recent move or

TABLE 2
*Model Fit Indexes for LPA Model*

| Profiles | BIC | BLRT | Entropy |
|---|---|---|---|
| 1 | 41,301.666 | | |
| 2 | 40,075.764 | 0.0000 | 0.727 |
| 3 | 39,856.105 | 0.0000 | 0.642 |
| 4 | 39,707.672 | 0.0000 | 0.684 |
| 5 | **39,319.682** | **0.0000** | **0.854** |
| 6 | 39,053.005 | 0.0000 | 0.875 |

*Note*. BIC = Bayesian information criterion; BLRT = bootstrap likelihood ratio test.
Best fitting model indicated in bold.

TABLE 3
*Means and Conditional Probabilities for Risk and Protective Factor Indicators*

| | Lower Protection Low Risk | Lower Protection Moderate Risk | Higher Protection Moderate Risk | Higher Protection Low Risk | Higher Protection High Risk |
|---|---|---|---|---|---|
| Class prevalence | 12.15% | 10.61% | 28.77% | 39.82% | 8.65% |
| Protective factors | | | | | |
| Social connections | 2.44 | 2.36 | 3.58 | 3.72 | 3.56 |
| Social support | 2.92 | 2.93 | 4.25 | 4.32 | 4.14 |
| Relationship functioning | 3.14 | 2.95 | 4.24 | 4.32 | 4.30 |
| Family cohesion | 3.49 | 3.49 | 4.39 | 4.38 | 4.37 |
| Risk factors | | | | | |
| At-home parent mental health diagnosis | | | | | |
| No | 0.81 | 0.65 | 0.78 | 0.88 | 0.78 |
| Yes | 0.19 | 0.35 | 0.22 | 0.12 | 0.22 |
| Recent relocation | | | | | |
| No | 0.82 | 0.73 | 0.79 | 0.87 | 0.72 |
| Yes | 0.18 | 0.27 | 0.21 | 0.13 | 0.28 |
| Recent reunification | | | | | |
| No | 0.99 | 0.84 | 0.88 | 0.98 | 0.67 |
| Yes | 0.01 | 0.16 | 0.12 | 0.02 | 0.33 |
| Days of deployment | 14.98 | 360.78 | 322.59 | 14.85 | 643.13 |

reunification, at-home parents had a lower probability of experiencing a mental health diagnosis, and mean cumulative deployment days were low compared to other profiles. On average, spouses endorsed comparatively lower levels of social support, social connectedness, relationship functioning, and family cohesion. Profile 2 (lower protection and moderate risk) accounted for 10.61% ($N$ = 173) of the sample. Spouses in this profile endorsed very similar levels of protective factors on average compared to profile 1. However, spouses had a higher probability of receiving a mental health diagnosis, experiencing a recent relocation, or reunification compared to profile 1. Finally, mean cumulative days of deployment were also higher in this group at 360.78. Profile 3 (higher protection and moderate risk) accounted for 28.77% ($N$ = 469) of the sample overall. Spouses in this group

reported higher levels of social support, social connectedness, relationship functioning, and family cohesion compared to profiles 1 and 2. Families in this group were similar to profile 2 in their probability of a recent relocation or reunification and in mean deployment days, but at-home parents were less likely to have received a mental health diagnosis compared to profile 2. Profile 4 (higher protection and low risk) was the largest group, accounting for 39.82% ($N$ = 649) of the sample. Spouses in this profile endorsed similar levels of protective factors on average compared to profile 3. However, families had a lower probability of a recent relocation, reunification, or mental health diagnosis. Mean deployment days were also low, similar to profile 1. Finally, profile 5 (higher protection and high risk) was the smallest group, accounting for 8.65% ($N$ = 141) of the sample. Spouses in this group endorsed similar levels of protective factors compared to profiles 3 and 4, but this group had the highest probability of a recent relocation and reunification, and the highest mean deployment days, at 643.13, though spouses had a lower probability of a mental health diagnosis compared to profile 2. To facilitate interpretation of these findings, Figure 1 displays continuous risk and protective factor indicator variables across latent profiles.

## Covariates

Families of service members who completed at least some college were more likely to be in the Higher Protection and Moderate Risk profile (profile 3) than the High Protection and Low Risk profile (profile 4), compared to families of service members with less education. Compared to the families of officers, families of enlisted service members were more

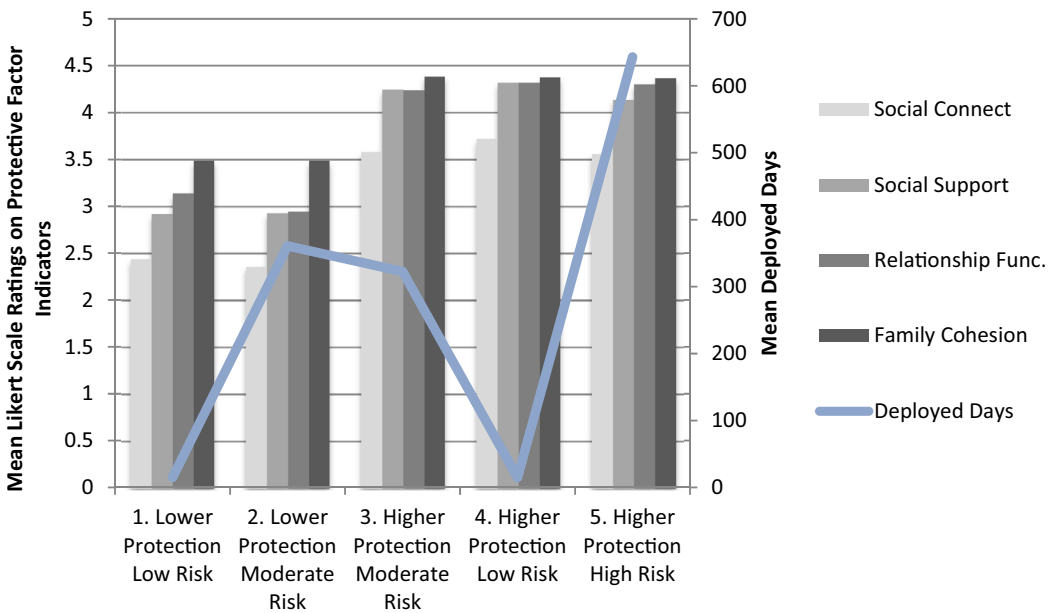


FIGURE 1. Visual Representation of Continuous Latent Profile Indicators where Bars Represent Protective Factors and Line Represents Mean Deployment Days.

Note. Additional risk factor indicators (at-home parent mental health diagnosis, 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. [Color figure can be viewed at wileyonlinelibrary.com]

likely to be in the Lower Protection and Moderate Risk profile (profile 2) compared to the Higher Protection and Low Risk profile. Finally, compared to families of non-White service members, families of White service members were more likely to be in the Higher Protection and High Risk profile (profile 5) compared to the Higher Protection and Low Risk profile (profile 4). Further exploration of bivariate relationship among covariates and individual indicator variables yielded relatively few consistent findings and are not shown here.

### Distal Outcomes

Distal outcome results are presented in Table 4. Omnibus chi-square results indicate significant differences in the prevalence of mental health diagnoses among youth across latent profiles ($\chi^2 = 30.067$, $df = 4$, $p < .001$). Individual chi-square tests evaluated differences in the prevalence of mental health diagnoses between two profiles. These results indicate a number of significant differences between individual profiles. The lowest rates of mental health diagnoses were observed in the higher protection and low-risk group (13.1%) and the higher protection and moderate-risk group (11.6%) while the highest rates were observed in the lower protection and low-risk group (31.1%) and the lower protection and moderate-risk group (30.5%).

## DISCUSSION

The purpose of the present study was to describe patterns of risk and protective factors affecting Army families and their association with mental health diagnoses among military-connected children. Approximately 18% of youth in this sample received a mental health diagnosis at a medical visit in the year following survey completion. Consistent with a family resilience perspective, this work highlights the relevance of family-level risk and protective factors to understanding the potential for adverse mental health outcomes among military-connected youth.

Findings reflect considerable heterogeneity among military families. LPA identified five distinct groups with variation in their access to protective factors and exposure to risk factors. The largest profile, accounting for 40% of the sample, was composed of families that experienced comparatively little exposure to risk factors and reported high levels of protective factors. Further, although there was variation in the levels of protective factors across profiles, even in the lower protection groups (profiles 1 and 2), families reported moderate levels of intrafamilial and community-level resources. These findings highlight

TABLE 4

*Child Latent Profiles Associated with Distal Outcome (Mental Health Diagnosis)*

| | **Outcome % (*SE*)** | **1** $\chi^2$ | **2** $\chi^2$ | **3** $\chi^2$ | **4** $\chi^2$ |
|---|---|---|---|---|---|
| 1. Lower protection and low risk | 31.1 (0.075) | | | | |
| 2. Lower protection and mod. risk | 30.5 (0.040) | 0.004 | | | |
| 3. Higher protection and mod. risk | 11.6 (0.015) | 6.415* | 20.108*** | | |
| 4. Higher protection and low risk | 13.1 (0.028) | 5.049* | 10.541** | 0.216 | |
| 5. Higher protection and high risk | 18.4 (0.038) | 2.209 | 4.795* | 2.488 | 1.193 |

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

strengths in military families, even among those exposed to higher risk. Protective factors represent potentially useful resources on which clinicians could draw for the purposes of prevention and intervention.

Regarding risk factors, slightly more than half of the families in this sample were grouped into two profiles (1 and 4) with relatively low levels of risk. Even in these profiles, however, there was some risk exposure, with the probability of a mental health diagnoses among at-home parents ranging between 12% and 19% and the probability of experiencing a recent move between 13% and 18%. Military service inherently involves risk, which is increasingly understood to apply more broadly to the families of service members (Burrell, Adams, Durand, & Castro, 2006). The families in these two profiles likely represent this low level of systemic risk consistent with military service. In contrast, just under half of the families in the sample were grouped into three profiles (2, 3, and 5) with higher risk exposure, including greater probability of mental health disorders among at-home parents, recent relocation or reunification, and considerably more cumulative days of deployment. For example, in profile 5 (higher protection and high risk), a third of families recently reunified following a deployment and also reported more than 600 cumulative days of deployment on average. Families in these profiles likely typify the high operational tempo associated with current overseas conflicts.

Consistent with a family resilience framework, the relationship between profiles and the prevalence of mental health diagnoses among military-connected youth highlights the importance of examining concurrent risk and protective factors. Overall, the heterogeneity in risk and protection across profiles was associated with a significant difference in the prevalence of mental health diagnoses among military-connected youth. Youth from families in the two profiles that were lower on protective factors (1 and 2) had statistically significantly elevated rates of mental health diagnoses (31.1% and 30.5%) compared to profiles 3 and 4 (11.6% and 13.1%), groups that reported higher levels of protective factors. Finally, the findings regarding the higher protection and high risk group (profile 5) are more nuanced. Though risk was elevated in this group, rates of mental health diagnoses were lower (18.4%), compared to profiles 1 and 2 (31.1% and 30.5%). A family resilience perspective suggests that, despite significant exposure to adversity, families in profile 5 also reported having critical resources on which to draw, which may have played an important role in determining the comparatively lower risk for adverse outcomes among children in this group relative to those in profiles 1 and 2. Further exploration using variable-focused methods is warranted in order to explicate the relative effects of risk and protective factors.

## Policy, Clinical, and Research Implications

From a policy perspective, findings presented here suggest many military families are likely faring well and have good internal and external resources on which to draw during periods of increased stress. The need for military-sponsored support programs is likely limited in this larger group. Resources directed to universal prevention programs, which would be important if a broader group of children and families appeared to be at risk, might be better used for targeted prevention and intervention designed specifically for the smaller group of families with higher risk exposure and fewer resources.

Clinically, results highlight the importance of evaluating both stressors and resources when assessing youth from military families, because both may be crucial to determining and preventing possible adverse outcomes, as a family resilience framework would suggest. While lower access to resources appears from these results to be particularly important in understanding risk for mental health outcomes, considering families' concurrent experiences of both elements may be most important. Awareness of the strengths families

possess may also provide a solid foundation on which to build intervention efforts. For example, a family stressed by multiple prolonged deployments and an at-home parent suffering from a diagnosed mental health condition may nevertheless have good social support. A mental health provider might explore ways for the family to engage its support network to reduce the stress burden on the at-home parent.

Finally, these findings point to the potential usefulness of family-level assessment in order to understand the well-being of military-connected youth. In describing family resilience, Walsh (2003) wrote that this concept "extends beyond seeing individual family members as potential resources for individual resilience to focusing on risk and resilience in the family as a functional unit" (p. 3). In this study, in which protective factors were assessed from the perspective of one parent in the family and risk factors centered primarily on the other parent, findings demonstrated that the concurrent experience of these strengths and vulnerabilities nevertheless operated at the family level and ultimately was significantly associated with the mental health of children in these systems. These results point to the potential usefulness of considering the family unit as a target for prevention and intervention efforts, alongside or as an alternative to provision of individual services. Reducing the family's experience of risk factors and/or increasing their access to resources may influence outcomes across family members. Traditionally, the military has focused minimal resources on families relative to the extensive resources devoted to the well-being and mission readiness of service members. Findings like those presented here suggest that increased attention to the well-being of military families may have relevance for both service members and their dependents.

## Limitations

Despite the strengths of this study, there are four primary limitations to consider. First, this is a voluntary sample composed entirely of Army families, which may limit generalizability. Although these are national data and many demographics are similar to the military more broadly (U.S. Department of Defense, 2018), service members in our sample were older and more likely to be officers, likely because our sample included only those who were married and had children. This may have resulted in an underestimation of risk factors. Further, a small percentage (10%) of missing data on protective factor scales may also limit generalizability. Second, though temporality was considered in linking data, we cannot infer causality when discussing the findings presented here. Similarly, though we were guided by a family resilience framework in our modeling choices and interpretation of findings, these analyses do not constitute an explicit test of this framework. As we were unable to assess for prior mental health diagnoses, we were thus unable to examine whether families maintained or returned to previous levels of functioning in response to adversity. Third, because DoD archival data were collected with the service member as the focal point, there was limited information available about children in these families.

Finally, because archival data were used in these analyses, many potential variables of interest were not available, including military-specific stressors like the mental health of the service member. Relatedly, we used diagnosis to reflect mental health challenges among at-home parents and children, as this information was available in archival healthcare records. However, these measures may be less sensitive to smaller fluctuations in mental health and may under-represent need as many barriers to treatment seeking and diagnosis have been identified in this population (Eaton et al., 2008). Further, recent evidence has highlighted the importance of normative stressors, which may affect outcomes for all families (Lucier-Greer et al., 2015). Our analyses did not find many significant associations between minority status, low educational attainment of the military parent, or military rank and latent profile membership. Nevertheless, normative stressors not

included here might have had a significant impact on results. Future research should consider patterns of both normative and military-specific stressors alongside protective factors in this population.

### Future Research

Scholars have articulated the need to explore resilience processes using both variable- and person-focused methodological approaches (Masten, 2001). Echoing these calls, the current findings highlight the usefulness of person-focused methods in addition to more traditional variable-focused approaches. Variable-focused statistical techniques are helpful to understand causality and the relationships among variables, but these methods may mask important differences between subgroups of military families, which can have the unintended consequence of overpathologizing military-connected youth (Rosato & Baer, 2012). Variable-focused research has consistently demonstrated an elevated risk of poor health and mental health outcomes in this population (Gorman et al., 2010; Mansfield et al., 2011; Sullivan et al., 2015). Although these findings are accurate and point to a critical need for services in this population, the large group of military families that emerged in this study that have good supports and low-to-moderate risk exposure is often overlooked. Future research using variable-focused methods could complement the present findings by exploring the relative effects of specific risk and protective factors and the possible combinations between these factors that may mitigate adverse outcomes. For example, the mental health of the at-home parent may be a particularly potent risk factor for military-connected youth (Chandra et al., 2010; Lester et al., 2010); this relationship may be best explored using variable-focused methods.

## CONCLUSIONS

The results presented here highlight that military families are not homogenous in their access to resources and exposure to risk. Clearly, there is a need to be concerned about military-connected youth, as evidenced by the approximately 18% of youth in this sample who had a mental health diagnosis in the year following survey completion. However, these findings also highlight the large group of military families that have relatively minimal comparative exposure to risk and report high levels of protective factors. Clinicians serving this population should be aware of the elevated risk of adverse outcomes among military-connected youth but must also be careful not to overpathologize. The importance of protective factors in these analyses also points to a critical need to build resources in and among military families. The military hierarchy has the opportunity and obligation to support prevention and intervention efforts that promote healthy marital and family functioning and build supportive relationships in military communities. A recently released NASEM report on the Military Family Readiness System details many efforts that are already underway toward this end (NASEM, 2019). These efforts include programs that promote well-being for military youth, including Boys and Girls Clubs, universal prevention efforts, like FOCUS educational workshops, selected or indicated prevention programs, like FOCUS and After Deployment: Adaptive Parenting Tools, and well as evidence-based interventions like Cognitive-behavioral Conjoint Therapy for PTSD (Beardslee et al., 2011; Gewirtz, Pinna, Hanson, & Brockberg, 2014; Lester et al., 2016; Monson et al., 2012; NASEM, 2019). To the extent that the policies, programs, and services identified in the NASEM report can develop and support the strengths of military families, these efforts have the potential to significantly improve outcomes for this population.

## REFERENCES


Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, *21*(3), 329–341. https://doi.org/10.1080/10705511.2014.915181

Barnes, V. A., Davis, H., & Treiber, F. A. (2007). Perceived stress, heart rate, and blood pressure among adolescents with family members deployed in Operation Iraqi Freedom. *Military Medicine*, *172*(1), 40–43. https://doi.org/10.7205/MILMED.172.1.40

Beardslee, W., Lester, P., Klosinski, L., Saltzman, W., Woodward, K., Nash, W. et al. (2011). Family-centered preventive intervention for military families: Implications for implementation science. *Prevention Science*, *12*(4), 339–348. https://doi.org/10.1007/s11121-011-0234-5

Bradshaw, C. P., Sudhinaraset, M., Mmari, K., Blum, R. W., & Hopkins, J. (2010). School transitions among military adolescents: A qualitative study of stress and coping. *School Psychology Quarterly*, *39*(1), 84–105.

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 & Society*, *33*(1), 43–58. https://doi.org/10.1177/0002764206288804

Cederbaum, J. A., Wilcox, S. L., Sullivan, K., Lucas, C., & Schuyler, A. C. (2017). The influence of social support on dyadic functioning and mental health among military personnel during postdeployment reintegration. *Public Health Reports*, *132*(1), 85–92. https://doi.org/10.1177/0033354916679984

Chandra, A., Lara-Cinisomo, S., Jaycox, L. H., Tanielian, T., Burns, R. M., Ruder, T. et al. (2010). Children on the homefront: The experience of children from military families. *Pediatrics*, *125*(1), 16–25. https://doi.org/10.1542/peds.2009-1180

Conforte, A. M., Bakalar, J. L., Shank, L. M., Quinlan, J., Stephens, M. B., Sbrocco, T. et al. (2017). Assessing military community support: Relations among perceived military community support, child psychosocial adjustment, and parent psychosocial adjustment. *Military Medicine*, *182*(9), e1871–e1878. https://doi.org/10.7205/MILMED-D-17-00016

Cozza, S. J., Lerner, R. M., & Haskins, R. (2014). Social policy report military and veteran families and children: Policies and programs for health maintenance and positive development. *Social Policy Report*, *28*(3), 3–17.

Eaton, K. M., Hoge, C. W., Messer, S. C., Whitt, A. A., Cabrera, O. A., McGurk, D. et al. (2008). Prevalence of mental health problems, treatment need, and barriers to care among primary care-seeking spouses of military service members involved in Iraq and Afghanistan deployments. *Military Medicine*, *173*(11), 1051–1056. https://doi.org/10.7205/MILMED.173.11.1051

Engel, R. C., Gallagher, L. B., & Lyle, D. S. (2010). Military deployments and children's academic achievement: Evidence from Department of Defense Education Activity Schools. *Economics of Education Review*, *29*(1), 73–82. https://doi.org/10.1016/j.econedurev.2008.12.003

Esposito-Smythers, C., Wolff, J., Lemmon, K. M., Bodzy, M., Swenson, R. R., & Spirito, A. (2011). Military youth and the deployment cycle: Emotional health consequences and recommendations for intervention. *Journal of Family Psychology*, *25*(4), 497–507. https://doi.org/10.1037/a0024534

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*(1), 399–419. https://doi.org/10.1146/annurev.publhealth.26.021304.144357

Foran, H. M., Eckford, R. D., Sinclair, R. R., & Wright, K. M. (2017). Child mental health symptoms following parental deployment: The impact of parental posttraumatic stress disorder symptoms, marital distress, and general aggression. *SAGE Open*, *7*(3), 1–10. https://doi.org/10.1177/2158244017720484

Gewirtz, A. H., Pinna, K. L. M., Hanson, S. K., & Brockberg, D. (2014). Promoting parenting to support reintegrating military families: After deployment, adaptive parenting tools. *Psychological Services*, *11*(1), 31–40. https://doi.org/10.1037/a0034134

Gewirtz, A. H., Polusny, M. A., DeGarmo, D. S., Khaylis, A., & Erbes, C. R. (2010). Posttraumatic stress symptoms among National Guard soldiers deployed to Iraq: Associations with parenting behaviors and couple adjustment. *Journal of Consulting and Clinical Psychology*, *78*(5), 599–610. https://doi.org/10.1037/a0020571

Gilreath, T. D., Wrabel, S. L., Sullivan, K., Capp, G. P., Roziner, I., Benbenishty, R. et al. (2016). Suicidality among military-connected adolescents in California schools. *European Child & Adolescent Psychiatry*, *25*(1), 61–66. https://doi.org/10.1007/s00787-015-0696-2

Gorman, G. H., Eide, M., & Hisle-Gorman, E. (2010). Wartime military deployment and increased pediatric mental and behavioral health complaints. *Pediatrics*, *126*(6), 1058–1066. https://doi.org/10.1542/peds.2009-2856

Hawkins, S. A., Sullivan, K., Schuyler, A. C., Keeling, M., Kintzle, S., Lester, P. B. et al. (2017). Thinking "big" about research on military families. *Military Behavioral Health*, *5*(4), 335–345. https://doi.org/10.1080/21635781.2017.1343696

Hisle-Gorman, E., Harrington, D., Nylund, C. M., Tercyak, K. P., Anthony, B. J., & Gorman, G. H. (2015). Impact of parents' wartime military deployment and injury on young children's safety and mental health. *Journal of*

*the American Academy of Child & Adolescent Psychiatry*, *54*(4), 294–301. https://doi.org/10.1016/j.jaac.2014.12.017

Holmes, A. K., Rauch, P. K., & Cozza, S. J. (2013). When a parent is injured or killed in combat. *The Future of Children*, *23*(2), 143–162. https://doi.org/10.1353/foc.2013.0017

Lester, P., Liang, L., Milburn, N., Mogil, C., Woodward, K., Nash, W. et al. (2016). Evaluation of a family-centered preventive intervention for military families: Parent and child longitudinal outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry*, *55*(1), 14–24. https://doi.org/10.1016/j.jaac.2015.10.009

Lester, P., Peterson, K., Reeves, J., Knauss, L., Glover, D., Mogil, C. et al. (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*(4), 310–320. https://doi.org/10.1016/j.jaac.2010.01.003

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*, *64*(3), 363–377. https://doi.org/10.1111/fare.12123

MacDermid Wadsworth, S. M., Cardin, J.-F., Christ, S., Willerton, E., Flittner O'Grady, A., Topp, D. et al. (2016). Accumulation of risk and promotive factors among young children in US military families. *American Journal of Community Psychology*, *57*(1–2), 190–202. https://doi.org/10.1002/ajcp.12025

Mansfield, A. J., Kaufman, J. S., Engel, C. C., & Gaynes, B. N. (2011). Deployment and mental health diagnoses among children of US Army personnel. *Archives of Pediatrics & Adolescent Medicine*, *165*(11), 999–1005. https://doi.org/10.1001/archpediatrics.2011.123

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. *New England Journal of Medicine*, *362*(2), 101–109. https://doi.org/10.1056/NEJMoa0900177

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*(3), 227–238. https://doi.org/10.1037/0003-066X.56.3.227

Meadows, S. O., Tanielian, T., Karney, B., Schell, T., Griffin, B. A., Jaycox, L. H. et al. (2017). The deployment life study: Longitudinal analysis of military families across the deployment cycle. *Rand Health Quarterly*, *6*(2), 7.

Monson, C. M., Fredman, S. J., Macdonald, A., Pukay-Martin, N. D., Resick, P. A., & Schnurr, P. P. (2012). Effect of cognitive-behavioral couple therapy for PTSD: A randomized controlled trial. *JAMA*, *308*(7), 700–709. https://doi.org/10.1001/jama.2012.9307

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

National Academies of Sciences Engineering and Medicine (2019). Strengthening the military family readiness system for a changing American Society.

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: A Multidisciplinary Journal*, *14*(4), 535–569. https://doi.org/10.1080/10705510701575396

Oshri, A., Lucier-Greer, M., O'Neal, C. W., Arnold, A. L., Mancini, J. A., & Ford, J. L. (2015). Adverse childhood experiences, family functioning, and resilience in military families: A pattern-based approach. *Family Relations*, *64*(1), 44–63. https://doi.org/10.1111/fare.12108

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*(3), 245–265. https://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*(1), 65–72. https://doi.org/10.1037/a0021249

Peterson, C., Park, N., & Castro, C. A. (2011). The global assessment tool. *American Psychologist*, *66*(1), 10–18. https://doi.org/10.1037/a0021658

Rosato, N. S., & Baer, J. C. (2012). Latent class analysis: A method for capturing heterogeneity. *Social Work Research*, *36*(1), 61–69. https://doi.org/10.1093/swr/svs006

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. *JAMA Pediatrics*, *169*(10), 922–928. https://doi.org/10.1001/jamapediatrics.2015.1413

Sullivan, K. S., Hawkins, S. A., Gilreath, T.D., & Castro, C. A. (2020). The U.S. Army family global assessment tool: Preliminary psychometrics and potential big data uses. *Military Behavioral Health*, *8*(1), 74–85.

Sullivan, K., Kintzle, S., Barr, N., Gilreath, T. D., & Castro, C. A. (2018). Veterans' social–emotional and physical functioning informs perceptions of family and child functioning. *Journal of Military, Veteran and Family Health*, *4*(2), 37–47. https://doi.org/10.3138/jmvfh.2017-0008

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*(15), 2128–2149. https://doi.org/10.1177/0192513X15592660

U.S. Department of Defense (2018). *2017 demographics: Profile of the military community*. Retrieved from http://download.militaryonesource.mil/12038/MOS/Reports/2017-demographics-report.pdf

Vie, L. L., Scheier, L. M., Lester, P. B., Ho, T. E., Labarthe, D. R., & Seligman, M. E. P. (2015). The U.S. Army person-event data environment: A military–civilian big data enterprise. *Big Data*, *3*(2), 67–79. https://doi.org/10.1089/big.2014.0055

Walsh, F. (2003). Family resilience: A framework for clinical practice. *Family Process*, *42*(1), 1–18. https://doi.org/10.1111/j.1545-5300.2003.00001.x