Parental deployment and distress, and adolescent disordered eating in prevention-seeking military dependents

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Parental deployment and distress, and adolescent disordered eating in prevention-seeking military dependents

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Abstract

Objective: Parental military deployment can lead to stress in the family system due to concerns about the deployed service-member’s safety and increased responsibilities for those not deployed. Parent-related stress can impact adolescent disordered eating. Given the important role that stress plays in disordered eating and obesity, it is crucial to understand the impacts of unique stressors to which vulnerable populations are exposed.

Method: We studied 126 adolescent (14.3 ± 1.6 years; 59.5% girls; 44.4% non-Hispanic White; BMI-z, 1.91 ± .39) military dependents prior to entering an obesity and binge-eating disorder prevention trial. The Eating Disorder Examination was used to assess adolescent disordered eating. Parents self-reported their own distress and family deployment history that occurred during the adolescent's lifetime.

Results: Parental distress interacted with frequency of parental deployments such that for those with high parental distress, more frequent deployment was associated with greater adolescent shape and weight concerns ($\beta = .21, p = .012$) and global eating pathology ($\beta = .18, p = .024$).

Discussion: In this hypothesis-generating study, the combination of number of deployments and parental distress may be associated with disordered eating among adolescent military dependents seeking prevention of binge-eating disorder and adult obesity. If these preliminary findings are supported longitudinally, interventions to reduce parental stress related to deployment may be warranted to reduce disordered eating in adolescent dependents.

Keywords
disordered eating, military adolescent dependents, parental deployment, parental distress
INTRODUCTION

Since the terrorist attacks on U.S. soil on September 11, 2001, 2.77 million service-members have been deployed, with these service-members serving on 5.4 million deployments (Wenger, O'Connell, & Cottrell, 2018). About half of deployed service-members had children at the time of deployment (Wenger et al., 2018), indicating that military deployments affect a large portion of the population. Among service-members, job-related deployments to both domestic and international locations are often required, and each deployment can last anywhere from 90 days to over 12 months in length. Importantly, among military dependents, parental deployments are associated with increased stress, mental health service utilization, suicidal ideation, and depressive symptoms (Alfano, Lau, Balderas, Bunnell, & Beidel, 2016; Card et al., 2011; Jensen, Martin, & Watanabe, 1996).

Adolescent military dependents may also be at high risk for eating disorders (Schvey et al., 2015; Waasdorp, Caboot, Robinson, Abraham, & Adelman, 2007) and obesity (Bagchi, Bencio, Kim, Lee, & Schone, 2007). Nearly paralleling the civilian population, 15% of military dependents meet criteria for obesity (Bagchi et al., 2007). Limited data suggest that disordered eating behaviors, and an exacerbated presentation, may be more common among adolescent military dependents than civilians. For example, Waasdorp et al. (2007) found that 21% of adolescent military dependents met eating disorder screening criteria via the Eating Attitudes Test-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982), a proportion nearly three times greater than their civilian peers (7–9%). Furthermore, compared to age and body mass index (kg/m², BMI)—matched civilian girls with loss-of-control eating, military dependent girls with loss-of-control eating report more binge-eating episodes, higher disordered eating, and more depressive symptoms (Schvey et al., 2015). These preliminary findings may be due to exposure to their parents’ eating- and weight-related behaviors and/or other stressors (e.g., caregiver deployment) associated with being a military dependent (Reed, Bell, & Edwards, 2011).

Of the unique stressors facing adolescent military dependents, past research consistently supports deployment as taxing on the entire family system. Stress related to deployment impacts family members who remain at home due to uncertainty and concerns about the deployed service-member's safety and increased responsibilities and shifting roles (McFarlane, 2009). For the returning service-member, difficulty reintegrating after deployment and the greater likelihood of mental health concerns (Booth-Kewley, Highfill-McRoy, Larson, Garland, & Gaskin, 2012; Bowling, Bowling, & Sherman, 2008; Hawkins et al., 2018; McNulty, 2005) can affect military readiness and contribute to increased deployment-related stress. Unsurprisingly, deployment has been associated with negative outcomes in the family system, including child maltreatment and neglect during deployments, high internalizing and externalizing symptoms during and after the deployed parent’s return, and high stress on both the parent remaining at home as well as the returning parent (Booth-Kewley et al., 2012; Clarke-Walper, Riviere, & Wilk, 2014; Gibbs, Martin, Kupper, & Johnson, 2007; Kelley, 1994; Lester et al., 2010; Milburn & Lightfoot, 2013). Cumulative length of parental combat deployments during a child’s lifetime and parental distress during and after return from combat increase risk for child depression and externalizing symptoms (Lester et al., 2010), indicating the impact of stress in the family system on dependents, as well as a dose–response relationship between combat deployments and child outcomes. Level of parental distress has consistently been linked to civilian children’s psychosocial adjustment (Kouros & Garber, 2010; Powdthavee & Vignoles, 2008; Webb et al., 2016), and for military dependents specifically, distress experienced by the parent remaining at home during a parental deployment is associated with increased eating and sleeping problems and sadness for the military dependent (Rosen, Teitelbaum, & Westhuis, 1993).

A potent contributor to disordered eating for adolescents with overweight or obesity is stress (Goldschmidt, Wall, Loth, & Neumark-Sztainer, 2015; Neumark-Sztainer, Wall, Story, & Sherwood, 2009; Pasold, McCracken, & Ward-Begnoche, 2014). The association between parental deployments and parental distress is largely due to added responsibilities, worry about deployed partners, and reduced support (Lester et al., 2010). Increased parental distress may interact with a higher number of deployments and thus be associated with greater disordered eating among military dependents at high risk for binge-eating disorder and obesity. Therefore, we conducted a cross-sectional, hypothesis-generating study as an initial effort to identify the potential associations between parental deployment and adolescent military dependents’ disordered eating prior to participation in a binge-eating disorder and an adult obesity prevention trial. We examined parental deployments in relation to disordered eating, and whether these relationships were cross-sectionally moderated by parental distress. Although hypothesis-generating, we expected that number of caregiver deployments and parental distress would interact such that having caregivers who were deployed more frequently and experiencing high levels of distress would be associated with more disordered eating among their adolescent dependents.
2 | METHOD

2.1 | Participants and procedure

Baseline data were drawn from two prevention studies: a pilot study that included only adolescent military dependent self-identified girls (ClinicalTrials.gov identifier: NCT02334202) and an effectiveness trial (ClinicalTrials.gov identifier: NCT02671292) that included both adolescent military dependent self-identified boys and girls. For both trials, participants were TRICARE (healthcare program that provides insurance to active and retired service-members in the United States, as well as their families) beneficiaries who completed assessments prior to participating in a binge-eating disorder and adult obesity prevention program. Eligible youth were identified by the Defense Enrollment Eligibility Reporting System and recruited through direct mailings, referrals from providers who care for adolescents with TRICARE benefits, and flyers posted, with permission, on military bases and listservs. Recruitment efforts were targeted toward parents of adolescents in the greater Washington, DC metropolitan area. Written assent and consent were obtained from adolescents and parents/guardians, respectively. Both protocols were approved by the USU of the Health Sciences Institutional Review Board and the Fort Belvoir Community Hospital Department of Research Programs.

For both studies, youth were eligible if they were 12 to <18 years at the start of the study, had a BMI ≥85th percentile for age and sex, and were English-speaking. For the pilot study, girls were eligible if they were prone to overeating or disinhhibited eating (i.e., eating in secret or sneaking/hiding food, eating in the absence of hunger). For the effectiveness trial, boys and girls were eligible and deemed at high risk for binge-eating disorder and adult obesity due to either reports of at least one episode of loss-of-control eating during the previous 3 months or elevated anxiety symptoms. Elevated anxiety was determined by a score of ≥32 on the STAIC trait scale (Spielberger, Lushene, Vagg, & Jacobs, 1983). Loss-of-control eating and anxiety are highly correlated cross-sectionally and prospectively (Shomaker et al., 2010; Tanofsky-Kraff et al., 2011) and each construct has been shown to predict excess weight gain (Sonneville et al., 2013; Staiano, Marker, Martin, & Katzmarzyk, 2016; Tanofsky-Kraff et al., 2009) and eating disorders (Schaumberg et al., 2019), specifically binge-eating disorder (Hilbert, Hartmann, Czaja, & Schoebi, 2013; Tanofsky-Kraff et al., 2011).

In both studies, individuals were excluded if they had a chronic major medical illness or obesity-related comorbidity, weight loss during the past 3 months for any reason exceeding 3% of body weight, any psychiatric disorder (other than binge-eating disorder) requiring treatment, and if they self-reported pregnancy, breast-feeding, or recent pregnancy, regular use of prescription medications that affect appetite or body weight (unless weight stable for at least 3 months), or current involvement in psychotherapy or a structured weight loss program. Participants and their parents were assessed at the USU Developmental Research Laboratory on Eating and Weight Behaviors or either the Family Medicine or Pediatric Clinic at Fort Belvoir Community Hospital.

2.2 | Adolescent assessments

2.2.1 | Anthropometrics

Adolescent participants’ height and fasting weight were measured with clothes on and shoes removed. BMI standard deviation scores (BMI-z), accounting for age and sex, were calculated based on the Centers for Disease Control and Prevention standards of growth (Kuczmarski et al., 2002).

2.2.2 | Disordered eating

The Eating Disorder Examination (EDE) interview v.14 OD/C.2 (Fairburn & Cooper, 1993) was administered by trained interviewers to assess the presence of DSM-5 binge-eating disorder and loss-of-control eating episodes in the past 3 months. The EDE also produces eating restraint, eating concern, shape concern, and weight concern subscales, as well as a global disordered eating score (an average of the four subscales). The shape concern and weight concern subscales were highly correlated in our sample (r = .79, p < .0001), and previous studies have shown the importance of a weight/shape composite score in disorders featuring loss-of-control eating (Goldschmidt et al., 2015; Grilo, Masheb, & White, 2010; Mond, Hay, Rodgers, & Owen, 2007), as well as its validity and reliability of use among adolescents (Burke et al., 2017; Wade, Byrne, & Bryant-Waugh, 2008). Thus, standardized scores within both subscales were created and an average was taken to produce a weight/shape composite z-score. The EDE has excellent psychometric properties in adolescents (Tanofsky-Kraff et al., 2014) and demonstrated excellent reliability for the shape and weight composite score (α = .90 in the current sample) and acceptable reliability for the global score (α = .70 in the current sample). Poor reliability was observed for the eating restraint subscale (α = .52), and unacceptable reliability was observed for the eating concern subscale (α = .23) in our sample. Past work has likewise found that the dietary restraint and eating concern subscales are less valid measures of disordered eating attitudes and behaviors when compared to the shape and weight concern composite score and the EDE global score among adolescents (Byrne, Allen, Lampard, Dove, & Fursland, 2010; Wade et al., 2008). Due to their low reliability, we did not conduct analyses with these subscales. In this study “disordered eating” refers to both attitudes and behaviors, as assessed by the EDE.

2.3 | Caregiver/parental questionnaires

2.3.1 | Deployment

Participants’ parent/guardian/caretaker reported on deployment history for primary child caregivers (for brevity, the term “parent” will be used to represent parent/guardian/ caretaker) that occurred during the course of the participant’s life. The total number of deployments was calculated by summing deployments across all caregivers.
2.3.2 | Parental distress

Parental distress was measured with the 12-item parental distress subscale of the Parent Stress Index—Short Form (Abidin, 1990). Parents reported on their perceived level of distress in their role as caregivers on a scale of 1 to 5 (e.g., “I feel trapped by my responsibilities as a parent.” “I feel alone and without friends”). Higher scores indicate higher perceived stress, with scores ranging from 12 to 60. This subscale was chosen because it most accurately captures stressors that would be salient for parents who have experienced deployments (e.g., increased responsibilities, decreased support). The Parent Stress Index—Short Form has demonstrated excellent internal consistency and reliability among parents of racially/ethnically diverse adolescents (Cavendish, Montague, Enders, & Dietz, 2014). The parental distress subscale demonstrated good reliability (α = .89) in the present sample.

2.4 | Data analysis

Analyses were conducted using SPSS v.25 (IBM Corp., 2017). Extreme outliers (<5%) were adjusted to fall three standard deviations from the mean (Tabachnick & Fidell, 2013). The frequency of number of parental deployments and the EDE global score were log-transformed to improve normality. Independent samples t tests were conducted to investigate differences between participants with no parental deployments and those with one or more parental deployments on the demographic variables, covariates, and study variables (i.e., parental distress, weight/shape composite score, global disordered eating). Pearson’s product–moment correlations between the independent and dependent variables were performed in order to investigate the relationships between these variables and check for multicollinearity.

To examine whether number of parental deployments interacted with parental distress to relate to disordered eating, two multiple regression models were used to predict the (a) EDE weight/shape composite score and (b) EDE global score. Covariates included age, sex, BMI-z, race/ethnicity (non-Hispanic White vs. non-White), loss-of-control presence, anxiety, and trial type (pilot vs. effectiveness). To facilitate interpretation of the interaction terms, both number of parental deployments and parental distress were mean-centered (Cohen, Cohen, West, & Aiken, 2002). To assess the interactions, a two-way product term was calculated from the centered parental deployments and parental distress variables. For significant interactions, significance tests of the simple slopes were conducted using a 99% confidence interval to determine if slopes were significantly different from zero. All other tests were two-tailed and were considered significant at p < .05.

3 | RESULTS

3.1 | Participant characteristics

One hundred twenty-six adolescents (59.5% girls) aged 12 to <18 years (M = 14.3, SD = 1.6) were studied. Twenty-one participants took part in the pilot trial; 105 participated in the effectiveness trial. Seventy-two (57.1%) participants identified as White, 28 (22.2%) as Black, 5 (4.0%) as Asian, 16 (12.7%) as multiple races, and 5 (4.0%) as other or unknown. Thirty participants (23.8%) identified as Hispanic. Two participants met criteria for binge-eating disorder. Findings did not differ whether or not these individuals were included in analyses, thus their data were retained.

Eighty-seven (69.0%) participants had parents who were deployed during their lifetime. Of those families who had a parent deployed during the adolescent’s lifetime, parents had an average of 3.16 (SD = 2.48) deployments. Participant characteristics by parent deployment status (presence or absence) are shown in Table 1. Female participants were more likely than male participants to have had a parent deployed at least once (p = .01); however, there were no other significant differences between the deployment groups for age, race/ethnicity, BMI-z, presence of loss-of-control eating episodes in the past 3 months, trial

### TABLE 1 Participant characteristics by deployment status

<table>
<thead>
<tr>
<th></th>
<th>No deployments n = 41</th>
<th>One or more deployments n = 85</th>
<th>Total N = 126</th>
<th>Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female, n (%)</td>
<td>18 (43.90%)</td>
<td>57 (67.06%)</td>
<td>75 (59.52%)</td>
<td>χ²(1) = 6.16</td>
<td>.01*</td>
</tr>
<tr>
<td>Age in years, M (SD)</td>
<td>14.34 (1.75)</td>
<td>14.33 (1.46)</td>
<td>14.33 (1.55)</td>
<td>t(67.77) = 0.03</td>
<td>.98</td>
</tr>
<tr>
<td>Race/Ethnicity*</td>
<td></td>
<td></td>
<td></td>
<td>χ²(1) = 0.22</td>
<td>.64</td>
</tr>
<tr>
<td>BMI-z score, M (SD)</td>
<td>1.95 (0.42)</td>
<td>1.90 (0.38)</td>
<td>1.91 (0.39)</td>
<td>t(124) = 0.70</td>
<td>.48</td>
</tr>
<tr>
<td>Loss-of-control eating past 3 months, n (%)</td>
<td>30 (73.17%)</td>
<td>50 (58.82%)</td>
<td>80 (63.49%)</td>
<td>χ²(1) = 2.46</td>
<td>.12</td>
</tr>
<tr>
<td>Effectiveness trial, n (%)</td>
<td>37 (90.24%)</td>
<td>68 (80.00%)</td>
<td>105 (83.33%)</td>
<td>χ²(1) = 2.09</td>
<td>.15</td>
</tr>
<tr>
<td>Anxiety symptoms, M (SD)</td>
<td>40.02 (6.40)</td>
<td>37.71 (6.05)</td>
<td>38.46 (6.24)</td>
<td>t(124) = 1.98</td>
<td>.05</td>
</tr>
<tr>
<td>Parental distress, M (SD)</td>
<td>23.09 (9.49)</td>
<td>22.56 (7.18)</td>
<td>22.73 (7.97)</td>
<td>t(62.89) = 0.32</td>
<td>.75</td>
</tr>
<tr>
<td>EDE weight/shape composite score, M (SD)</td>
<td>−0.12 (0.88)</td>
<td>−0.02 (0.97)</td>
<td>−0.06 (0.94)</td>
<td>t(124) = −0.55</td>
<td>.58</td>
</tr>
<tr>
<td>EDE global score*, M (SD)</td>
<td>1.36 (1.28)</td>
<td>1.44 (1.24)</td>
<td>1.41 (1.25)</td>
<td>t(123) = −0.30</td>
<td>.76</td>
</tr>
</tbody>
</table>

Note: Untransformed means and standard deviations are provided.
Abbreviation: EDE, Eating Disorder Examination.
*Race/ethnicity chi-square analysis was conducted comparing non-Hispanic White participants against all others.
*EDE global score, n = 125.
*p < .05.
type, anxiety symptoms, parental distress, or EDE variables ($p > .05$). Correlations among the independent and dependent variables showed that only the two dependent disordered eating variables were significantly correlated ($r = .93$, $p < .001$; Table 2).

### 3.2 Weight/shape composite score

In the linear regression model, there were no significant main effects of number of deployments ($\beta = -.08$, $p = .36$) or parental distress ($\beta = -.004$, $p = .72$) on weight/shape composite score (Table 3; $R^2 = .29$, $F[10,115] = 4.67$, $p < .001$). However, there was a significant interaction between number of deployments and parental distress on the weight/shape composite score ($\beta = .21$, $p = .01$). For parents with moderate or low distress, there was a negative relationship between number of deployments and weight and shape concern. In comparison, for those with high parental distress, number of deployments was associated with higher shape and weight concerns among adolescent dependents (Figure 1a; to interpret significant interactions, the relationship between number of deployments and eating variables are graphed at low ($-1$ standard deviation from the mean), mean, and high (+1 standard deviation from the mean) parental distress values). None of the simple slopes were significantly different from zero. The contrast estimates and confidence intervals (CI) were as follows: low = $-0.34$ (CI: $-0.74, 0.07$), mean = $-0.10$ (CI: $-0.39, 0.18$), high = $0.14$ (CI: $-0.21, 0.48$).

### 3.3 Global score

In the linear regression model, there were no significant main effects of number of deployments ($\beta = -.06$, $p = .24$) or parental distress ($\beta = .001$, $p = .91$) on global disordered eating (Table 3; $R^2 = .35$, $F[10,114] = 6.17$, $p < .001$). However, there was a significant interaction between number of deployments and parental distress ($\beta = .18$, $p = .02$). For parents with moderate or low distress, there was a negative association between number of deployments and global disordered eating. The opposite pattern was observed for those with high parental distress, with a positive association between number of deployments and global disordered eating (Figure 1b). None of the simple slopes were significantly different from zero. The contrast estimates and confidence intervals (CI) were as follows: low = $-0.10$ (CI: $-0.39, 0.18$), mean = $0.14$ (CI: $-0.21, 0.48$).

### TABLE 2

Pearson’s product–moment correlation table for main variables of interest

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of caregiver deployments</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental distress</td>
<td>.07</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDE weight/shape composite score</td>
<td>.001</td>
<td>.03</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>EDE global score</td>
<td>-.05</td>
<td>.09</td>
<td>.93**</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: Number of caregiver deployments and EDE global score were log-transformed. Abbreviation: EDE, Eating Disorder Examination. **$p < .001$.

### TABLE 3

Linear regression analyses of the interaction between number of deployments and parental distress with disordered eating as dependent variables

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>b</th>
<th>SE(b)</th>
<th>$\beta$</th>
<th>p</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDE weight and shape composite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.29</td>
</tr>
<tr>
<td>Age</td>
<td>.02</td>
<td>.05</td>
<td>.04</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-.09</td>
<td>.08</td>
<td>-.10</td>
<td>.27</td>
<td></td>
</tr>
<tr>
<td>BMI-z</td>
<td>-.01</td>
<td>.04</td>
<td>-.004</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>-.08</td>
<td>.07</td>
<td>-.10</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>LOC presence</td>
<td>.23</td>
<td>.07</td>
<td>.26</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>.01</td>
<td>.01</td>
<td>.16</td>
<td>.047</td>
<td></td>
</tr>
<tr>
<td>Trial type</td>
<td>-.09</td>
<td>.05</td>
<td>-.10</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>Number of deployments</td>
<td>-.06</td>
<td>.04</td>
<td>-.10</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>Parental distress</td>
<td>.001</td>
<td>.01</td>
<td>.18</td>
<td>.91</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: EDE, Eating Disorder Examination; LOC, loss-of-control eating.
The contrast estimates were as follows: low = −0.15 (CI: −0.33, 0.03), mean = −0.06 (CI: −0.18, 0.07), high = 0.04 (CI: −0.12, 0.19).

**DISCUSSION**

In this initial, hypothesis-generating study of the relationships among parental deployment, parental distress, and disordered eating among adolescent military dependents, we found that deployment frequency was positively linked to disordered eating only among youths whose parents reported higher distress. Parental distress in relation to more frequent parental deployments may be a contributing factor to disordered eating among high-risk adolescents, although this finding requires testing with longitudinal designs. While the simple slope analyses did not reach significance likely due to reduced power in this preliminary study, the pattern of findings was in the hypothesized direction.

Parental deployment has been found to be a potentially stressful life event for the family system, and military children specifically due to concern about the deployed parent’s safety, as well as increased responsibilities and shifting roles and expectations for those remaining at home (McFarlane, 2009). Previous research has shown that frequent deployments and more cumulative time deployed is associated with parental distress (Lester et al., 2010) and adolescents’ internalizing and externalizing behaviors (Milburn & Lightfoot, 2013). Although unexplored in pediatric military samples, there is support from the civilian literature that family stress is associated with (Blodgett Salafia & Lemer, 2012; Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2009) and predictive of (Allen, Gibson, McLean, Davis, & Byrne, 2014; Lyke & Matsen, 2013) disordered eating and eating disorder risk factors. However, in the present study we did not find direct links among number of deployments, parental stress, and disordered eating; thus, our data are consistent with the hypothesis that the combination of greater frequency of deployments and higher parental distress are associated with higher
disordered eating in the military dependent. While cross-sectional, this may suggest that the way in which adolescents respond with disordered eating to their parents’ deployments may depend on how stressful the parents perceive their situation, more so than the stressor (number of deployments) or parental distress considered separately. Future research should examine the prospective relationships between deployment, parental distress, and child psychopathology.

A mechanism that might explain the relationships among deployment exposure, parental distress, and youth disordered eating is the child’s ability to cope with parental distress. Indeed, one study found that 25% of adolescents endorsed using food to cope with problems with parents (Martyn-Nemeth et al., 2009). It could be that youth who respond to their parent’s stress with maladaptive coping engage in more disordered eating as means of self-soothing or avoiding the distress (Heatherton & Baumeister, 1991). This specific hypothesis warrants testing. Taken together, both deployment frequency and parental distress may further exacerbate disordered eating among youth presenting for a binge-eating disorder and adult obesity prevention program.

The lack of a significant direct relationship between deployment and disordered eating and parental distress and disordered eating suggests that it may be important for future research to examine both risk and protective factors as moderators. In particular, moderators that might ultimately assist parents in coping effectively with the stress of deployment might be especially important to explore. Past work indicates that there are a number of protective factors that buffer the effects of repeated deployments on parental distress, such as social support, marital satisfaction, and positive attitudes toward the service branch (e.g., Army, Navy) and current mission (Allen, Rhoades, Stanley, & Markman, 2011). Examining the role of these constructs could potentially identify points of intervention to reduce the negative effects of multiple deployments. Lastly, future research specifically investigating adolescent dependents’ response to their parents stress is warranted.

Study strengths include the racially/ethnically diverse sample of male and female military dependents, an understudied group, as well as the use of a structured interview for the assessment of disordered eating, measured height and weight, and the assessment of number of parental deployments that allowed us to expose a dose-response relationship between number of deployments, parental distress, and disordered eating. Limitations include the cross-sectional nature of the data that prohibits inference regarding directionality. Indeed, the current study should be considered preliminary and an initial step to serve as the foundation for a prospective analysis, as there are likely a number of additional factors to consider when investigating the impact of parental deployment on the family system and adolescent dependent disordered eating (e.g., marriage quality, socioeconomic status, number of members in the household, military rank, military occupational assignment, parental eating behaviors and weight). Further, we did not analyze the length, timing, or nature (e.g., direct exposure to combat, peacekeeping, relief) of parental deployment. In this study, parents were queried on number of deployments that occurred since the birth of the participant; it would be important to consider whether deployments that occurred while participants were infants were less impactful than those experienced as adolescents. Moreover, past work has found that cumulative length of deployments is associated with parental distress and child psychosocial outcomes (Lester et al., 2010). While we assessed number of deployments as a means of approximating a dose-response relationship among our variables, future work should look at these associations in relation to total time deployed. Such work would enable one to assess whether cumulative length of deployment is a more robust factor than total number of deployments in child disordered eating. Knowing whether one long-term deployment is more disruptive than multiple, shorter deployments would be important in further determining risk and tailoring interventions among this already vulnerable population.

Lastly, our sample was not representative of all male and female adolescent military dependents, due to the fact that those who completed measures did so prior to participating in a binge-eating disorder and adult obesity prevention trial and were selected due to reports of overeating, loss-of-control eating, and/or anxiety symptoms. Although all analyses were adjusted for these variables, future work should investigate whether results are replicated in a nonselected sample of adolescent military dependents of all weight strata.

Future work employing longitudinal designs would allow for clarification of the impact of deployment on disordered eating. If these findings are supported longitudinally, interventions and/or interventions to reduce family stress before, during, and after parental deployments may be warranted. Further, given research demonstrating that deployment is acutely stressful to the family system (Creech, Hadley, & Borsari, 2014), reducing distress among parents of high-risk military youths who are experiencing a deployment may potentially help prevent eating disorders and excess weight gain in this population. Lastly, disordered eating among military dependents is likely a small component when considering the large impact parental deployment has on the family system, both in regards to internalizing and externalizing behaviors. If these findings are replicated prospectively, future work should consider the function of disordered eating among individual adolescent military dependents (e.g., as a means of emotion regulation or as a means of controlling one’s environment), and whether other maladaptive behaviors or attitudes are comorbid. By observing disordered eating behaviors in the context of the individual’s unique situation, environment, and other symptoms, we may be better able to serve the military population and their families by developing more tailored interventions.

DISCLAIMER
D. Klein, A. Morettini, W. Leu, J. Quinlan, and J. A. Yanovski are Commissioned Officers in the United States (U.S.) Air Force, Navy, or Public Health Service (PHS). The opinions and assertions expressed herein are those of the authors and are not to be construed as reflecting the views of Air Force, Navy, PHS, USU, Fort Belvoir Community Hospital, or the U.S. Department of Defense.
DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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