The association of military-connectedness and family reorganization indicators with substance use patterns among California adolescents

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Abstract

For military-connected adolescents, substance use associated with military-related stressors is a public health concern. Family reorganization is one mechanism hypothesized to account for negative outcomes. However, indicators of family reorganization, including having more responsibilities and being more independent, may be protective in certain cultures and have not been examined in this population. This study examines patterns of family reorganization indicators among military and nonmilitary-connected youth and associated patterns of substance use. Data were drawn from 13,628 7th, 9th and 11th grade students who completed the 2013 California Health Kids Survey. A latent class model for military-connectedness and situational characteristics (SC) reflective of family reorganization and a latent class model for substance use were estimated simultaneously. A five-class model was best fitting for military-connectedness and situational characteristics (non-military/hi-SC, non-military/moderate-SC, non-military/lo-SC, military/hi-SC, military/lo-SC). A four-class model was best fitting for substance use (abstainers, experimenters, moderate users, frequent users). Compared to the non-military/moderate SC class, students in the military/high SC class had 70% increased odds (OR = 1.70, 95% CI = 1.12, 2.60) and students in the military/low SC class had double the odds (OR = 2.10, 95% CI = 1.41, 3.15) of being in the frequent substance use class compared to the abstainers class. Results indicate that military-connected adolescents are at higher risk of substance use compared to peers, but situational characteristics may be protective. Findings suggest the need for screening in school and primary care settings and may point to possible avenues for prevention and intervention with military-connected youth.

Keywords: Military, substance use, family reorganization
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While many military families thrive despite stressors, research has connected deployment and other war-related stressors to various negative outcomes for military-connected adolescents (Cederbaum et al., 2013; Chandra et al., 2010; Flake, Davis, Johnso & Middleton, 2009; Gilreath, Cederbaum, Astor, Benbenishty, Pineda, & Atuel, 2013; Gilreath et al., 2015; Gorman, Eide & Hisle-Gorman, 2010; Lester et al., 2010; Reed, Bell, & Edwards, 2011; Sullivan, Capp, Gilreath, Benbenishty, Roziner & Astor, 2015). However, mechanisms underlying these associations and the impact of changes in the family system resulting from military-connectedness or deployments are less well understood. Family reorganization, including increased adolescent household responsibilities and sense of obligation to their families, is a system-level change, which may result from the military involvement or deployment of a parent (Huebner & Mancini, 2005). Situational characteristics, which may reflect family reorganization, include youth reports of greater responsibilities, more independence, and better problem-solving. These characteristics, which could be protective under certain conditions, may increase adolescent stress and compound adverse outcomes in the context of wartime military family life.

In other research, these indicators of family reorganization are referred to as parentification, which may have adverse consequences for adolescents (Jurkovic, 1997; Burton, 2007; Champion et al., 2009; Stein, Riedel & Rotheram-Borus, 1999). While role shifts are no doubt powerful forces within family systems, cultural factors may impact the valence of these influences. Because these changes have not been studied among military families and because the term parentification tends to have a negative connotation, we will not use this term. This
study, grounded in structural family systems theory (Minuchin, 1974), will examine the impact of military-connectedness, deployment, and indicators of family reorganization on the functioning of military-connected adolescents. Specifically, the purpose of the study is to examine naturally occurring patterns of family reorganization indicators among military and nonmilitary-connected youth and to examine associations with patterns of substance use among this population.

Military-connected youth

Since the transition to an all-volunteer force, more military personnel are having families during military service. Spouses and children of service members now number close to 3 million (US Department of Defense [DOD], 2013). Traditional definitions of the military family include the spouses and dependents of all active duty and reserve personnel (Cozza, Lerner & Haskins, 2014). However, increasingly scholars suggest that spouses and children of veterans should be included in this definition, as the consequences of military family life can last long after separation from the service (Lester & Flake, 2013; Sherman, 2014). The Military Child Education Coalition (MCEC) estimates that, when including both active and veteran families, approximately 4 million school-age children have had parents serve since the start of combat operations in 2001 (MCEC, 2015).

Military Deployments

For adolescents, the deployment of a close family member has been associated with increases in internalizing behavior (Cederbaum et al., 2013; Gilreath, et al., 2015; Reed et al., 2011), substance use (Gilreath et al., 2013; Sullivan et al., 2015), poor academic achievement (Engel, Gallagher, & Lyle, 2010), increased victimization and weapon-carrying (Gilreath et al, 2014; Sullivan et al.; 2015), and problematic behavior (Flake et al., 2009; Gorman et al., 2010;
Ryan-Wenger, 2001). This connection between military-connectedness and deployment with adverse outcomes may be due to fear and worry for a loved one, family relocation, and other aspects of military life (Ryan-Wenger, 2001) that impact family and adolescent functioning.

**Theoretical and empirical perspectives on family reorganization**

Structural family systems theory (Minuchin, 1974) provides a useful framework to consider the relationship between roles that adolescents play in their family systems and risk engagement. Minuchin (1974) suggests that healthy family functioning is predicated on clear, appropriate boundaries between subsystems; distorted boundaries can lead to negative outcomes. Assuming new roles within the family is a normal part of development, but these shifts can become destructive when they are chronic instead of episodic or when the child is expected to take on roles beyond those that are age-appropriate. These changes have been linked to adverse outcomes, including depression, low self-esteem, poor academic performance, and substance use (Burton, 2007; Champion et al., 2009; Jurkovic, 1997; Stein, Riedel & Rotheram-Borus, 1999). However, changes in the roles of adolescents in the family system can be adaptive (Jurkovic, 1997) and have also been linked with a number of positive outcomes including an increased sense of competence and enhanced coping (Fuligni, Alvarez, Bachman & Ruble, 2005; Kuperminc et al., 2009; Telzer & Fuligni, 2009).

A family’s culture may influence whether these role shifts are viewed as normative and adaptive or stressful and disruptive to adolescent functioning (Sang, Cederbaum & Hurlburt, 2014). In many racial and ethnic minority families in particular, adolescents may be expected to assume family obligations as a natural part of development (Kuperminc, Jurkovic & Casey, 2009; Orellana, 2001). In this context, family role shifts may be considered normative, and adolescents may experience the protective aspects of these processes (Sang et al., 2014).
Increasingly, membership in the military is being considered a unique culture warranting consideration alongside other aspects of diversity (MacDermid-Wadsworth, 2013). Given the lack of previous research on this topic within the military culture, it is unclear whether family reorganization observed in other cultural contexts will be disruptive or protective among military families.

**Family reorganization in the military**

Military-connectedness and particularly deployment present the potential for family reorganization. Scholars have established a number of situations in which these changes are likely, including when parents/guardians are absent due to death, divorce, or work (Byng-Hall, 2008). Military-connectedness during wartime may be associated with long work hours and regular family separations even when not deployed (Pincus, House, Christenson & Adler, 2001). Military deployment is associated with parental absence for extended periods of time; multiple deployments result in repeated absences and may result in a parent who is psychologically absent, even when physically present (Faber, Willerton, & Clymer, 2008; Huebner, Mancini, Wilcox, Grass & Grass, 2007; Pincus et al., 2001). Families experiencing these circumstances may reorganize in order to better meet their needs and obligations (Pincus et al., 2001). Qualitative work with military-connected adolescents suggests that shifts in adolescent roles and responsibilities do occur in military families, particularly around parental deployments (Huebner & Mancini, 2005; Mmari, Roche, Sudhinaraset, & Blum, 2009).

To our knowledge, no quantitative studies have focused on situational characteristics that may be indicators of these changes, including adolescent reports of responsibility, independence and problem-solving abilities. Further, no studies have examined associations between these characteristics and outcomes for youth. This represents a significant gap in research concerning
military culture and family functioning. Theory suggests that military-connectedness and deployment may increase the likelihood of family reorganization, but there is little evidence regarding whether these shifts will be detrimental or protective for adolescents in these family systems. This study explores the occurrence of these indicators in the military population and examines the relationship between patterns of military-connectedness, deployment and family reorganization indicators with patterns of substance use among adolescents.

Methods

Participants

Data for these analyses were drawn from the 2013 administration of the California Healthy Kids Survey (CHKS). The CHKS is a statewide school health survey administered by WestEd on behalf of the California Department of Education. The survey is given bi-annually in paper and pencil format to all 5th, 7th, 9th and 11th grade public school students. Present analyses included 13,628 students in 7th, 9th and 11th grades; 5th graders were not included, as they were not asked detailed questions about substance use. Respondents were located in eight school districts in Southern California who participated in both the CHKS Core and Military-connected Schools Modules. Only students present in school on the day of data collection responded to the survey; the final response rate was 87%. Further details about the CHKS administration have been published elsewhere (Austin & Duerr, 2004). Secondary analyses of de-identified CHKS data has been deemed exempt by the [blinded for review] Institutional Review Board.

Measures

Military Connectedness and Deployment

Military-connectedness was assessed with the question: “Who in your family is currently in the military (Army, Navy, Marines, Air Force, National Guard or Reserves)?”
purposes of this study, students were defined as military-connected through a parent if they chose either mother or father in response to this question. Students were defined as being military-connected through a sibling if they chose the brother or sister response option. In order to be defined as coming from a veteran family, students had to: 1) answer yes to the question: “Do you have someone in your family (like a parent, grandparent, brother, sister) who is in the military now or sometime in the last 10 years?” and 2) answer no to the question: “Do you have someone in your family (like a parent, grandparent, brother, sister) who is currently in the military (Army, Navy, Marines, Air Force, National Guard or Reserves)?” Lifetime experience with deployment was assessed with the question: “As far as you can remember, how many times in the last 10 years did any member of your family leave home and serve (deploy) outside the USA?” Students were defined as experiencing deployment if they chose once or twice or more. Finally, current impact of deployment was assessed with one item, which states: “I worry about a family member who is serving in the military outside the USA.” Students were defined as worrying about a deployment if they chose: a little true, pretty much true, or very much true in response to this item.

*Family reorganization indicators*

Family reorganization indicators were assessed using three Likert-type items beginning with the prompt: “How true is each of these sentences about you and your family?” The items included: 1) I feel that I have more responsibilities at home (like chores) than my friends; 2) I am more independent than many of my friends; 3) I know how to solve problems in my life better than most of my friends. Each sentence had five response options including: not at all true, a little true, pretty much true, very much true and don’t know (dropped from analyses).

*Substance use*
For the purposes of this study, we focused on the four most endorsed substances on the CHKS survey, which included: 1) a whole cigarette; 2) one full drink of alcohol; 3) marijuana; and 4) inhalants. Regarding lifetime use, a list of substances was preceded with the prompt: “During your life, how many times have you used the following substances?” Six response options ranged from 0 to 7 or more times. Recent use of substances was assessed with the prompt “During the past 30 days, on how many days did you use…”. Six response options ranged from 0 days to 20-30 days. Student responses regarding recent and lifetime use were combined to create the following categories: never used, no recent use, 1 or 2 days recent use, 3 to 9 days recent use, and 10 to 30 days recent use.

Control variables

Sex (male/female), grade (7th, 9th or 11th), and race/ethnicity (White, Black, Latino, Asian/Pacific Islander, mixed) were included in analyses as controls.

Statistical Analyses

Latent Class Analysis (LCA) was used to identify subgroups of adolescents based on experiences of military-connectedness, deployment and indicators of family reorganization. Subgroups of adolescents were also identified based on alcohol, tobacco, marijuana and inhalant use. To determine the appropriate number of classes for both models, an initial one-class model was compared with a series of models specifying an increasing number of classes. Optimal model selection was based on: 1) low Adjusted Bayesian Information Criterion (BIC), 2) significant Lo-Mendell-Rubin Likelihood Ratio Test (LMR LRT), 3) significant Bootstrap Likelihood Ratio Test (BLRT) and 4) theoretical and conceptual considerations (Nylund, Asparouhov & Muthen, 2007). Wald tests for the differences in proportions were employed to examine whether military-connected youth were more or less likely to describe themselves as
experiencing situational characteristics reflective of possible family reorganization. Following separate analyses of both models, a final combined LCA model was run in which both military-connected and substance use classes were estimated concurrently. Military-connected class membership was used to predict the likelihood, expressed as odds ratios, of substance use class membership while controlling for covariates, including grade, gender and race/ethnicity. SAS Version 9.4 was used for descriptive statistics and MPlus Version 7 was used for LCA models. Missing data on dependent variables was accounted for using full information maximum likelihood (FIML) in MPlus; listwise deletion was utilized for independent variables in the model.

Results

Sample demographics are presented in Table 1. Latino students comprised the largest racial/ethnic category in this sample (48.85%), followed by White students (25.37%). Students were evenly split between genders and grade levels. Approximately 10% of the sample identified as having a parent currently serving in the military, while 4.20% reported having a military sibling and 5.81% reported having a veteran family member. Regarding deployment experiences, 18.71% of the sample reported experiencing the deployment of a close family member in the preceding 10 years, while 16.12% reported feeling worried about a family member who was currently deployed overseas.

For military-connectedness and situational characteristics reflective of family reorganization, model fit indices are included in Table 2; conditional probabilities are presented in Table 3. While LMR-LRT and BLRT p-values remain significant for the six-class model, meaningful substantive differences from the five-class model were not noted, so the five-class model was chosen as the best overall fit for the data. Class 1 (“military/high situational
characteristics (SC)” accounted for 7.39% of the overall sample and encompassed all categories of military-connected youth (including those connected through siblings or to veterans and those experiencing deployment). Youth in this class had a higher probability of reporting having more responsibility, being more independent and being better at solving problems than their peers.

Class 2 (“non-military/low SC”) accounted for 22.23% of the sample and included youth who did not endorse any of the military-connection variables. Regarding having more responsibility, being more independent, or being able to solve problems better than their peers, youth in this group had a higher likelihood of reporting these statements were not at all true or only a little true. Class 3 (“military/low SC”) accounted for 14.32% of the sample and encompassed all categories of military-connectedness. In contrast to Class 1, youth in this group had a decreased likelihood to describe themselves as experiencing situational characteristics reflective of family reorganization. Class 4 (“non-military/high SC”) accounted for 25.23% of the sample and included largely non-military connected students. Youth in this class had a greater probability of describing themselves as having more responsibilities, being more independent and being better able to solve problems than their peers. Class 5 (“non-military/moderate SC”) also included largely non-military connected youth. Students in this group had an increased probability of reporting that statements regarding responsibility, independence and problem-solving were “pretty much true.” Among the military-connected classes, Wald tests for differences in proportions indicated that the likelihood of being military-connected ($x^2 = 0.027, p = 0.869$) or experiencing a deployment ($x^2 = 0.133, p = 0.716$) in the previous 10 years did not differ between the military/hi-SC and military/low-SC classes.

For substance use, model fit indices are included in Table 2; conditional probabilities are presented in Table 4. Increased adjusted BIC and non-significant LMR-LRT and BLRT $p$-values
indicated that a four-class model was the best fit for the data. Class 1 (“frequent polysubstance users”) accounted for 8.23% of the overall sample. Members of this class had a higher probability of reporting regular use of tobacco, alcohol, marijuana and inhalants. Class 2 (“polysubstance experimenters”) accounted for 20.75% of the sample. Members of this class had an increased likelihood of endorsing some lifetime substance use but little recent use. Class 3 (“moderate substance users”) accounted for 3.73% of the sample. This class had a higher probability of endorsing some lifetime use as well as moderate recent use of substances. Finally, class 4 (“abstainers”) accounted for the majority of the sample (67.51%); youth in this group had an increased probability of endorsing very limited lifetime or recent use of substances.

Multinomial logistic regression was used to predict the odds of substance use class membership based on military class membership while controlling for sex, grade and race/ethnicity. Results, expressed as odds ratios, are presented in Table 4. Compared to the non-military/moderate SC class, students in the military/high SC class had 70% increased odds (OR = 1.70, 95% CI = 1.12, 2.60) and students in the military/low SC class had double the odds (OR = 2.10, 95% CI = 1.41, 3.15) of being in the frequent substance use class compared to the abstainers class. Similarly, compared to the non-military/moderate SC class, students in the military/high SC class had nearly triple the increased odds (OR = 2.87, 95% CI = 1.18, 6.97) and students in the military/low SC class had over triple the increased odds (OR = 3.07, 95% CI = 1.26, 7.48) of being in the moderate substance use class compared to the abstainers class. Finally, compared to the non-military/moderate SC class, students in the military/low SC class had 42% increased odds (OR = 1.42, 95% CI = 1.08, 1.88) of being in the substance use experimenters class compared to the abstainers class.

Discussion
This study aimed to describe patterns of military-connectedness and situational characteristics indicative of family reorganization and the association of these patterns with patterns of substance use among adolescents in California. Conditional probabilities from the military-connectedness model suggest that the largest group in our sample consisted of non-military connected youth who were likely to report that having more responsibilities, being more independent and having better problem solving abilities was a little true or pretty much true of themselves. Among military-connected youth, more students endorsed low to moderate levels of these characteristics (approximately 14% of the overall sample) than students who endorsed high levels of these characteristics (approximately 7% of the overall sample).

With regard to substance use, the majority of students reported very little use of tobacco, alcohol, marijuana or inhalants, while a substantial minority (approximately 20%) reported some experimentation with substance use and a small minority (approximately 12%) reported moderate or frequent polysubstance use. This general pattern is consistent with previous results reported from the state of California (Gilreath, Astor, Estrada, Johnson, Benbenishty & Unger, 2014). These findings suggest that the number of youth abstaining from all substances is higher in California than in other parts of the country and in national samples. Using national Youth Risk Behavior Surveillance (YRBS) data, Connell and colleagues (2009) found a similar distribution of abstainers, experimenters, moderate users and frequent users, but only 26.7% of this national sample fell into the abstainers class. These differences may be due to the large percentage of Hispanic youth in the current sample. As suggested by Gilreath and colleagues (2014) many of these youth may be members of immigrant families and not fully acculturated, making them less likely to use drugs and alcohol during adolescence (Almeida, Johnson, Godette, & Atusi, 2012; De la Rosa, 2002).
Previous research with this population has suggested that military-connected youth are at greater risk of substance use than their nonmilitary peers (Gilreath et al., 2013; Sullivan et al., 2015). The results presented here echo these findings; military-connected youth in this sample, compared to non-military connected youth who endorsed moderate situational characteristics, had significantly greater odds of reporting experimentation, moderate and frequent substance use compared to abstinence. Previous research has suggested increased risk of externalizing behaviors, including substance use, among military-connected youth may be the result of increased exposure to stressors associated with wartime military family life, including experiences of parental deployment, relocations, and fear or worry for loved ones (Ryan-Wenger, 2001).

Many have hypothesized that family reorganization and shifts in the roles and responsibilities of adolescents are likely to occur in military families during wartime, which may at least partially account for adverse outcomes among youth in these families (Huebner & Mancini, 2005; Mmari et al., 2009; Pincus et al., 2001). However, in this sample, military-connected youth and youth who have experienced deployment were not over-represented among adolescents who report experiencing more indicators reflective of family reorganization. These findings call into question the theoretical value of family reorganization as a mechanism to account for negative outcomes in this population. Further, the odds of belonging to the substance use classes were lower for military-connected youth who tended to describe themselves as having more responsibilities, being more independent and better able to solve problems than their peers. This finding indicates that these situational characteristics may actually be protective for military-connected youth. Further research is needed to understand factors that may be driving the relationship between wartime military connectedness and adverse
outcomes for youth. Identifying these mechanisms is critical for developing effective prevention and intervention efforts to support military families.

There are a number of limitations that should be considered when interpreting these findings. First, the CHKS is a self-report, cross-sectional survey. Causality cannot be inferred from these findings. Additionally, the variables that have been used as indicators of family reorganization are not standardized measures. While these items represent broader categories, they nevertheless correspond to more specific representations of these characteristics in standardized measures (e.g. Hooper & Doehler, 2012). Finally, these data were collected in one region of Southern California. Care should be taken when generalizing to other regions.

Despite these limitations, we can draw a number of important conclusions from the findings presented here. First, consistent with previous work, while many military-connected youth appear to cope with stressors well, these students may nevertheless be at greater risk for substance use compared to their non-military peers. This finding underscores the need to assess for and prevent substance use in this population. Pediatricians, health and mental health care providers, and school faculty and staff, in both military and civilian contexts, have the opportunity to prevent or intervene with military-connected youth who may exhibit these and other risky behaviors. Secondly, military-connected youth who report having more responsibilities, being more independent and solving problems better than their peers appear to be at lower risk of these adverse outcomes compared to those who are less likely to endorse these characteristics. This finding implies that fostering these characteristics among military-connected youth may be protective, suggesting a possible avenue for prevention and intervention with a population at risk.
Compliance with Ethical Standards

a. The authors have no funding sources to disclose.
b. The authors have no conflicts of interest to disclose.
c. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.
d. Informed consent was obtained from all individual participants included in the study. Secondary analysis of all de-identified data was deemed exempt by the [blinded for review] IRB.


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