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Abstract

Suicides in the US military were observed rising in 2004, most notably in the Army and Marine Corps, and particularly, in the Army National Guard (ARNG). Alarmed, Army leaders and researchers have offered various explanations and prescriptions, often lacking any evidence. In the present study, three data sets were used to examine evidence for various perspectives on suicide—dispositional risk, social cognitive, stressor-strain, and social cultural/institutional, each having different emphases on relevant explanatory variables and underlying mechanisms of suicide. Primary risk factors associated with having committed suicide among the 2007–2010 ARNG suicide cases were age (young), gender (male), and race (white), supporting the dispositional risk perspective on suicide. Some evidence supported the stressor-strain perspective in that postdeployment loss of a significant other and a major life change showed statistically significant, yet weaker associations with increased suicide intentions. Implications of results are discussed for future research and preventive strategies.

Keywords

suicide, military, Army National Guard, reservists, combat

Since 2004, suicides in the US Army have risen, particularly in the Army National Guard (ARNG). Suicide rates for the Army climbed from about 13.7 per 100,000 in

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2005 to 20.2 in 2008¹—higher than the most recently available suicide rate for the matched age civilian population, which was 19.2 per 100,000.² Suicide rates for the ARNG increased starting in 2006 and, in 2010, exceeded that of the active component Army (31 per 100,000 vs. 25 per 100,000) and the Army Reserve (24 per 100,000) as well as the most recently available civilian age-adjusted rate of 20.3 per 100,000.³ These increases are especially disconcerting when considering that suicide rates for the military, historically, have been well below those of age-adjusted civilian rates⁴ and that suicide rates have been lowest during wars.⁵ Army leaders and researchers have sought to understand this increase and reverse the apparent trend. The literature on suicide contains several perspectives on suicide, each with somewhat different emphases on relevant explanatory variables for the underlying mechanisms of suicide, and which therefore offer potentially multiple explanations for this recent increase in the ARNG. The present study uses available data to test the evidence for each perspective, and thus has implications for the treatment and prevention of suicide. The four perspectives are dispositional risk, stressor-strain, social cognitive, and social cultural/institutional. Each perspective is treated in more detail below.

Dispositional Risk Perspective

Individual background or demographic characteristics are often gathered in suicide research. The extent to which these characteristics describe those who commit suicide when compared with those who do not shows those who have greater risk and raises possible underlying mechanisms for suicide, for example, antecedent conditions and pathways leading to suicidal behaviors.⁶ Individual characteristics commonly focused on include regional domicile, gender, race, and age.⁷ Civilian suicide research literature has consistently shown age (young adults and seniors), gender (male), and race (white) to be associated with suicide.⁸ Indeed, the primary factors associated with suicide risk in both the active component US Army and ARNG have been shown to be age (under thirty years), gender (male), and race (white).⁹ Similar suicide factors such as age (young adults and seniors), gender (male), and race (non-Hispanic white) are found to be significant in the civilian population.¹⁰ This perspective is called dispositional risk, which identifies individual-level or demographic risk factors for the disease examined and targeted. The perspective implies narrowing the group who might be suicidal by focusing on the demographics of previous suicide cases and using those patterns for screening those at greatest risk and in need of possible preventive treatment. Identifying which individuals are at risk, targeting populations for preventive medicine, and examining possible underlying processes of risk factors for suicide constitute the methodology of this approach. Preventive strategies are aimed at screening individuals for risk factors and providing appropriate protective measures based on the particular intersection of demographic characteristics.

Stressor-Strain Perspective

Negative health outcomes have been explained by life circumstances experienced by the individual, such as excessive or lack of work, work–family imbalance or conflict, and interpersonal problems.¹¹ These circumstances then lead to strain on individual physical and emotional health, and over time, result in exhaustion and depletion¹² and often lead to negative outcomes, including depression and suicide.¹³ In a similar vein, it was thought initially that military personnel who had experienced combat or had deployed multiple times experienced high levels of strain and distress.¹⁴ Indeed, research had shown deployment experiences, such as the number and length of deployments, as well as engagement in combat, were associated with increased posttraumatic stress disorder (PTSD) and related symptoms.¹⁵ The services that endured much of the ground combat operations in Iraq and in Afghanistan (the Army and Marine Corps) were in fact first to show possibly linked rises in suicide rates.¹⁶ Rates for the Marine Corps and the Army first showed increases starting in 2001. Suicide rates for the Army climbed from about 13 per 100,000 in 2005 to about 20 in 2008¹⁷—higher than the age-matched civilian population rate of about 19 per 100,000.¹⁸ Such linkages between stressful or traumatic events and dysfunctional outcomes lead to the perspective being labeled “stressor-strain.” The perspective implies examining the personal history surrounding suicide; in particular, events preceding the suicide likely to cause distress and necessitate individual coping and adjustments, such as having been deployed, number and length of deployments, and combat exposure, with possible loss of significant relationship and financial difficulties as associated or independent events. Observed relationships between these experiences and suicide would imply mitigation strategies that would lessen stressful conditions (e.g., frequency and intensity), in addition to augmenting individual resources that would facilitate adopting more adaptive coping alternatives.

Social Cognitive Perspective

A third perspective emphasizes the importance of the individual’s appraisal of social relationships, which ideally can provide the individual with a sense of belonging, meaning and purpose, and sense of self. Perceiving a lack of these connections, the individual can experience estrangement and become socially marginalized, often increasing the risk for suicide. Given the emphasis on individual perceptions in relation to social groups, this perspective is labeled “social cognitive.” Joiner’s interpersonal theory of suicide¹⁹ exemplifies this perspective. Suicide is explained by psychological conditions, largely related to social context. Two conditions, “thwarted belongingness” and “perceived burdensomeness” to others, frame the potential desire for suicide. Thwarted belongingness occurs when individuals feel disconnected from others and perceive that nobody truly cares about them or can understand their individual situations. Perceived burdensomeness describes when

individuals no longer feel as if they are making worthwhile contributions to others and, in particular, to groups with which they had previously identified. Rather, individuals believe they have become a liability to others. A third condition is “acquired capability,” where through painful events (e.g., repeated attempt or witnessing pain, violence, and suffering) the individual has overcome the fear of death and become accustomed to the eventual physical pain of suicide. The relationships of these conditions to suicidal behaviors have been supported by several recent studies.²⁰

This perspective understands suicide in terms of the individual’s appraisal of his or her role in social groups and its importance to self-identity (reference groups). The assessment of such perceptions can identify who is at risk for suicide, and the individual can subsequently be targeted for cognitive behavioral therapy which would aim to alter these negative perceptions of the self in relation to reference groups. In the Army, such reference groups would include the soldier’s squad or team, as well as the soldier’s family. Family and chaplain support would obviously be critical with regard to possibly helping or improving perceptions regarding the latter. Military team-training would be expected to promote positive interpersonal relations within such small groups, leading to the individual’s sense of contribution and worth to the larger group.

Social–Cultural/Institutional Perspective

Durkheim’s²¹ historical analysis of suicide cases, written in late nineteenth-century France, described broad social influences related to this behavior in Europe. Noting differences in suicide rates between Protestants and Catholics, Durkheim proposed two forces connecting the individual and social group—regulation and integration. Norms and customs that prescribed acceptable behaviors, in particular with others, described regulation. Internalization of group practices determined the extent to which the individual became attached and committed to the group and described integration. Extremes of the two influences yielded suicides having different motivations—low levels of regulation and integration resulted in “egoistic” (marginalized from group) and “anomic” (devoid of meaningfulness) suicides, while high levels of each produced “altruistic” (sacrifice for the group) and “fatalistic” (hopelessness) suicides.

In Durkheim’s typology, the military, much like the strong, community-based religious institution, theoretically provides some degree of social–cultural protection from egoism and anomie-generated suicide. At the same time, the risk of altruistic suicide is potentially higher, although the US military arguably lacks the kind of extreme normative forces that would legitimate such behavior (cf. kamikaze pilots and suicide terrorist bombers). Regarding a reserve military force such as the ARNG, given the less life-encompassing nature of its service members’ commitment, one would expect a relatively less prophylactic effect against egoistic and anomic suicide compared with full-time active duty service members.

Some studies of suicide have made associations between broad societal shifts and changes in suicide rates. Stockard and O'Brien²² and O'Brien and Stockard²³ examined the distribution of suicide rates by age groups for birth cohorts 1930, 1965, and 2000. Over time, they observed that the age distributions of the suicide rates shifted such that in 2000 there were relatively more suicides committed by younger age groups (late teens to mid-twenties) than in 1930 or 1965. They speculated that decreased social integration and regulation among more recent cohorts as a result of increased cohort size and proportionally more disrupted families were associated with these shifts in suicides and homicides. Most recently, Mastroianni and Scott²⁴ described the importance of broader social factors in understanding suicides in the military. These factors include differences between those who now primarily serve in the all-volunteer force and American society as a whole; tenuous legitimization of the current wars by policy makers and the media; and society's collective understanding or lack thereof regarding the US's involvement in Iraq and Afghanistan. They argued that these factors heavily influence whether soldiers interpret their military service and, in particular, combat tours, as worthwhile and meaningful, and how readily soldiers can assimilate and integrate their military experiences.

Social-cultural influences on individual and group behavior can also be found within the organization of the military itself. Indeed, a hallmark of military life is its institutional character,²⁵ which heavily influences individual and group values, norms, and behaviors. Life in the military occurs almost entirely in one setting under supervisory authority. Daily activities occur in the presence of others who are treated alike and required to do specific activities, defined and imposed by established procedures and authority to achieve the goals of the large institution. In such settings, it would be expected that the institutional character reflected in norms, values, and expected behaviors would greatly influence individual behavior.²⁶ Again, such military life among reserve forces like the ARNG is somewhat less circumscribed and certainly more erratic than among the regular active duty force, and thus less "total" in its institutional character.

This perspective, then, focuses on broad social and institutional characteristics impacting relationships the individual has with primary groups, organizations, and society, and implies that changes in social-cultural and institutional practices, norms, and values can influence processes associated with lower suicide risk. Preventive strategies recognize and minimize, to the extent possible, the negative effects of social-cultural and institutional changes associated with suicide risk. Such strategies are necessarily ambitious due to the broad and political level of their application.

Study Purpose and Analytic Approach

The purpose of the present study was to examine evidence for each perspective in explaining suicides in the ARNG using available archival data.

Description of Suicide Cases

The US Army began collating and publishing data on suicide cases at the beginning of 2007. The focus of the present study is the ARNG, which also began data collection at this time. Thus, analyses were limited to ARNG suicide cases that occurred during calendar years 2007, 2008, 2009, and 2010. Most of the ARNG suicide cases (2007 through 2010, $N = 294$) occurred among soldiers who serve part-time as opposed to full-time (86.4 percent of the total 2007 through 2010 suicides). This comes as no surprise, as ARNG soldiers predominately serve part-time except when activated for deployment missions. Additionally, most of the suicides occurred outside the military context—not during weekend drill, not during annual training, and not while performing other active duty military service, but rather in civilian status (90.5 percent). The most frequent methods for suicide were gunshot (65.3 percent) and hanging (16.3 percent). Table 1 displays the percentages of suicide cases (2007 through 2010) falling within various demographic groups. Suicides were predominately male (94.6 percent) and white (89.8 percent). Over one-half were single (56.5 percent), non-prior service (59.9 percent), young in age (42.5 percent seventeen to twenty-four years old and 20.1 percent twenty-five to twenty-nine years old), and never had been deployed (56.5 percent). (Also shown are percentages of soldiers in each demographic group for the 2007–2010 ARNG population.)

These statistics, while informative, do not consider all of those “eligible” who had committed suicide. For this, prevalence rates for groups are reported (see last column of Table 1). The overall ARNG suicide rate across 2007–2010 was 20.5 per 100,000 and was slightly larger than the best available civilian age-adjusted rate (about 19 per 100,000 in 2009).²⁷ Soldiers having a higher rate than the ARNG overall rate were younger, white, male, single, lower enlisted ranks; having alternative high school degrees; and living in western states.

Data Sources for Perspectives on Suicide

Three existing data sets were used to examine support for the various perspectives on suicide. Each had strengths as well as limitations largely due to having been collected before the plan of the present study. The first data set (CY2007 through CY2010) was derived from the ARNG’s personnel data system (ALURRT). This data set was primarily used to examine support for the dispositional risk perspective. This personnel system offered data on both suicides and non-suicides and was suited for use in logistic regression analyses to examine the relative predictive power of specified variables. Data on having been deployed and combat-related military occupational specialty also allowed examining evidence for the stressor-strain perspective. The major limitation of the data involves few variables which could be used in analyses, largely due to data reliability issues.

The second data set represented survey data obtained from routine data collection of returning ARNG soldiers from deployment during CY2010. This data set was

Table 1. Description of Army National Guard (ARNG) Suicides (2007 through 2010)

Demographic group	% of Total	% in ARNG population	2007–2010 Rate per 100,000 (standard error)
Age 17–24 years	42.5*	35.6	24.4 (2.2)
Age 25–29 years	20.1	19.0	21.1 (2.7)
Male	94.6*	86.0	22.5 (1.4)
White	89.8*	74.5	24.6 (1.5)
Single	56.5*	48.8	23.7 (1.8)
Married	34.7*	44.6	16.0 (1.6)
Alternative high school education (non-diploma)	16.3*	10.5	31.2 (4.5)
Less than average aptitude (AFQT < 50)	22.1	22.2	20.5 (2.6)
Rank, privates or E1-E3	31.3*	23.3	27.2 (2.8)
Non-prior service	59.9	55.2	22.0 (1.7)
Part-time military service (M-day)	86.4*	79.9	22.0 (1.4)
Combat military occupational specialty	61.2	55.8	22.4 (1.7)
Never deployed	56.5	55.8	21.6 (1.7)
Not currently in training	92.2	87.3	21.5 (1.3)
Western states	29.6*	19.5	31.0 (3.3)
Total 2007–2010 suicides	294		20.5 (1.2)

Note: Alternative high school educations are those soldiers having nontraditional high school credential, including high school degree in 365 days, home study diploma, high school certificate of attendance, test-based equivalency diploma, overseas graduate equivalency degree, occupational program certificate, and correspondence school diploma.

Less than average aptitude are those soldiers having an Armed Forces Qualification Test (AFQT) score less than 50 and are below the 50th percentile.

Non-prior service soldiers are those having no previous military service prior to joining the ARNG.

Part-time military service are those soldiers who are “mobilization” (M-day) or part-time soldiers who drill one weekend a month and complete fifteen days annual training (vs. serving full-time).

Combat military specialty are those soldiers having occupations directly related to combat, for example, infantry, armor, artillery, and so on. Combat military occupational specialties (MOS) for males included the series 11, 13, 19, 21, 25, 31, 68, 79, 88, 89, and 91; and for females included the series 15, 21, 25, 31, 68, and 92.

Never deployed are soldiers who have never been mobilized and served full-time deployment tour.

Not in training are soldiers not currently waiting for training or not enrolled in training, such as officer basic course, individual active duty training status, awaiting or in basic officer leader course, and in split-phase training.

Western states are those soldiers serving in units in states west of the Mississippi River.

*Percent differences (absolute value) between the suicide cases and ARNG population must exceed 5.7 percent to be statistically significant (z-test between percentages, $p < .05$, two-tailed).

primarily used to examine support for the stressor-strain perspective. Soldiers responded to standardized questionnaires (called the Unit Risk Inventory-Reintegration or URI-R)²⁸ about their deployment and postdeployment experiences, including questions about suicide intentions. Responses to other survey questions, such as combat exposure and postdeployment experiences, were used in multiple regression analyses to examine the predictive power of variables relative to one

another. Strengths of the data were that soldiers responded to questions both during deployment and after deployment. The data set was very large, containing survey data from nearly 5,000 soldiers in fifty units. Due to the intended anonymity of the survey, little soldier background information was available, resulting in several limitations, such as inability to match results to personnel and other data, to include soldiers' age, gender, and race.

The third data set was obtained from tabulations of Army reserve component soldiers' responses to the 2009 Status of Forces questionnaires.²⁹ These data were primarily used to examine support for the social-cultural/institutional perspective. Responses of junior-ranking enlisted soldiers from the ARNG were compared to those from the US Army Reserve (USAR). The USAR has had consistently lower suicide rates than the ARNG.³⁰ Thus, the analytic question was whether soldiers perceived reserve military service in the ARNG more negatively than soldiers in the USAR and, in particular, regarding experiences representing broad-based social-cultural and institutional characteristics, such as leadership and cohesion. A sample of junior-ranking enlisted was chosen for comparison, since the majority of suicides occur among young, non-prior service soldiers. Data for this group were reported in publicly available tabulation volumes.³¹ There were limited data available to directly assess evidence for the social-cognitive perspective on suicide.

Dispositional Risk Perspective

Prevalence rates show the risk related to demographic variables for suicide. Lacking, however, is the risk of one demographic relative to others. To address this shortcoming, logistic regression analysis was conducted. Logistic regression analysis is best suited for multivariate analyses when the outcome or criterion variable is dichotomous, such as having committed suicide or not. Output of logistic regression in the current analysis showed the likelihood of a soldier with specified demographics to commit suicide relative to other demographic groups (odds ratio). Regression coefficients showed the direction and magnitude of the variable's relationship with having committed suicide or not. Soldier demographic background and military-related experiences variables were used to predict having committed suicide or not. All ARNG suicide cases from calendar years 2007 through 2010 were included in the analysis along with a corresponding random sample of 1,000 living soldiers drawn from each year's ARNG population (total $N = 4,293$).³² Variables included age, gender, race, level and type of high school graduation, mental category (based on the Armed Forces Qualification Test), marital status, rank, prior service, military status (M-day or part-time vs. full-time military service), military occupational specialty (coded into combat arms vs. others), in-training, and ever deployed. Hierarchical entry was used to examine the contribution of each variable set to explained variance. (Only the last column in the table is affected by the order of variable set entry and not the regression coefficient, standard error, or likelihood ratio.) The order of entry was based on the temporal occurrence of variables, that is, basic

demographics (e.g., age, gender, and race) were entered first followed by variable values of successively later temporal occurrence.³³ Suicide cases and the random samples of non-suicide cases across the calendar years were considered together in one equation to achieve more power in analyses. Year was entered as the final predictor variable (with 2010 as the reference category) in order to detect any year effects by having combined suicide cases across the four years of data. Due to the inter-relatedness of variables contributing to multicollinearity, not all available variables were entered as predictor variables.³⁴ Table 2 displays results of the logistic regression analysis.

The overall equation was statistically significant, Wald $\chi^2(14) = 82.17$, $p < .001$. Variables associated with having committed suicide included the following: younger ages of seventeen to twenty-four years (1.74 times more likely than the over twenty-nine years age group), younger ages of twenty-five to twenty-nine years (1.43 times more likely than the over twenty-nine years age group), being male (3.05 times more likely than females), and being white (1.85 times more likely than other race groups). A strong year effect was evident for odd ratios associated with the year of the data collection. The likelihoods (odds ratio) of soldiers committing suicide in 2007, 2008, and 2009 were each about 0.50 less than that in 2010 (the reference category). Of particular note is that the demographic variables—age, male, white, and single—accounted for over half (59.1 percent) of the explained variance (see Table 2, far right-hand column). The explained variance for year, or cases in 2010 compared to the cases in the other years, was 24.5 percent. Military-related variables (prior service, M-day, in-training, combat military occupational specialty, and having been deployed) added 14.3 percent to the explained variance.

This evidence strongly supported the dispositional risk perspective compared to the stressor-strain and other perspectives. Those who committed suicide were largely part-time reservists while in civilian status. Soldier demographic characteristics most associated with having committed suicide were being male, white, and aged seventeen to twenty-four years. Military-related variables, including having been deployed and having a combat military occupational specialty, did not show significant independent association with having committed suicide.

Stressor-Strain Perspective

Responses of returning ARNG soldiers to the URI-R survey were used to examine the stressor-strain perspective. The inventory consisted of about ninety survey items, and its primary purpose was to screen for high-risk behaviors and dysfunctional attitudes of soldiers, which may have occurred during deployment or postdeployment. As a part of reintegration activities, soldiers were asked to complete the URI-R at any time from sixty to ninety days after returning from deployment. Survey data were available from those soldiers who had returned from deployments in calendar year 2010, numbering fifty company-sized units, with 4,642 responding soldiers.

Table 2. Logistic Regression Prediction of 2007–2010 ARNG Suicides versus Random Sample of Suicides by Soldier Characteristics

Predictor Variable	Unstandardized regression coefficient	Standard error	Likelihood odds ratio	Predictive power (% of total variance accounted for by set of predictors by row)
Aged 17–24 years	.55**	.21	1.74	
Aged 25–29 years	.35*	.18	1.43	
Male	1.12***	.28	3.05	
White	.62***	.17		
Single	–.26	.16	0.78	59.2
Alternate high school degree (non-diploma)	.15	.19	1.16	2.0
Prior service	.02	.16	1.03	12.2
Part-time military service (M-day)	.25	.17	1.28	
Currently in training	–.38	.28	0.68	
Combat military occupational specialty	.07	.18	1.07	
Deployed	–.15	.14	0.86	2.1
Year 2007	–.62***	.17	0.54	
Year 2008	–.61***	.17	0.54	
Year 2009	–.57**	.17	0.57	
Year 2010 (reference)				24.5
Constant	–4.00	.38	0.02	
R ²	.049			100.0
Wald χ^2 (df = 14)	82.17***			

Source: Adapted from J. Griffith, "Suicide in the Army National Guard: An Empirical Inquiry." *Suicide and Life-Threatening Behavior* 42, 1 (2012): 104–119

Note: The sample used in this analysis was the combined cases of 2007–2010 suicide cases ($N = 294$) plus random samples of 1,000 soldiers each calendar year for comparison (see Note 32 for explanation). List-wise deletion $N = 4,288$.

Variable values were "dummy coded," where "1" is condition present and "0" as condition absent.

To avoid multicollinearity problems, not all variables were entered in the regression analysis due to being correlated with predictor variables. Omitted variables were AFQT and rank.

Odds ratio is the likelihood that soldiers having the variable value (e.g., male) is more likely to commit suicide than the reference group (e.g., female), that is, males are 3.05 times more likely than females to commit suicide, and so on.

* $p < .05$. ** $p < .01$. *** $p < .001$.

The survey data provided reasonably good estimates from the surveyed units, as most of the unit members had taken the survey. The mean response rate of units was 90.2 percent, with a range of 55 percent–100 percent. Most of the soldiers had returned from Operation Iraqi Freedom (OIF; 84.2 percent) and some (15.8 percent) from Operation Enduring Freedom (OEF). Additionally, the type of units comprising the sample (i.e., combat arms, combat support, and combat service support) was proportional to the unit types actually deployed. Nearly all (90 percent) of the

Table 3. Percentage of 2010 Deployed ARNG Soldiers Who Reported Suicide Intentions during Deployment and after Deployment and By Combat Exposure (from URI-R Survey Data)

Suicide intentions ^a during deployment/ after deployment	% of Total		
No/No	94.1		
No/Yes	1.4		
Yes/No	1.7		
Yes/Yes	2.8		
N	4,642		
Suicide intentions during deployment/after deployment	No combat experiences	Experienced combat	Z test between row percentages
No/No	95.3	93.3	-2.93**
No/Yes	1.1	1.7	1.74 ⁺
Yes/No	1.6	1.7	0.26
Yes/Yes	2.0	3.3	2.77**
N	1,824	2,818	

Source: Adapted from J. Griffith, "Suicide and War: The Mediating Effects of Negative Mood, Posttraumatic Stress Disorder Symptoms and Special Support among Army National Guard Soldiers." *Suicide and Life-Threatening Behavior* 42, 1 (2012): 104-119

Note: ^aSuicide intentions included soldiers who responded "yes" to any one of the three survey items: thoughts of suicide, planned suicide, and attempted suicide.

⁺p < .10. **p < .01, two-tailed.

soldiers reported having been deployed for seven to twelve months. Eighty-eight percent of the soldiers reported having returned from deployment within three to six months, equally divided between having returned after one to three and four to six months. Two-thirds (64.9 percent) of the soldiers had no previous deployments, only the current. About one-third (34 percent) of the soldiers in the sample reported having been previously deployed, two or more times. ARNG units are predominately combat arms and combat support, which was reflected in the percentages of soldiers in these units, respectively 38 percent and 29 percent.

The URI-R data provided suicide intentions during and after deployment. Suicide intentions were assessed by asking soldiers questions typically used to assess suicide ideations and tendencies, such as questions about having thoughts of suicide, having made a plan, and having attempted suicide.³⁵ Soldiers were asked to respond to the items twice—one set applied to when deployed and another set applied to after having returned—or in other words, deployment suicide intentions and postdeployment suicide intentions. See the top portion of Table 3.

Soldiers who reported suicide intentions during deployment generally reported the same intentions after deployment, and the association of combat experiences with suicide symptoms was negligible (bottom portion of Table 3). Of the soldiers, 2.8 percent had reported suicide intentions both during

deployment and after deployment. A small percentage of soldiers reported suicide intentions only after deployment (1.4 percent) and likewise during deployment but not after deployment (1.7 percent). Combat experiences showed very weak associations with suicide intentions. Net change in intentions was examined during deployment and postdeployment among those who experienced combat versus those who did not. The vast majority of soldiers reported no suicide intentions during deployment as well as afterward, that is, 95.3 percent of those having no combat experiences and 93.3 percent of those having combat experiences. Combat experiences were associated with a 0.6 percent increase for those who had no suicide intentions during deployment but had intentions after deployment ($z = 1.74, p < .10$), and with a 1.3 percent increase for those who reported intentions both during deployment and after, which was statistically significant ($z = 2.77, p < .01$).

The URI-R data allowed further examination of evidence for the stressor-strain perspective on suicide. Stressors, such as war exposure and postdeployment challenges or adjustments, were used to predict postdeployment suicide intentions. Combat experiences were assessed by asking soldiers about having witnessed a trauma, having been engaged in combat, seeing another individual wounded or killed, having lost a friend in combat, and having killed anyone. These items, though abbreviated, are very similar in content to those in recently developed combat experience scales.³⁶ Postdeployment negative events were assessed by soldier responses to having experienced end of a significant personal relationship, having financial difficulties, and having experienced significant life change after having returned from deployment (Table 4). Deployment suicide intentions were entered first in the multiple regressions, thereby yielding a change score as the criterion variable.³⁷ Predictor variable sets—war exposure and postdeployment stressors—were then entered hierarchically based on their temporal occurrence.

The overall equation was statistically significant, $F(11, 4040) = 258.17, p < .001$, explaining 41.1 percent of the variance in postdeployment suicide intentions. The total variance explained was largely accounted for by suicide intentions during deployment (39.6 percent). Suicide intention during deployment was also the strongest predictor of the set of predictors (standardized regression coefficient = .60). Both war experiences and postdeployment stressors accounted for little of the explained variance. Considering the individual predictor variables, having had a significant life change and having lost a significant personal relationship after returning from deployment were both significantly associated with changed suicide intentions from deployment to postdeployment. Standardized regression coefficients were .07 and .08, $p < .001$, respectively. War experiences showed little association with suicide intentions.

Evidence generally did not support the stressor-strain perspective on suicide. Few soldiers expressed suicide intentions either during deployment (4.5 percent) or after deployment (4.2 percent). Few soldiers changed intentions toward suicide from deployment to postdeployment (1.4 percent) and more soldiers showed persistent suicide intentions (2.8 percent). Having experienced direct combat showed low associations with changed suicide intentions. Evidence for the stressor-strain perspective applied

Table 4. Prediction of Postdeployment Suicide Intentions by Deployment Suicide Intentions, Combat Exposure, and Postdeployment Stressors among 2010 Deployed ARNG Soldiers (from URI-R Survey Data)

Predictor variable	% of Sample	R with self-reported suicide behavior ^a	Standardized regression coefficient	R ² added	% of total R ²
Suicidal intentions during deployment	4.2 (thoughts)	.65**	.60***	.396	96.4
War Exposure					
No. of deployments in last 6 years	64.9 (current)	.07**	.03*		
Length of deployment	89.8 (7–12 months)	.06**	.01	.001	0.2
Witness combat trauma	20.0	.15**	.01		
Direct combat	20.0	.07**	.02 ⁺		
Killed someone	4.5	.09**	.00		
Lose friend	14.9	.03	-.01		
See wounded, killed, or dead	20.0	.03*	.00	.001	0.2
Postdeployment Stressors					
End of significant relationship	20.0	.17**	.08***		
Financial troubles	11.8	.18**	.02		
Major life change	10.2	.17*	.07***	.013	3.2
Total R ²				.411	
F(11, 4040)	258.17***				

Source: Adapted from J. Griffith, "Suicide and War: The Mediating Effects of Negative Mood, Posttraumatic Stress Disorder Symptoms and Special Support among Army National Guard Soldiers." *Suicide and Life-Threatening Behavior* 42, 1 (2012): 104–119

Note: Values represent the sum of positive responses to: thought about suicide, planned suicide, and attempted suicide.

^aSuicide included soldiers who had committed suicide, coded as 1s, and those who had not and were part of the living, non-suicide sample, coded as 0s.

+ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

mainly to postdeployment stressors rather than combat exposure. Having experienced combat and number of deployments showed marginal associations with changed suicide intentions. By comparison, postdeployment stressors of a loss of significant relationship and a major life change showed statistically reliable associations with changed suicide intentions. Also of note is the strong association of suicide intentions during deployment with those after deployment—evidence that suicide intentions show consistency among individuals over time. It is acknowledged that suicidal

intentions are not the same as completed suicide, that is, the latter includes the additional dynamic of action, despite its correlation with intention.

Social Cultural/Institutional Perspective

The ARNG has had consistently higher suicide prevalence rates than the USAR,³⁸ and thus, a lingering question was—Were soldiers in the ARNG experiencing military service more adversely than USAR soldiers? To respond to the question and to initially test the broader perspective of a social cultural/institutional cause for suicide, comparisons were made between responses of ARNG and USAR soldiers to the 2009 Status of Forces Survey. The Status of Forces Survey is a web-based questionnaire, which asked reserve military members about their attitudes and opinions on a wide range of personnel issues.³⁹ Response percentages of junior-ranking soldiers to questions were calculated for items that tapped different aspects of military experience. The items represented broad aspects of organizational climate and likely are indicative of social cultural/institutional milieu,⁴⁰ including leadership, cohesion, readiness, job satisfaction, and retention intentions. Junior-ranking enlisted responses were chosen because this is the group that has had the highest prevalence of suicide. Table 5 displays responses of ARNG and USAR soldiers. Soldiers responded similarly, and in some cases, ARNG soldiers gave more positive responses concerning their unit and service.

Given these results, the difference in USAR and ARNG suicides is likely explained by proportionally more soldiers who are at risk in the ARNG than in the USAR (young, male) due to the force structure differences. That is, the ARNG has more combat arms and less combat support units than the USAR, with the former units staffed by young men. As shown in Table 6, the ARNG has proportionally more soldiers having dispositional at-risk factors than does the USAR, that is, younger in age (eighteen to twenty-four years old), more males, and more junior ranking enlisted. In addition, the ARNG, compared to the USAR, has more junior ranking enlisted who have less military experience and are yet to be integrated into military service, that is, fewer prior service and more awaiting training.

In summary, ARNG and USAR soldiers did not differ in their experiences of leadership, cohesion, readiness, job satisfaction, and retention. Insofar as these content areas reflect broad social-cultural and institutional aspects of integration, ARNG and USAR soldiers did not report differences.

Discussion

In the present study, three data sets were used to examine evidence for various perspectives on suicide, each having different emphases on relevant explanatory variables and underlying mechanisms of suicide. Notwithstanding the limited scope and detail of the data available, several summary statements are possible. Table 7 displays summary findings.

Table 5. Comparison of ARNG and USAR Junior-ranking Enlisted (Privates and Specialists, E1–E4) Perceptions of Reserve Military Experiences

Survey content area/item	ARNG (N = 1,077)	USAR (N = 572)	% Difference
	Weighted % Agreed		
Leadership			
Trust immediate supervisor	74	71	+3
Immediate supervisor treats fairly	70	73	–3
Conflict between supervisor and supervised	22	19	+3
Satisfied with supervision	65	67	–2
Micromanaged	37	32	+5
Chain of command will listen	63	59	+4
Would go to leaders with personal problem	54	50	+4
Cohesion			
Coworkers put forth effort	66	60	+6*
Coworkers get along	77	77	0
Coworkers help each other	75	74	+1
Readiness	% Well prepared		
Self-prepared for wartime	75	67	+8*
Unit prepared for wartime	65	60	+5
Training to perform wartime missions	70	65	+5
Satisfaction with assigned job	% Agreed		
Work makes use of skills	62	59	+3
Satisfied with work	66	62	+4
Work provides sense of pride	73	65	+8*
Overall satisfaction with reserve service	% Agreed		
Satisfied with military life	72	69	+3
Enjoy serving in reserve	79	71	+8*
Proud to serve	82	77	+5
Retention intentions	% Agreed		
Likely choose to stay	63	59	+4

Source: Defense Manpower Data Center (2009, released July 2010). *Status of Forces Survey of Reserve Component Members: Tabulations of Responses* (DMDC report no. 2010-002)

*Percentage differences (absolute value) between ARNG and USAR must exceed 5 percent to be statistically significant (z-test between percentages, $p < .05$, two-tailed).

Evidence supported the dispositional risk perspective of suicide. Primary risk factors for having committed suicide were age (younger than twenty-five years), gender (male), and race (white). Military-related variables, including having been deployed and combat exposure, showed little relationship to suicide. These findings are consistent with analyses of the active component Army suicides. US Army Public Health Command has consistently reported suicide cases as occurring disproportionately among males, Caucasians, younger in age (eighteen to twenty-four years), and often having an untreated behavioral condition and/or substance abuse.⁴¹ Initial findings of the Army's comprehensive study of suicide, STARRS or "Study to

Table 6. Comparison of ARNG and USAR Junior-ranking Enlisted (Privates and Specialists, E1–E4) Population Characteristics

Background characteristic, 2009	ARNG (N = 362,844)		USAR (N = 205,281)		% Difference
	N	%	N	%	
Of all enlisted:					
18–24 years old	125,749	39.3	58,025	34.4	+4.9
Male	273,479	85.5	129,577	76.8	+8.7
E1–E4	181,084	56.6	91,500	54.2	+2.4
E1–E4, ≤ 2 years military service	94,058	29.4	46,362	25.6	+3.8
Of 2010 gains:					
Non-prior service	36,757	64.9	12,744	46.2	+18.7
Awaiting training	16,155	43.4	5,815	36.5	+6.9

Source: Defense Manpower Data Center (2010).

Assess Risk and Resilience in Servicemembers,” also showed the highest suicide risk profile to include: gender (male), age (young), and race (white). Suicide rates increased over time for soldiers in all settings (i.e., those never deployed, currently deployed and previously deployed).⁴² Similar suicide risk factors such as age (young adults), gender (male), and race (non-Hispanic white) have been identified in the civilian population.⁴³ There was some evidence that postdeployment stressors were associated with suicide intentions, namely, a loss of significant other and a major life change. This finding is consistent with US Army Public Health Command research studies which described relationship problems as an additional risk factor for active component Army suicides.⁴⁴ Other research studies have also shown the negative effects of postdeployment events on mental well-being (e.g., PTSD and substance abuse).⁴⁵ In the present study, a loss of significant other was related to increased suicide intentions after deployment. The connection between such a loss and Joiner’s⁴⁶ interpersonal theory of suicide is clear, in particular among men who rely on relatively less social support.⁴⁷ Thus, with a loss of a significant other, the soldier could feel a lack of belonging and more like a burden to others, and over time through habituating to pain, more likely to commit suicide. In regard to broader contextual experiences and suicide, there were few differences in the way ARNG soldiers experienced reserve military service when compared to USAR soldiers. Suicide rates have been consistently higher among ARNG soldiers than USAR soldiers, but findings here suggest no organizational differences associated with suicide in this case.

How then can the three consistent factors associated with suicide be reconciled within an interpretative framework? Griffith⁴⁸ has offered a tentative interpretation, though speculative, that ties together these three primary factors in relation to stress adaptation. Demographic risk factors likely relate to age-specific tasks of identity and relationship development, contextualized by gender and race. Age necessitates age-specific tasks concerning development of self-identity and the quality of

Table 7. Perspectives on Suicide: Supporting Evidence, Findings, and Future Research Questions

Perspective	Supporting evidence	Findings	Future research questions
Dispositional risk	Strong evidence	Factors most associated with suicide are age (17–24 years), gender (male), and race (white). Concurrent Army research also adds past or current behavioral health condition, largely untreated, and substance abuse.	What are mechanisms associated with suicide that underlie these basic demographic characteristics? Are behavioral health conditions the consequences, antecedents, and/or co-occurring conditions of suicide?
Stressor-strain	Limited evidence	Having been deployed and various combat exposure events showed little relationship to suicide. Few changes in suicide intentions from deployment to postdeployment. Postdeployment stressors, such as a loss of significant other, are associated with suicide.	Do stressors interact with dispositional risk factors (the above as well as negative affectivity, childhood trauma) leading to greater personal distress?
Social cognitive	Not examined due to lack of data	Growing evidence in the suicide literature	Do social cognitive factors play a larger role among dispositional risk groups when under stressful conditions?
Social-cultural /Institutional	Limited evidence, <i>not</i> a factor between USAR and ARNG	Some evidence of more recent generational cohorts at greater risk for suicide due to broad societal changes	What are social changes in generations associated with cohort prevalence rates of suicide? To what extent are these changes associated with suicides in the military? Why does the Army not appear to offer the same socially integrative protection against suicide as it once did?

interpersonal relations. Race and gender define the context of coping. Race can determine the nature and amount of informal support available to the individual. Gender is associated with differences in the benefit of support, in addition to being variably socialized to be competitive and aggressive, and having familiarity and comfort with weapons of violence. Age-specific tasks are further elaborated below, in particular, in the context of gender and race.

Suicides in the Army occur largely from seventeen years of age through the mid-twenties. This age span prescribes specific tasks for the individual, which define who individuals are and how their identities relate to others. For individuals at this age, major tasks in their psychosocial development are (1) developing a coherent, positive identity as opposed to being confused about self-identity; and (2) having intimate relationships as opposed to being isolated.⁴⁹ Major suicide theorists Joiner, VanOrden, Witte, and Rudd and Durkheim⁵⁰ have included in their theories of suicide the lack of self-identity in the context of others. Self-identity provides the individual with a sense of worth and meaning, characteristics often absent in suicide cases.

Race is likely associated with the nature and amount of informal support available to the individual, especially during stressful circumstances, to help augment the individual's coping. Documented in the general literature is the extended support network experienced by African Americans.⁵¹ Thus, under stressful circumstances, whites would be expected to have more negative consequences than African Americans, due to the buffering effects of indigenous social supports.⁵² Some have also described African Americans' higher level of participation in religion, compared to whites' generally lower level, as an additional inhibition against self-harm.⁵³ Others have also described the greater resiliency among African Americans in adapting to adverse life circumstances, to include discrimination, unemployment, poverty, and urban challenges.⁵⁴

Maris, Berman, and Silverman⁵⁵ offered several reasons for the gender association with suicide, including that males are more likely to engage in suicide-risk behaviors, such as alcohol abuse and accessing firearms, along with deeper shame from failure. Males are also less likely to engage in protective behaviors, such as seeking help for problems, being aware of signs of personal distress, having flexible coping skills, and having developed social supports. Many of these associations are a result of different socialization patterns between males and females, in particular, regarding interpersonal behaviors. Males' aggressiveness and competitiveness, along with greater exposure, familiarity, and comfort with weapons often lead to their greater availability and less inhibition to use them for self-harm.⁵⁶ There is also evidence that women benefit more than men from social integration,⁵⁷ and with its absence men are more vulnerable to the negative effects of stressful circumstances.

Directions for Future Research

The primary risk factors, being basic demographic characteristics, suggest strong underlying socialization and/or physiological bases for suicide risk. These processes remain

to be examined in future research studies. Future research studies need to elaborate on the underlying mechanisms of the primary risk factors for suicide—namely, young age, male, and white. Given the three primary factors, it might be that certain soldiers experience postdeployment stressors more adversely than others. Recent research on suicide has shown the greater vulnerability of males to loss of social support than females.⁵⁸ Other studies have shown childhood experience⁵⁹ and negative affectivity⁶⁰ worsen the negative effects of trauma, and childhood trauma appears to more adversely affect men than women in these relationships. Lacking basic soldier demographic information in the survey data examined here (due to anonymity requirements), the combination of the primary risk factors and postdeployment stressors could not be examined. This, then, remains an area for future research, especially in view of these findings concerning important personal dispositional factors. Examining these relationships is likely important in understanding processes that underlie the primary risk factors identified in this study. Related questions are: To what extent are reported behavioral health problems of suicidal soldiers, such as substance abuse and depression, the consequences, antecedents, and/or co-occurring conditions of suicide intention? Do social cognitive factors play a larger role among dispositional risk groups when under stressful conditions? Regardless of dispositional risk factors, how do we explain the increases in suicide rates over time, given the presumed social integrative advantage previously displayed by the Army? Has the dynamic of suicide intention versus completion in the Army changed and, if so, why?

Directions for Preventive Policy

Findings here and elsewhere imply that there is a personal, though not fully understood, disposition to being at risk for suicide. What this means is that not everyone is at the same degree of risk. Having been deployed and combat exposure can be traumatic for some soldiers, often leading to behavioral health conditions, such as PTSD and depression. Yet, most soldiers will be exposed to such events without negative behavioral health consequences, in particular, suicide intentions—as results here have shown. Soldier demographic attributes were associated most highly with suicide risk and may be associated with dispositional risk to suicide, along with childhood trauma and negative affectivity. These findings may explain why suicide intentions in the present study showed consistency during and after deployment. Erbes et al.⁶¹ also reported regularity in personal difficulties and distress among National Guard soldiers before, during, and after deployment. Findings then imply only some soldiers having some underlying disposition to suicide will likely be suicidal. Preventive strategies might include systematic screening for suicide intentions and a standard set of questions, for example, recent thoughts of killing oneself, plans made, and attempts, given as a part of records review and the annual periodic health examination. Screening might also include the experiences of interpersonal difficulties and loss, and substance abuse, as these have been found to be co-occurring conditions of suicide.⁶² Some military researchers have even proposed questions about

early childhood,⁶³ for example, “By today’s standards, do you think the punishment you received from your parents would be considered abusive?”). After identifying those at risk, soldiers need to be managed and provided appropriate support and care. Analyses of active component Army suicides have shown that the majority of suicide cases had behavioral health problems, which were largely untreated or underwent occasional treatment.⁶⁴ Similar analyses cannot be done for reservists due to the lack of medical data. Medical care delivery data outside of military service are not maintained on reservists. Reservists not in full-time military status have to rely on private health care, which is often lacking among junior-ranking soldiers.⁶⁵ Thus, there are fewer options available for treatment. This is an area needing further attention by policy makers.

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