



---

## Social Support Mediates the Relationship Between Mental-Physical Multiple Morbidities and Engagement in Aerobic Physical Activity Among Military Service Members and Veterans

*Justin McDaniel, David L. Albright, Alan Beck, Kari L. Fletcher, Kate H. Thomas, & Robert J. McDermott*

---

### Abstract

Some research shows that physical activity levels are low among veterans, but research gaps exist specifically in regards to promoting physical activity in veterans with multiple morbidities. For the present study, we retrieved data from the 2015 Behavioral Risk Factor Surveillance System (BRFSS). The study sample included 57,842 military service members and veterans. We carried out a mediation analysis to determine the effect of social support on the relationship between multiple morbidities and aerobic physical activity. Social support partially mediated the relationship between the presence of multiple morbidities and aerobic physical activity,  $\beta_a\beta_b = -0.003$ , [95% CI = -0.007, -0.001]. Programs aimed at facilitating adequate social support among service members and veterans with multiple morbidities may increase their uptake of aerobic physical activity, and thus, decrease concomitant risk for health-related disorders.

*Keywords:* Military Veterans, Military Veteran Health, Physical Activity, BRFSS, Military Veteran Morbidity, Mediation Analysis

---

### Background

According to the United States (U.S.) Department of Labor, there are approximately 2.2 million service members (~ 1% of the population), and 21.2 million veterans (~ 9% of the population) living in the United States. Service members and veterans (SMVs) experience mental and physical health disorders at rates higher than those who have not served in the military (Wilcox, Finney, & Cederbaum, 2013). For example, Kemp and Bossarte (2012) found that veterans were twice as likely to commit suicide when compared to non-veterans. Additionally, veterans were more likely than non-veterans to report two or more chronic health conditions during the 2007-2010 National Health Interview Survey (U.S. Centers for Disease Control and Prevention [CDC], 2012).

Whereas most SMVs are thought to possess resilience – the capacity to recover or bounce back from life’s challenges (Ginsburg, 2006) – it can be helpful to consider the role that risk factors such as deployment to a combat zone, age, prior mental health or trauma history, military status, and adjustment challenges (Cederbaum et al., 2013) play in mental, physical, and co-morbid health disorders in this population over the lifespan. Additionally, it may be beneficial to improve understanding of the extent to which perceptions of instrumental, emotional, or relational support that serve as protective factors (Nock et al., 2013) moderate morbidity risk.

Because it is difficult to generalize the pathogenesis or etiology of mental and physical health disorders among SMVs (Fletcher, Albright, Rorie, & Lewis, 2017), it may be useful to apply a public health or epidemiologic disparity approach when considering specific problems of at-risk populations, as well as factors that contribute to morbidity or resilience. Several population segments with current or past military affiliation experience higher rates of drop-out in higher education, homelessness, and

incarceration (Fletcher, Mankowski, & Albright, 2018). Barriers that negatively impact military-affiliated individuals' ability to seek support may be veteran-specific (e.g., attitudes about mental health treatment; Teasley, Gourdine, & Canfield, 2010), military-specific (e.g., limits to confidentiality; Hoyt, 2013), systems-of-care-specific (e.g., long wait times; RAND, 2016), or combinations of these and other factors. Facilitators that promote health include targeted efforts to increase access to, and improve social support among military-affiliated populations (Turchik & Wilson, 2010; Veterans Health Administration [VHA] Office of Health Equity, 2013).

Another way to conceptualize health among military-affiliated populations is through the study of health behaviors. To date, few studies have examined the prevalence of health behaviors – physical activity in particular – in SMV cohorts (Caddick & Smith, 2014). Littman, Forsberg, and Koepsell (2009) showed that only a minority of veterans met physical activity guidelines in 2003; however, the effect of comorbid conditions was not considered, nor was the role of social support. In the present study, the research team attempted to determine the influence of social support on meeting recommendations for weekly aerobic physical activity – defined as “activity in which the body’s large muscles move in a rhythmic manner for [150 minutes per week]” (CDC, 2015, para. 2) – among veterans with multiple morbidities of depression, coronary heart disease, and diabetes. We were particularly interested in examining the extent to which social support mediates the relationship between the existence of multiple morbidities and aerobic physical activity.

## Methods

### *Study Design and Sample*

The team obtained secondary data for this cross-sectional study from the 2015 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS includes a national telephone survey initiated by the U.S. Centers of Disease Control and Prevention (CDC) that monitors chronic conditions, health-related behaviors, and utilization of preventive services (CDC, 2017). Additional details about the survey methods and data collection process used by the CDC for the BRFSS are published elsewhere (CDC, 2017). The sample for the present study included participants who indicated that they had served on activity duty in the U.S. Armed Forces – in the regular military, the National Guard, or a military reserve unit (n = 57,842).

### *Measures*

**Control Variables.** Thirteen age categories in five-year intervals beginning at 18 years old were used to assess age. Sex was measured as either male or female. Race was assessed according to the following categories: White, Black or African-American, American Indian or Alaskan, Asian, Native Hawaiian or other Pacific Islander, other race, no preferred race, or multiracial.

Annual household income was assessed in eight categories, listed on the BRFSS survey as: < \$10,000, \$10,000 to \$14,999, \$15,000 to \$19,999, \$20,000 to \$24,999, \$25,000 to \$34,999, \$35,000 to \$49,999, \$50,000 to \$74,999, and ≥ \$75,000. Educational attainment was measured with six ascending categories: never attended school, completed 8th grade, completed 11th grade, completed high school, completed some college or technical school, and completed a four-year degree.

**Study Variables.** Of interest in the present study were relationships among the following three variables: the existence of multiple morbidities, social support, and engagement in the recommended amount of aerobic physical activity. To measure the existence of multiple morbidities among SMVs – operationalized as depressive disorder, coronary heart disease, and diabetes – we aggregated responses to the following questions among SMVs so long as the participant answered “yes” to all three: (1) ever told that you have a depressive disorder, including depression major depression, dysthymia, or minor depression; (2) ever told you had angina or coronary heart disease;

and (3) ever told you have diabetes. However, women who indicated that they had diabetes only during pregnancy were not coded as having diabetes.

Social support was measured with the following question: *How often do you get the social and emotional support you need?* Response options included: “always,” “usually,” “sometimes,” “rarely,” or “never.” The final study outcome was aerobic physical activity, measured as whether or not the SMV met or exceeded the aerobic physical activity recommendation of 150 minutes per week. Respondents were excluded from the inferential analysis if: (a) their response to a particular question was left blank; (b) they refused to answer the question; or (c) if they indicated that they were not sure. The final sample included 2,466 SMVs.

### Data Analysis

The research team calculated descriptive statistics (frequencies and percentages) for all study variables. In addition, we carried out mediation analysis, according to procedures described by Baron and Kenny (1986), so as to determine the effect of social support on the relationship between multiple comorbid conditions and engagement in aerobic physical activity. Baron and Kenny suggest that three regression models must be generated to demonstrate mediation. First, a model (Equation 1) is generated to estimate the impact of the independent variable (X) on the mediating variable (M). A second model (Equation 2) is generated to determine the effect of X on the dependent variable (Y). Finally, a third model (Equation 3) is generated to determine the impact of the X and the M on the Y. The following conditions must be met with the three models for perfect mediation to be evident: (a) there must be a statistically significant relationship between X and M in the first model; (b) there must be a statistically significant relationship between X and Y in the second model; and (c), in the third model, the M, but not the X, must be a statistically significant predictor of the Y.

Because the Y variable in our study was nominal in scale and the residuals in Equation 1 followed a normal distribution following a bootstrapping procedure with 1,000 resamples – a technique that permits the creation of a sampling distribution that lends to parametric analysis – (Freedman, 1981), logistic regression was needed for Equation 2 and Equation 3, and Ordinary Least Squares (OLS) regression was needed for Equation 1 (Long, 2008). To make coefficients comparable across equations and to permit the calculation of the indirect effect, we applied MacKinnon and Dwyer’s (1993) adjustment to all regression coefficients.

$$M_{ij} = \beta_{0j} + \beta_{\alpha} X_{ij} \quad (1)$$

$$\ln\left(\frac{Y}{1-Y}\right) = \beta_{0j} + \beta_c X_{ij} \quad (2)$$

$$\ln\left(\frac{Y}{1-Y}\right) = \beta_{0j} + \beta_{c'} X_{ij} + \beta_b M_{ij} \quad (3)$$

To test the mediating effect of social support (M) on the relationship between the presence of multiple morbidities (X) and engagement in recommended amounts of aerobic physical activity (Y) among SMVs, the three previously described regression models were generated. Five variables were included as control variables in each equation: age, sex, race, income level, and education level. Bias Corrected (BCa) 95% confidence intervals based on 1,000 resamples were generated in all models to increase the precision of estimates (Efron & Tibshirani, 1986). The indirect effect in the mediation analysis, which specifies the amount of mediation in the model, was tested for statistical significance with MacKinnon, Lockwood, and Williams’ (2004) Monte Carlo Method for Assessing Mediation (MCMAM). In the MCMAM approach, “a sampling distribution of  $\beta_{\alpha}\beta_b$  is formed by repeatedly generating  $\beta_{\alpha}$  and  $\beta_b$  and computing their product ... [and] percentiles of this sampling distribution

are identified to serve as limits for a  $100(1 - \alpha)\%$  asymmetric confidence interval” (Preacher & Selig, 2012, p. 83).

### Results

Table 1 (below) reports the demographic information for the study sample. A greater percentage of SMVs included in the study were  $\geq 60$  years of age than below age 60. Furthermore, descriptive results showed that most SMVs included in the study were white men with incomes  $\geq$  \$25,000 per year. Whereas there was some variation in educational attainment, over half of the study sample had completed at least some college.

Table 1  
*Demographic characteristics of the study sample (n = 2,466)*

Variable	Frequency (n)	Percent (%)
Age		
18 – 24 Years	28	1.100
25 – 29 Years	54	2.200
30 – 34 Years	40	1.600
35 – 39 Years	46	1.900
40 – 44 Years	73	3.000
45 – 49 Years	104	4.200
50 – 54 Years	143	5.800
55 – 59 Years	182	7.400
60 – 64 Years	261	10.600
65 – 69 Years	505	20.500
70 – 74 Years	375	15.200
75 – 79 Years	274	11.100
80 or Older	365	14.800
Sex		
Male	2257	91.500
Female	209	8.500
Race		
White	2317	94.000
Black or African-American	44	1.800
American Indian or Alaskan Native	27	1.100
Asian	4	0.200
Native Hawaiian or Pacific Islander	1	0.100
Other Race	31	1.300
No Preferred Race	4	0.200
Multiracial	0	0.000
Income		
< 10,000 USD	51	2.100
10,000 – 14,999	67	2.700
USD 15,000 – 19,999	109	4.400
USD 20,000 – 24,999	166	6.700
USD 25,000 – 34,999	265	10.700
USD 35,000 – 49,999	377	15.300
USD 50,000 – 74,999	439	17.800
USD $\geq$ 75,000 USD	701	28.400

Education	Never Attended School	2	0.100
	Completed Grade Eight	29	1.200
	Completed Grade Eleven	73	3.000
	Completed High School	661	26.900
	Some College or Technical School	802	32.600
	Completed Four-Year Degree	892	36.300

Table 2 (below) reports the descriptive results for the main study variables. Regarding mental health conditions, approximately 1 in 6 SMVs reported having a depressive disorder. Regarding physical health conditions, approximately 1 in 8 SMVs reported having coronary heart disease (CHD), and approximately 1 in 5 SMVs reported having diabetes. Whereas more than half of the persons in the study sample reported always getting needed social support, over 10% indicated that they either rarely or never receive social support. Finally, 42% of SMVs did not meet the 150 minutes per week recommendation for aerobic physical activity.

Table 2  
*Descriptive results regarding multiple morbidities, social support, and physical activity among service members and veterans*

Variable	Frequency (n)	Percent (%)
Depressive Disorder	No	
	Yes	2067 84.800
Coronary Heart Disease	No	386 15.700
	Yes	2155 87.400
Diabetes	No	286 11.600
	Yes	1960 79.500
Multiple Morbidity	No	434 17.600
	Yes	2439 98.900
Emotional Support	Always	22 0.900
	Usually	1437 58.300
	Sometimes	547 22.200
	Rarely	229 9.300
	Never	95 3.900
Met PA*	No	158 6.400
	Yes	1029 41.700
Recommendation	No	1370 55.600
	Yes	

\*PA = Physical Activity

Table 3 (below) shows the results of the mediation analysis. Three regression models were generated to determine whether social support mediated the relationship between the presence of multiple morbidities and engagement in recommended amounts of aerobic physical activity among SMVs in 2015. The results of model 1, where M was regressed on X, showed that SMVs with multiple morbidities were less likely to receive sufficient social support. The results of model 2, where Y was regressed on X, showed that SMVs with multiple morbidities were less likely to engage in

recommended amounts of aerobic physical activity. Lastly, model 3, where Y was regressed on X and M, showed that both X and M were both statistically significant predictors of aerobic physical activity. In model 3, social support was negatively associated with aerobic physical activity, indicating that SMVs who failed to receive the social support that they needed were less likely to engage in recommended amounts of aerobic physical activity. To the extent that X remained statistically significant after controlling for M, the hypothesized model exhibited partial mediation. The indirect effect, however, was still statistically significant based on the MCMAM approach with 20,000 resamples,  $\beta_a\beta_b = -0.003$ , [95% CI = -0.007, -0.001]. Therefore, the proportion of the direct effect that was mediated was 5.17%.

Table 3

*The mediating effect of social support on the relationship between the presence of multiple morbidities and physical activity*

	1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>
	<i>X</i> → <i>M</i>	<i>X</i> → <i>Y</i>	{ <i>X, M</i> } → <i>Y</i>
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Multiple Morbidities ( <i>X</i> ) <sup>b</sup>	0.034 (0.014) *	-0.058 (0.028) *	-0.053 (0.028) *
Social Support ( <i>M</i> ) <sup>b, c</sup>			-0.103 (0.026) *
Intercept	3.278 (0.231) *	-1.292 (0.413) *	-0.769 (0.423)
Control Variables			
Age	0.001 (0.009) *	0.042 (0.017) *	0.042 (0.016) *
Sex	-0.071 (0.079)	0.044 (0.165)	0.031 (0.165)
Race <sup>d</sup>	-0.020 (0.139)	0.336 (0.225)	0.333 (0.236)
Income	-0.140 (0.016) *	0.113 (0.026) *	0.092 (0.001) *
Education	-0.108 (0.032) *	0.026 (0.053)	0.008 (0.052)
	<i>F</i> or $\chi^2$	28.167	35.383
	<i>p</i>	< 0.001	< 0.001
<i>R</i> <sup>2</sup> or Nagelkerke <i>R</i> <sup>2</sup>	0.073	0.022	0.033

<sup>a</sup> Unstandardized regression coefficients are shown for each model

<sup>b</sup> MacKinnon and Dwyer's (1993) comparable coefficients and SE's are shown

<sup>c</sup> Social support outcomes were coded thusly: Always = 1, ... Never = 5

<sup>d</sup> Recoded as White = 1, Non-White = 0, due to low representation among Non-White races

\* Statistically significant beta based on a bootstrapped BCa 95% CI with 1000 resamples

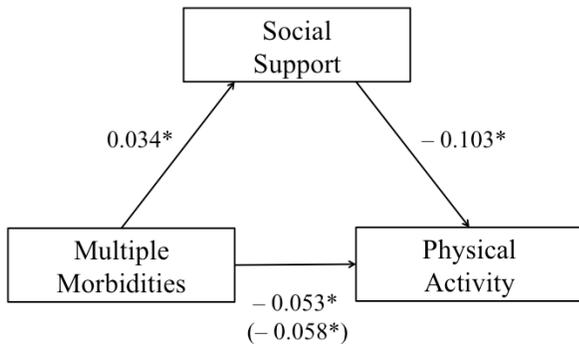


Figure 1. Unstandardized regression coefficients for the mediating effect of social support on the relationship between the presence of multiple morbidities and aerobic physical activity. Asterisks indicate statistical significance based on a bootstrapped (with 1,000 resamples) 95% bias corrected confidence interval. The

unstandardized regression coefficient between multiple morbidities and aerobic physical activity, without controlling for social support, is in parentheses.

### Discussion

Our findings suggest that social support may explain engagement in recommended amounts of aerobic physical activity among SMVs with multiple morbidities. Social support may increase motivation for aerobic physical activity (Newsom, Shaw, August, Strath, & Foley, 2016). Moreover, engaging this population in aerobic physical activity may reduce the risk for suicide (a potential outcome of depression), heart attack (a potential outcome of CHD), or retinopathy (a potential outcome of diabetes) – as aerobic physical activity has been shown to be protective against each of these problems (Gutierrez, Davidson, Friese, & Forster, 2016; Kokkinos et al., 2010).

Programs are readily available to SMVs; however, access may be a concern for veterans who no longer are on active duty. Whereas current military members generally partake in physical training in a group setting, veterans who are separated from the military may lose some of their *esprit de corps*, and consequently, lack the individual motivation to maintain an active lifestyle (Thomas & Plummer Taylor, 2015). The Veterans Administration (VA) has implemented the MOVE program to provide support for weight control via proper nutrition and exercise (U.S. Department of Veterans Affairs, 2017). Unfortunately, a limitation of the MOVE program is access. Many of the program offerings are at regional VA facilities, making attendance less convenient for veterans living in rural or remote areas. Although the VA now has implemented a mobile phone-based lifestyle-coaching MOVE application (app), older veterans may not access phone apps to the extent that their younger counterparts do. Therefore, it is unclear if this mHealth-based program will have a notable impact on veterans' health behavior.

Veterans are often categorized by the conflict eras (Thomas et al., 2015) that characterize social and services/policy conditions during their respective years of service (i.e., Korean era, Vietnam era, Operation Enduring Freedom [OEF] and Iraqi Freedom [OIF] era veterans). Pietrzak et al. (2010) found veterans of OEF and OIF with unit support and post-deployment social support were less likely to experience post-traumatic stress disorder (PTSD) and depression. At the time of this study, Vietnam era veterans were considered “older” era veterans. Because the application of post-deployment social support is a relatively new phenomenon (U.S. Department of Veterans Affairs, 2014), older era veterans may not have been exposed to it or debriefed about it. Boscarino (1995) found that Vietnam era veterans were more likely to experience PTSD, depression, and drug use, and suggested that the absence of social support should not be overlooked as a possible cause for these post-deployment issues. A 2007 report from the U.S. military discussed the importance of “Battlemind Psychological Debriefings” and its importance for reintegration into society for combat veterans (Adler, Castro, & McGurk, 2007). Whereas such debriefings are now a common practice, older era veterans are still less likely to have experienced them or been connected to any recommended therapeutic or ongoing social support (Weiner, Monin, Mota, & Pietrzak, 2016).

Our study has several limitations that should be considered. First, the age distribution for respondents in the present study was negatively skewed, indicating that a large percentage of military veterans in our study were above the age of 60. To the extent that older age has been shown to be a risk factor for the comorbid chronic conditions examined in this study (Booth et al., 2006), the findings may not be generalizable to younger active duty service members. Also, the cross-sectional nature of the data precludes identifying cause-and-effect relationships. In addition, we analyzed the experiences of service members and veterans – a broad population. Veterans, National Guardsman, and current active duty members may have different and even divergent military experiences, as well as subsequent social support and comorbid conditions; future studies should examine physical

activity in these different groups. Another limitation is the number of comorbid conditions included in the present analysis. By focusing on depression, CHD, and diabetes, we may have overlooked other comorbid conditions (e.g., chronic obstructive pulmonary disease, heart failure, peripheral vascular disease, arthritis and other orthopedic conditions, visual disorders, and countless other health-related matters) that could influence activity levels. Future studies should explore other disease states as possible predictors of physical activity or inactivity.

We also were unable to ascertain information in the data set that might influence aerobic physical activity – prior mental health status, history of trauma, or other relevant conditions. Moreover, we could not examine participants' length of military service, or the impact of specific deployments on health-related variables that subsequently could affect physical activity levels. Furthermore, in focusing on aerobic physical activity as a dependent variable, we did not consider other pro-health or anti-health behaviors (tobacco use, excessive alcohol use, recreational drug use, and so on) that could impact physical activity. Lastly, we could extract only one measure of social support – a single item that examined perceived frequency of social support. Future studies should explore more comprehensive or multi-dimensional measures of social support (intensity, dependability, number of sources, and so on) to improve understanding of the nature of social support, and what is needed to catalyze and sustain physical activity. Furthermore, because of using an existing data set for our secondary analysis, we were unable to gain any insights about the context of physical activity and the specific health-related conditions that were identified.

Whereas several limitations attended the methodology and analysis in the present study, our results provide answers to previously unanswered questions. Little is known about the health behaviors of depressed veterans with comorbid chronic health conditions – such as CHD and diabetes. Social support, in the present study, accounted for 5% of the direct effect between the presence of multiple morbidities and aerobic physical activity among SMVs. To be sure, given the minimal influence of social support on aerobic physical activity, other factors – unaccounted for in the present study – may have played a significant role in engagement in aerobic physical activity. However, to the extent that social support has been shown to have significant impact on health and health behaviors, both within and outside the context of physical activity (Berkman, 1995; Kahn et al., 2002; Resick, 2001), further research into: (a) other co-occurring mediators with social support, and (b) manifold dimensions or distinct latent elements of social support is needed.

### **Conclusion**

Military SMVs are at risk for comorbid conditions as well as reduced physical activity compared to their civilian counterparts. Although social support only partially mediated the relationship between multiple morbidities in SMVs and engagement in aerobic physical activity, the introduction of adequate social support may encourage greater participation in the recommended level of aerobic physical activity. There are many programs underway with novel approaches to support SMVs along the path to increased physical activity (Thomas, Plummer Taylor, Hamner, Glazer, & Kaufman, 2015). Potentially, information about accessing these programs could be included in military discharge debriefings and routine healthcare visits at VA facilities, especially for older veterans as they may be at greater risk for multiple comorbid conditions and may not have any familiarity with post-deployment social support programs. In addition, SMVs could be encouraged to reach out to various programs that would engage them in ongoing exercise and other health-promoting leisure activities.

---

## References

- Adler, A., Castro, C., & McGurk, D. (2007). *Battlemind Psychological Debriefings*. Retrieved from <http://www.usamrd-w.amedd.army.mil>.
- Baron, R., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.
- Berkman, L. F. (1995). The role of social relations in health promotion. *Psychosomatic Medicine*, *57*, 245–254.
- Booth, G. L., Kapral, M. K., Fung, K., & Tu, J. V. (2006). Relation between age and cardiovascular disease in men and women with diabetes compared with non-diabetic people: A population-based retrospective cohort study. *The Lancet*, *368*, 29–36.
- Caddick, N., & Smith, B. (2014). The impact of sport and physical activity on the well-being of combat veterans: A systematic review. *Psychology of Sport and Exercise*, *15*, 9-18.
- Centers for Disease Control and Prevention. (2017). *Behavioral risk factor surveillance system*. Retrieved from <https://www.cdc.gov/brfss/index.html>.
- Centers for Disease Control and Prevention. (2015). Glossary of terms. Retrieved from <https://www.cdc.gov/physicalactivity/basics/glossary/index.htm#aerobic>.
- Centers for Disease Control and Prevention. (2012). *The health of male veterans and nonveterans aged 25-64: United States, 2007-2010*. Retrieved from <https://www.cdc.gov/nchs/data/databriefs/db101.htm>.
- Efron, B., & Tibshirani, R. (1986). Bootstrap methods for standard errors, confidence intervals, and other measures of statistical accuracy. *Statistical Science*, *1*(1), 54-77.
- Fletcher, K. L., Albright, D. L., Rorie, K. A., & Lewis, A. M. (2017). Older veterans. In J. Beder (Ed.), *Caring for the military: A guide for helping professionals*. New York, NY: Routledge.
- Fletcher, K. L., Mankowski, C. M., & Albright, D. L. (In press). The challenges posed by the mental health needs of military service members and veterans. In J. Rosenberg and S. Rosenberg (Eds.), *Community mental health: Challenges for the 21<sup>st</sup> century* (3<sup>rd</sup> ed.). Florence, KY: Routledge.
- Freedman, D. A. (1981). Bootstrapping regression models. *The Annals of Statistics*, *9*(6), 1218–1228.
- Ginsburg, K. R. (2006). *A parent's guide to building resilience in children and teens*. Elk Grove Village, IL: American Academy of Pediatrics.
- Gutierrez, P. M., Davidson, C. L., Friese, A. H., & Forster, J. E. (2016). Physical activity, suicide risk factors, and suicidal ideation in a veteran sample. *Suicide and Life-Threatening Behavior*, *46*(3), 284-292.
- Hoyt, T. (2013). Limits to confidentiality in U.S. Army treatment settings. *Military Psychology*, *25*, 46–56.
- Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., ... Corso, P. (2002). The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine*, *22*(4s), 73-107.

- Kemp, J., & Bossarte, R. (2012). *Department of Veterans Affairs mental health services suicide prevention program*. Retrieved from <https://www.va.gov/opa/docs/suicide-data-report-2012-final.pdf>.
- Kokkinos, P., Myers, J., Faselis, C., Panagiotakos, D. B., Doumas, M., Pittaras, A., ... Fletcher, R. (2010). Exercise capacity and mortality in older men: A 20-year follow-up study. *Circulation, 122*, 790-797.
- Littman, A. J., Forsberg, C. W., & Koepsell, T. D. (2009). Physical activity in a national sample of veterans. *Medicine and Science in Sports and Exercise, 41*(5), 1006-1013.
- Long, R. G. (2008). The crux of the method: Assumptions in ordinary least squares and logistic regression. *Psychological Reports, 103*(2), 431-434.
- MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review, 17*, 144-158.
- Newsom, J. T., Shaw, B., August, K., Strath, S., & Foley, T. Physical activity-related social control and support, perceived norms, and physical activity. *The Gerontologist, 56*(Suppl. 3), 566.
- Nock, M. K., Deming, C. A., Fullerton, C. S., Gilman, S. E., Goldenberg, M., Kessler, R. C., ... Ursano, R. J. (2013). Suicide among soldiers: A review of psychosocial risk and protective factors. *Psychiatry: Interpersonal & Biological Processes, 76*(2), 97-125.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128.
- Pietrzak, R.H., Johnson, D.C., Goldstein, M.B., Malley, J.C., Rivers, A. J., Morgan, C.A., ... Southwick, S.M. (2010). Psychosocial buffers of traumatic stress, depressive symptoms, and psychosocial difficulties in veterans of Operations Enduring Freedom and Iraqi Freedom: The role of resilience, unit support, and postdeployment social support. *Journal of Affective Disorders, 120*(1), 188-192.
- Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures, 6*, 77-98.
- RAND Corporation. (2016). *Balancing supply and demand for veterans' health: A summary of three RAND assessments conducted under the Veterans Choice Act: RAND Health*. Santa Monica, CA: RAND. Retrieved from [http://www.rand.org/content/dam/rand/pubs/research\\_reports/RR1100/RR1165z4/RAND\\_RR1165z4.pdf](http://www.rand.org/content/dam/rand/pubs/research_reports/RR1100/RR1165z4/RAND_RR1165z4.pdf).
- Resick, P. A. (2001). *Stress and trauma*. New York, NY: Psychology Press.
- Teasley, M., Gourdine, R., & Canfield, J. (2010). Identifying perceived barriers and facilitators to culturally competent practice for school social workers. *School Social Work Journal, 34*, 90-104.
- Thomas, K.H., & Plummer Taylor, S. (2015). Bulletproofing the psyche: Mindfulness interventions in the training environment to improve resilience in the military and veteran communities. *Advances in Social Work, 16*(2), 312-322.
- Thomas, K.H., Plummer Taylor, S., Hamner, K., Glazer, J., & Kaufman, E. (2015). Multi-site programming offered to promote resilience in military veterans: A process evaluation of the Just Roll With It bootcamps. *Californian Journal of Health Promotion, 13*(2), 15-24.

- Thomas, K.H., Turner, L.W., Kaufman, E., Paschal, A., Knowlden, A.P., Birch, D.A., & Leeper, J. (2015). Predictors of depression diagnoses and symptoms in veterans: Results from a national survey. *Military Behavioral Health, 3*(4), 255-265.
- Turchik, J. A., & Wilson, S. M. (2010). Sexual assault in the U.S. military: A review of the literature and recommendations for the future. *Aggression and Violent Behavior, 15*, 267–277.
- U.S. Centers for Disease Control and Prevention. (2017). *BRFSS: Survey data and documentation*. Retrieved from [https://www.cdc.gov/brfss/data\\_documentation/index.htm](https://www.cdc.gov/brfss/data_documentation/index.htm).
- U.S. Department of Labor. (2016). *Bureau of Labor Statistics: Employment situation of veterans summary*. Retrieved from <http://www.bls.gov/news.release/vet.nr0.htm>.
- U.S. Department of Veterans Affairs. (2014). *Spotlight: Post-deployment health research*. Retrieved from <https://www.hsrd.research.va.gov/news/feature/postdeployment.cfm>.
- U.S. Department of Veterans Affairs. (2017). *MOVE! Weight management program*. Retrieved from <https://www.move.va.gov>.
- Veterans Health Administration Office of Health Equity. (2013). *What is it all about?* Retrieved from [http://www.hsrd.research.va.gov/for\\_researchers/cyber\\_seminars/archives/769-notes.pdf](http://www.hsrd.research.va.gov/for_researchers/cyber_seminars/archives/769-notes.pdf).
- Weiner, M.R., Monin, J.K., Mota, N., & Pietrzak, R.H. (2016). Age differences in the association of social support and mental health in male U.S. veterans: Results from the national health and resilience in veterans study. *American Journal of Geriatric Psychiatry, 24*(4), 327-336.
- Wilcox, S. L., Finney, K., & Cederbaum, J. A. (2013). Prevalence of mental health problems among military populations. In B. A. Moore & J. E. Barnett (Eds.), *Military Psychologists' Desk Reference* (pp. 187-196). New York, NY: Oxford University Press.
- 

Justin McDaniel, Ph.D.\*  
Assistant Professor of Public Health  
Southern Illinois University  
475 Clocktower Dr., Mailcode 4632  
Carbondale, IL 62901  
P: 618-453-1832  
E: jtmcd@siu.edu

\* Denotes corresponding author

David L. Albright, Ph.D., MSW  
Hill Crest Foundation Endowed Chair of Mental Health  
School of Social Work  
The University of Alabama  
Box 870314  
Tuscaloosa, AL 35487-0314  
P: 205-348-4416  
E: dlalbright@ua.edu

Alan Beck, Ph.D., CHES, ACSM-CEP, EP-C, CIFT, CPT  
Prevention Research Center  
Washington University, St. Louis

One Brookings Drive  
Campus Box 1196  
St. Louis, MO 63130  
P: 314-935-0125  
E: alan.beck@wustl.edu

Kari L. Fletcher, Ph.D., MSW, LICSW  
Associate Professor and Coordinator of the Area of Emphasis in Military Practice (AEMP)  
School of Social Work, University of St. Thomas  
St. Catherine University-University of St. Thomas School of Social Work  
2115 Summit Ave.  
St. Paul, MN 55105  
P: 651-962-5807  
E: kari.fletcher@stthomas.edu

Kate H. Thomas, Ph.D., MCHES  
Assistant Professor of Public Health  
College of Health Sciences  
Charleston Southern University  
9200 University Blvd.  
Charleston, SC 29406  
P: 843-863-7247  
E: kthomas@csuniv.edu

Robert J. McDermott, Ph.D.  
Professor of Public Health  
Southern Illinois University  
475 Clocktower Dr., Mailcode 4632  
Carbondale, IL 62901  
P: 813-431-2200  
E: robert.mcdermott@siu.edu

---