

Protective and Vulnerability Factors Contributing to Resilience in Post-9/11 Veterans With Service-Related Injuries in Postsecondary Education

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MeSH TERMS

- brain injuries
- educational status
- health status
- protective factors
- resilience, psychological
- veterans

OBJECTIVE. To examine differences in psychosocial protective factors (social support, meaningful occupation, and academic self-efficacy) and health-related vulnerability factors (posttraumatic stress, depression, and somatic symptoms) contributing to resilience in post-9/11 veterans with service-related injuries and nonveterans in postsecondary education.

METHOD. A cross-sectional, matched-participants design using propensity score matching was used to test differences in mean levels of protective and vulnerability factors between injured veterans ($n = 26$) and nonveterans ($n = 19$); zero-order correlations explored relationships among study variables.

RESULTS. The veteran sample demonstrated lower levels of psychosocial protective factors and higher levels of health-related vulnerability factors compared with nonveterans (10.491 to 11.561). Psychosocial protective factors were consistently negatively associated with health-related vulnerability factors ($-.27$ to $-.63$).

CONCLUSION. Post-9/11 veterans with service-related injuries are at a substantial disadvantage in terms of resilience; lower protective factors and elevated vulnerability factors may increase their risk for poor campus integration and impede academic achievement.

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Resilience in the face of traumatic life circumstances has been defined as the relative resistance to an environmental risk or the overcoming of stress and adversity despite traumatic exposure (Rutter, 2006). Mild traumatic brain injury (mTBI), posttraumatic stress disorder (PTSD), and depression resulting from military service can be “mutually exacerbating” and may contribute to poor psychosocial functioning, including increased suicide risk (Brenner, Vanderploeg, & Terrio, 2009). Resilience in the face of enduring trauma-related challenges may be fostered, however, through establishing supportive relationships with others, enhancing participation in meaningful occupations, and developing self-efficacy beliefs that motivate and sustain effective occupational performance (King, 2004).

Occupational therapy can play an instrumental role in fostering resilience and full life participation for post-9/11 veterans who have sustained injuries and seek to reintegrate into their communities and attend institutions of higher education (Radomski & Brininger, 2014). The study of post-9/11 veterans’ engagement in postsecondary education environments has only recently begun, however, and there is a great need to enhance the profession’s knowledge in this area (Tomar & Stoffel, 2014). Moreover, although resilience has been identified as an important perspective for understanding the recovery process after traumatic events (Fine, 1991), models of resilience capable of guiding occupational

therapy service delivery have not been developed within the profession for this population.

The purpose of the present exploratory study was to add to the profession's understanding of the psychosocial and health-related challenges of post-9/11 veterans who have sustained service-related injuries and are seeking college degrees. This article presents a study that tested a novel resilience-based model that can contribute to the profession's understanding of veterans in higher education, offers guidance for the targeted delivery of occupational therapy services, and suggests approaches for multidisciplinary collaboration.

Post-9/11 Veterans in Higher Education

After the decade-long conflicts in Afghanistan and Iraq, more than 2 million military veterans have returned to their communities, and in 2013 more than three-quarters of a million veterans, service members, and dependents were using benefits from the Post-9/11 Veterans Educational Assistance Act of 2008 (Pub. L. 110–252; Dortch, 2014; Obama, 2011). However, high rates of mTBI and associated mental health concerns are distressing consequences of military service. Prevalence rates of mTBI in veterans range from 10% to 20%; rates of PTSD, from 5.6% to 30.5%; and rates of depression, from 5.6% to 16.0% within 3 to 12 mo following combat (Thomas et al., 2010; Wilk, Herrell, Wynn, Riviere, & Hoge, 2012). Furthermore, mTBI, PTSD, and depression are associated with elevated somatic symptoms (e.g., physical symptoms such as pain and fatigue), which contribute to functional impairments and poor health outcomes (Thomas et al., 2010).

Studies of post-9/11 veterans on college campuses have reported significant PTSD symptoms, moderately severe depression, and at least some noticeable suicide risk (Rudd, Goulding, & Bryan, 2011). Military service, especially service-related trauma, results in higher rates of mental health challenges and social and educational adjustment difficulties for veterans compared with their civilian peers, and studies have indicated that student veterans have lower grade point averages than their nonveteran counterparts (e.g., Duradella & Kim, 2012). Moreover, service-related mental health issues are associated with maladaptive behaviors such as binge drinking, health risk behavior, and suicide risk, thereby limiting social integration and contributing to poor academic outcomes for student veterans (Barry, Whiteman, & Wadsworth, 2014).

Occupational therapy research involving post-9/11 veterans in higher education, though limited, has suggested that the presence of mTBI, PTSD, and depression can have

a negative impact on the student role. Plach and Sells (2013) found that the most common self-reported problems involved difficulties in social relationships and academics, followed by sleeping and driving. Within this sample, 40% reported mTBI, nearly a quarter screened positive for PTSD, and three-quarters screened positive for depression. Unfortunately, college campuses do not appear to be fully prepared to address the complex mental health needs of post-9/11 veterans (McBain, Kim, Cook, & Snead, 2012; Steele, Salcedo, & Coley, 2010). Together, these findings suggest that post-9/11 veterans living with mTBI and comorbid mental health difficulties may face substantial challenges with campus integration and academic achievement.

Resilience-Based Model for Surmounting the Sequelae of Traumatic Experiences

Promoting resilience in post-9/11 veterans is an emerging role for the occupational therapy profession, and a greater understanding is required of both protective and vulnerability factors that contribute to resilience (American Occupational Therapy Association [AOTA], 2009; Radomski & Bringer, 2014). In a model of cumulative adversity (Brenner et al., 2009), mTBI, PTSD, depression, and somatic symptoms are seen as mutually exacerbating vulnerability factors that contribute to behavioral challenges and increased suicide risk, thereby decreasing resilience. Models of resilience also identify protective factors supportive of resilience that contribute to positive developmental outcomes by offsetting the vulnerability factors imposed by past traumatic experience, including persistent emotional and functional impairments (Pietrzak et al., 2010; Smith-Osborne, 2007).

The current study draws on King's (2004) Model of Meaning in Life Experiences, a perspective on resilience that includes three associated processes for acquiring meaning in life: (1) *belonging* (having supportive personal relationships), (2) *doing* (participating in meaningful occupations), and (3) *self-understanding* (seeking to understand oneself and one's place in the world). King's perspective on this process suggests that the meaning people ascribe to their relationships, occupations, and understanding of self is always open to change and revision. These three meaning processes afford protective resources to people by minimizing the impact of negative reactions (e.g., PTSD, depression) that can arise after exposure to traumatic life events (Bonanno, 2004; Rutter, 1990). Maximizing protective resources is a pressing concern for post-9/11 veterans who experience postdeployment depression (as high as 16%) and PTSD (as high as 30%; Thomas et al., 2010).

Resilience can be viewed as a dynamic process in which psychosocial growth may be promoted at turning points in peoples' lives (Bonanno, 2004). Rutter (1990) viewed a *turning point* as a critical juncture in life in which new experiences can lead to the development of resilience and the mitigation of negative reactions to past traumatic events. The postsecondary education environment offers a critical context for such a turning point in the lives of post-9/11 veterans with service-related injuries.

The first influential factor capable of fostering resilience and protecting people from poor life outcomes is belonging, which can be found in the availability of close and supportive personal relationships (Bonanno, 2004; Masten, 2001). According to King's (2004) model, the positive effects of social supports on resilience likely operate through the provision of practical assistance, support for personal motivation and competent behavior, and positive self-understanding. For post-9/11 service members, social relationships that afford emotional and instrumental supports have been found to be negatively associated with PTSD (Pietrzak et al., 2010), and veterans with PTSD may struggle with maintaining supportive social relationships (Elliott, Gonzalez, & Larsen, 2011). In addition, lower levels of social supports have been associated with lower self-efficacy beliefs and diminished academic persistence in postsecondary education (Smith-Osborne, 2012b).

Doing, the second aspect of King's (2004) model of resilience, highlights the role of human action as an important protective resource for achieving optimal human growth and development. Meaningful occupation is one perspective on doing that serves to motivate and sustain continued engagement in day-to-day life, thereby offering a protective resource fostering resilience and personal well-being (Eakman, 2015; King, 2004). Unfortunately, post-9/11 veterans with service-related trauma face considerable barriers to participation in meaningful occupation (Plach & Sells, 2013), and some engage in maladaptive behaviors that place them at risk of poor academic and social outcomes (Whiteman, Barry, Mroczek, & Wadsworth, 2013).

Self-understanding is the third aspect of the resilience model proposed by King (2004). Self-efficacy as proposed by Bandura (1997) is a perspective on self-understanding that refers to people's beliefs that their skills and abilities are sufficient for achieving valued personal goals. Academic self-efficacy as a factor supporting resilience in post-9/11 veterans in college is not well understood, however, despite its role as a key motivational resource associated with academic persistence and achievement

(Chemers, Hu, & Garcia, 2001). Across studies of veterans in college settings, notable differences in relationships among PTSD, self-efficacy, social supports, and educational attainment have been reported (Barry et al., 2014; Smith-Osborne, 2012a).

In light of this literature review, we hypothesized that post-9/11 veterans with service-related injuries would report lower levels of psychosocial protective factors (social support as an indicator of belonging, meaningful occupation as an indicator of doing, and academic self-efficacy as an indicator of self-understanding) and higher levels of health-related vulnerability factors (mTBI, PTSD, depression, and somatic symptoms) than nonveteran students. A secondary purpose was to explore relationships among these protective and vulnerability factors in resilience. We hypothesized that, as a group, psychosocial factors would be negatively intercorrelated with health-related factors given that they reflect protective and vulnerability roles within their respective models of resilience. In other words, social support, meaningful occupation, and academic self-efficacy were expected to be negatively correlated with PTSD, depression, and somatic symptoms.

Method

Design and Participants

This study used a nonexperimental, cross-sectional matched-groups design. New Start for Student Veterans (NSSV) is an educational support program for post-9/11 veterans with service-related injuries that is housed in the occupational therapy department of Colorado State University. After the study's approval by the university's institutional review board, NSSV participants were invited to complete an online survey. Of a possible 30 NSSV participants, 26 provided informed consent and completed the survey between November 2013 and April 2014, and they received a \$10 gift card. The most common self-reported injuries of the NSSV participants on intake included PTSD ($n = 10$); mTBI ($n = 10$); shoulder, back, or foot injuries ($n = 8$); and bone fractures ($n = 8$), with 15 NSSV participants reporting more than one service-related injury. Using a self-report indicator of combat-related mTBI (Hoge et al., 2008), 20 NSSV participants (76.9%) reported having experienced a service-related mTBI as a result of an explosion, vehicle accident, or fall; 11 NSSV participants (42.3%) reported a combination of two or more causes. Table 1 provides additional information regarding the NSSV participants.

A sample of 291 undergraduate students provided informed consent and completed the same survey instruments

as the NSSV participants. To obtain the nonveteran sample, 3,276 randomly selected undergraduate students were sent an email invitation in April 2014, followed by two reminder emails. A total of 353 surveys were initiated; 297 were completed, and these participants were entered into a lottery for an iPad Mini. Of the 297, 6 participants reported veteran status and were excluded from the sample. Both samples were undergraduates and primarily White. Compared with the nonveterans, the NSSV participants were older, $t(25.6) = 14.5, p < .001$, and a greater proportion were male, $\chi^2(n = 317) = 13.0, p = .001$, were married, $\chi^2(n = 317) = 41.7, p < .001$, or lived off campus, $\chi^2(n = 317) = 22.0, p < .001$ (see Table 1).

Instruments

Psychosocial Protective Factors. An indicator of social support was adapted from the Postdeployment Support Questionnaire (PSQ), which is a 10-item self-report scale assessing the extent to which family, friends, and the larger community provide emotional and instrumental social support ($\alpha = .84$; Vogt, Proctor, King, King, & Vasterling, 2008; Vogt, Smith, King, & King, 2012). Of the 10 PSQ items, Items 1, 2, 5, and 6 were removed because

they refer to military associations. The Engagement in Meaningful Activities Survey (EMAS) is a well-validated 12-item self-report assessment of positive subjective experiences associated with day-to-day activities (i.e., meaningful occupations; $\alpha = .91$; Eakman, 2012, 2014; Goldberg, Brintnell, & Goldberg, 2002). The Academic Self-Efficacy Scale (ASE) is a psychometrically sound 8-item self-report assessment of *academic self-efficacy*, which refers to people's beliefs in their abilities to be successful within a university setting ($\alpha = .88$; Chemers et al., 2001). These tools were intended to provide measures of the protective psychosocial factors in resilience found in King's (2004) model consistent with belonging (PSQ), doing (EMAS), and self-understanding (ASE).

Health-Related Vulnerability Factors. The Posttraumatic Stress Disorder Checklist–Civilian Version is a well-validated 17-item self-report survey assessing the extent of problems and complaints associated with PTSD according to diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*; American Psychiatric Association, 1994) ($\alpha = .94$; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). A cutoff score of 50 was used to indicate a positive screen

Table 1. Demographic Characteristics of Veteran and Nonveteran Participants

Characteristic	Veterans, <i>n</i> (%) (<i>n</i> = 26)	Nonveterans, <i>n</i> (%) (<i>n</i> = 291)	Matched Nonveterans, <i>n</i> (%) (<i>n</i> = 19)
Age, yr, <i>M</i> ± <i>SD</i> (range)	31.6 ± 8.1 (24–57)	20.9 ± 3.0 (18–37)	27.8 ± 3.5 (24–37)
Gender			
Male	23 (88.5)	139 (47.8)	15 (78.9)
Female	3 (11.5)	152 (52.2)	4 (21.1)
Marital status			
Married	9 (34.6)	10 (3.4)	5 (26.3)
Not married	17 (65.4)	281 (96.6)	14 (73.7)
Race or ethnicity			
American Indian or Alaska Native	1 (3.8)	3 (1.0)	0 (0.0)
Asian	0 (0.0)	14 (4.8)	0 (0.0)
Black or African-American	1 (3.8)	3 (1.0)	0 (0.0)
Hispanic or Latino	4 (15.4)	25 (8.6)	1 (5.3)
Native Hawaiian or Pacific Islander	0 (0.0)	3 (1.0)	0 (0.0)
White	20 (76.9)	235 (80.8)	17 (89.5)
Other	0 (0.0)	8 (2.7)	1 (5.3)
Year of study			
Freshman	7 (26.9)	135 (46.4)	1 (5.3)
Sophomore	7 (26.9)	78 (26.8)	9 (47.4)
Junior	4 (15.4)	69 (23.7)	7 (36.8)
Senior	7 (26.9)	6 (2.1)	1 (5.3)
Not indicated	1 (3.8)	3 (1.0)	1 (5.3)
Campus living status			
On campus	0 (0.0)	139 (47.8)	0 (0.0)
Off campus	26 (100.0)	152 (52.2)	19 (100.0)
Cohabitation status			
Lives with others	20 (76.9)	251 (86.3)	13 (68.4)
Lives alone	6 (23.1)	40 (13.7)	6 (31.6)

Note. *M* = mean; *SD* = standard deviation.

for PTSD (Brewin, 2005). The Patient Health Questionnaire Depression Scale (PHQ-9) is a psychometrically sound nine-item self-report assessment of how often people experience symptoms associated with the nine *DSM-IV* criteria for depression ($\alpha = .86$; Kroenke, Spitzer, & Williams, 2001). A cutoff score of 11 was used to indicate the presence of depression (Manea, Gilbody, & McMillan, 2012). The Patient Health Questionnaire Somatic Symptoms Scale (PHQ-15) is a well-validated 15-item self-report assessment of somatic symptom severity; greater severity has been associated with substantial functional impairments and disability ($\alpha = .78$; Kroenke, Spitzer, & Williams, 2002). The item on menstrual cramps was eliminated because of the low number of women in the NSSV sample.

Data Analysis

To draw a subsample of nonveterans who were most comparable to the NSSV participants, we used propensity score matching. Propensity score matching is commonly used to examine treatment effects of nonrandomized treatments when background variables are associated with exposure to the treatment or the outcomes of interest. The propensity to be exposed to the treatment is estimated for the treatment and control units, and then treated units are matched to control units who had a similar propensity to be exposed to the treatment. In this study, we were not examining the effect of a treatment but rather used the propensity score approach to create a maximally comparable control group given the available data. We sought to reduce bias in estimates of mean group differences in the outcome variables by matching participants on available demographic variables associated with the study's psychosocial protective and health-related vulnerability factors (Austin, 2011).

A total of six regression models were run in a combined sample of NSSV and nonveteran participants, regressing each of the six outcomes on the full set of demographic variables found in Table 1. Using a forward entry method, age was found to predict each outcome, gender predicted somatic symptoms, cohabitation status predicted social support, and campus living status predicted posttraumatic stress ($p \leq .05$ for each regression coefficient). Age, gender, and cohabitation and campus living status were then used in establishing a matched sample.

A logistic regression algorithm using nearest neighbor matching with replacement was completed following an iterative process; full details on this process are available from the first author (Eakman). Balance in covariates between matched groups was achieved as assessed by a test of standardized mean differences ($|d|$ s); all covariate $|d|$ s

were ≤ 0.25 (Thoemmes, 2012). The relative multivariate imbalance measures before (0.716) and after (0.365) matching were compared and indicated improved covariate balance (Thoemmes, 2012). This matching process resulted in maintaining the 26 NSSV participants along with 19 nonveterans comparable in age, gender, and campus living and cohabitation status (right-hand column of Table 1). Weights were computed as part of the matching with replacement algorithm to account for some nonveterans serving as a match for more than one veteran (Austin, 2011; Stuart, 2010).

Weighted independent t tests were used to estimate differences in psychosocial protective and health-related vulnerability factors between groups. Cohen's d effect sizes were estimated as an indicator of the magnitude of difference in the outcome variables between groups. Effect sizes were interpreted as $0.20 = \textit{small}$, $0.50 = \textit{medium}$, $0.80 = \textit{large}$, and $1.30 = \textit{very large}$ (Maher, Markey, & Ebert-May, 2013). For propensity score matching, we used Propensity Score Matching for SPSS, Version 3.0.2 (Thoemmes, 2012). For zero-order correlations and other analyses, we used IBM SPSS Statistics (Version 22; IBM Corporation, Armonk, NY). The magnitude of zero-order correlations was interpreted as $<.20 = \textit{low}$, $.20-.30 = \textit{moderate}$, and $>.30 = \textit{large}$ (Hemphill, 2003).

Results

We hypothesized that post-9/11 veterans with service-related injuries would report lower levels of psychosocial protective factors in resilience and higher levels of health-related vulnerability factors in resilience than nonveteran students. Table 2 shows a consistent pattern of findings in support of this hypothesis; lower levels of social support, meaningful occupation, and academic self-efficacy in the NSSV participants were accompanied by substantially higher levels of PTSD, depression, and somatic symptoms compared with nonveterans. In terms of the psychosocial outcomes, effect sizes ranged from medium to large, whereas differences in health-related outcomes ranged from large to very large, with posttraumatic stress displaying the greatest difference among the outcome variables ($d = 1.56$). As expected, the proportion of NSSV participants reporting mTBI ($n = 20$) was significantly greater than the matched nonveteran sample ($n = 4$), $\chi^2 (n = 45) = 13.77, p < .001$.

Of the NSSV participants, 19 (73.1%) screened positive for PTSD, 18 (69.2%) screened positive for depression, and 17 (65.4%) screened positive for both PTSD and depression. Of the matched nonveteran participants, 3 (15.8%) screened positive for PTSD,

Table 2. Differences in Psychosocial and Health-Related Resilience Factors Between Veteran ($n = 26$) and Matched Nonveteran ($n = 19$) Participants

Variable	Veterans, M (SD)	Matched Nonveterans, ^a M (SD)	t	p	Cohen's d
Psychosocial protective factors					
Belonging—Postdeployment Support Questionnaire score	20.23 (6.31)	25.08 (4.01)	-2.94	.005	-0.92
Doing—Engagement in Meaningful Activities Survey score	27.88 (8.55)	33.83 (6.99)	-2.48	.017	-0.76
Self-understanding—Academic Self-Efficacy Scale score	4.34 (1.31)	4.92 (1.03)	-1.59	.120	-0.49
Health-related vulnerability factors					
PTSD—PTSD Checklist—Civilian Version score	53.96 (17.55)	30.98 (11.31)	5.33 ^b	<.001	1.56
Depression—PHQ-9 score	13.08 (6.81)	6.33 (3.66)	4.28 ^b	<.001	1.24
Somatic symptoms—PHQ-15 score	13.23 (6.26)	6.29 (3.39)	4.78 ^b	<.001	1.38

Note. M = mean; PHQ = Patient Health Questionnaire; PTSD = posttraumatic stress disorder; SD = standard deviation.

^aWeighted means, derived from the propensity score matching process. ^bEqual variances not assumed; groups were matched on age, gender, and campus living and cohabitation status.

5 (26.3%) screened positive for depression, and 3 (15.8%) screened positive for both PTSD and depression. Table 3 provides the zero-order correlations among and between the psychosocial and health-related outcomes. As hypothesized, the psychosocial outcomes were consistently negatively associated with the health-related outcomes, displaying large inverse correlations in all cases except for EMAS with PTSD, which was medium.

Discussion

In this study, we tested a novel model of protective and vulnerability factors in resilience for post-9/11 veterans in higher education. Veterans with service-related trauma reported deficits in psychosocial protective factors along with substantially greater health-related vulnerabilities compared with a matched sample of nonveterans. This finding is concerning given that the postsecondary education context is a critical turning point in veterans' lives. The college setting offers opportunities for promoting resilience and positive developmental trajectories after military service. However, positive changes require the adequate availability of psychosocial protective factors to promote resilience and offset the negative reactions (e.g., PTSD) that can follow exposure to traumatic events (Rutter, 2012). Furthermore, negative associations among

the psychosocial and health-related resilience factors offer evidence consistent with recent initiatives that seek to foster psychosocial protective factors in student veterans with PTSD and depression (Smith-Osborne, 2012a).

The most substantive difference between the matched groups in the current study was PTSD symptoms. This finding is concerning given that mental health problems such as PTSD contribute to difficulties with organization skills, homework completion, and class attendance, which have been associated with lower examination scores and grade point averages in nonveteran and veteran students (Bryan, Bryan, Hinkson, Bichrest, & Ahern, 2014; Hysenbegasi, Hass, & Rowland, 2005; Markoulakis & Kirsh, 2013). The effect size estimate of PTSD severity in our study was very large compared with the small effect size (.37) found by Barry, Whiteman, and Wadsworth (2012) between veterans and nonveterans in college. Moreover, two-thirds of the NSSV participants concurrently screened positive for PTSD and depression, reflecting the unique mental health challenges of the veterans with service-related trauma who are referred to our supported education program.

Of the psychosocial protective factors, social support has been identified as a critical resource in the development of resilience and as a key factor promoting campus integration in student veterans (Whiteman et al., 2013). Present findings, however, indicate a large gap in social

Table 3. Zero-Order Correlations Between Psychosocial and Health-Related Resilience Factors in a Combined Sample of Veteran and Matched Nonveteran Participants ($N = 45$)

Variable	1	2	3	4	5	6
1. Postdeployment Support Questionnaire (belonging)	—					
2. Engagement in Meaningful Activities Survey (doing)	.43**	—				
3. Academic Self-Efficacy Scale (self-understanding)	.40**	.33*	—			
4. PTSD Checklist—Civilian Version (PTSD)	-.56**	-.27 [†]	-.37*	—		
5. PHQ-9 (depression)	-.63**	-.47**	-.41**	.79**	—	
6. PHQ-15 (somatic symptoms)	-.44**	-.36*	-.31*	.61**	.67**	—

Note. PTSD = posttraumatic stress disorder; PHQ = Patient Health Questionnaire.

* $p < .05$. ** $p < .01$. [†] $p = .07$.

supports between veterans with service-related injuries and nonveterans. In addition, the associations found between social support and PTSD and depression indicate that these mental health issues may serve as impediments to maintaining and garnering social support and therefore likely play a role in hindering the development of this important protective factor in resilience (King, Taft, King, Hammond, & Stone, 2006).

Emerging evidence indicates that the occupational performance challenges of post-9/11 veterans in college are multifaceted (i.e., not limited to academics) and appear to be explained, in part, by the presence of mTBI, PTSD, and depression symptoms (Plach & Sells, 2013). Our findings indicate significantly greater levels of somatic symptoms and functional limitations in the NSSV participants than in matched nonveterans, which can negatively influence occupational performance (Hoge, Terhakopian, Castro, Messer, & Engel, 2007). Meaningful occupations serve to meet basic human needs, contribute to positive developmental trajectories, and foster resilience, whereas failure to meet these needs can lead to poor physical and mental health outcomes (King, 2004; Wilcock, 2006; Yerxa, 1998). Our findings suggest that veterans with service-related trauma may not experience the full richness of meaningful occupation, such as satisfaction arising from competent task performance, pleasure and enjoyment found in personal relationships and creative expression, or the sense of independence and control found when people express their personal beliefs and values through effective occupational performance (Eakman, 2015; Hammell, 2009; Hasselkus, 2011).

Academic self-efficacy was lower in the NSSV sample than in matched nonveterans, displaying a moderate effect size, although this difference was not statistically significant. This finding contrasts with that of a study that found no relation between academic self-efficacy and PTSD in a sample of combat veterans (Barry et al., 2012). The mean level of PTSD in our veteran sample was more than a standard deviation higher than in the Barry et al. (2012) study and therefore may be a factor in the negative relation between academic self-efficacy and PTSD found in the current study. PTSD symptoms in student veterans may serve a role in degrading self-efficacy beliefs and limiting occupational performance abilities. Such an understanding has been suggested, highlighting the role self-efficacy beliefs serve across theories of resilience (Glynn, Drebing, & Penk, 2009). Moreover, therapeutic approaches aimed at enhancing self-efficacy beliefs and their underlying occupational performance capacities may present a reasonable avenue for addressing the negative consequences of mental health problems such as PTSD within student veterans.

Occupational therapy has a responsibility to support veterans with service-related trauma in their transition back to their communities (AOTA, 2009; Tomar & Stoffel, 2014). To address this charge, occupational therapy interventions with student veterans should target the development of protective factors in resilience such as those suggested within the current study. For example, interventions to remediate the academically related occupational performance challenges of post-9/11 veterans could address aspects of doing and self-understanding. Given the challenges associated with mTBI, therapeutic approaches could involve remediation or compensation, or both, for related vision, cognitive, and awareness limitations that affect everyday tasks to support the student role and related life roles (Cogan, 2014; Radomski, Davidson, Voydetich, & Erickson, 2009).

Supported education models, which have resulted in increased levels of enrollment and participation for people with serious mental illnesses, also should be considered as a means through which occupational therapy services could be delivered in college settings by targeting vulnerability factors in resilience such as depression and PTSD (Arbesman & Logsdon, 2011). Supported education programming that integrates a psychosocial resilience perspective has recently been advocated for veterans with PTSD and related mental health concerns in postsecondary environments (Smith-Osborne, 2012a). This model includes a multidisciplinary collaboration approach integrating rehabilitation service providers and mental health counselors. As with supported education models, occupational therapy intervention adopting a resilience perspective should address fostering family and peer support systems related to belonging, enabling participation in meaningful occupations related to doing, and developing occupational performance skills supporting achievement in academics and valued life roles related to self-efficacy. Symptom management interventions could offer a means for addressing the negative impacts of mental health difficulties such as PTSD.

Multidisciplinary cooperation is essential in developing effective supported education programming, and such service coordination remains desperately needed to address the complex constellation of issues faced by veterans with service-related injuries in college (McBain et al., 2012). In addition to direct service delivery, occupational therapy practitioners could spearhead collaborative relationship building among campus disability and learning support services, mental health providers, educators, and Department of Veterans Affairs officials, as is occurring in the NSSV program.

Limitations and Directions for Future Research

One limitation of the current study is that we did not assess indicators of postsecondary success such as academic persistence and grade point average. Lower levels of psychosocial protective factors and higher levels of health-related vulnerability factors found in the current study have been shown to predict poor social integration and limit academic achievement in student veterans. Future research should adopt indicators of postsecondary success to more directly determine the role these resilience factors play in student veterans with service-related injuries.

The availability of demographic variables related to postsecondary retention and success (e.g., socioeconomic status, first-generation student status) was limited in the current study, and future researchers should consider adopting such controls. However, by using propensity score matching, we were able to create a group of nonveteran students who were comparable to the veterans in terms of age, gender, and cohabitation and campus living status, thereby reducing bias in estimates of between-group differences in the psychosocial and health-related resilience factors (Austin, 2011).

This study used a validated self-report assessment of concussion to operationally define mTBI, and we were unable to establish a level of neurological insult associated with the reported concussive events. Future studies could benefit from adopting comprehensive screening protocols to more accurately establish the presence of mTBI (Brenner et al., 2009; Wilk et al., 2012).

Suggestions of causal relationships among the psychosocial and health-related resilience factors in this study could not be verified given the study's design. Future research should adopt longitudinal methods that can detect changes in association among these variables over time. In circumstances in which random assignment of participants to treatment and control conditions is not feasible, propensity score methods capable of mimicking the characteristics of randomized studies should be considered (Austin, 2011).

Implications for Occupational Therapy Practice

The findings of this study have the following implications for occupational therapy practice:

- Veterans with service-related injuries seeking postsecondary degrees may be at substantial risk of poor campus integration and limited academic achievement.
- Occupational therapy is uniquely positioned to address this constellation of protective and vulnerability

factors in resilience, thereby positively influencing the integration of veterans with service-related injuries into their local communities and college campuses.

- Occupational therapy practice could address symptom remediation and compensation for occupational performance challenges and contribute to a multidisciplinary supported education team in postsecondary education environments.

Conclusion

Using a matched-participants design with propensity scores, lower levels of psychosocial protective factors accompanied by higher levels of health-related vulnerability factors in resilience were found in post-9/11 veterans with service-related injuries compared with a matched nonveteran sample. Occupational therapy is uniquely suited to address this constellation of protective and vulnerability factors in resilience, thereby enhancing academic achievement and community integration for this population. ▲

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