

# Operation Enduring Freedom and Operation Iraqi Freedom Veterans with amputation: An exploration of resilience, employment and individual characteristics

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## Abstract.

**BACKGROUND:** Since 2002 approximately 1,700 US military service members have experienced trauma related amputations from injuries incurred in Afghanistan and Iraq (Fisher, 2015).

**OBJECTIVE:** This study explores the variables of resilience, individual characteristics, and employment status of a sample of these Veterans who served in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) and sustained an amputation.

**METHODS:** Veterans identified through the VA Corporate Data Warehouse (N = 165) completed a survey on their experiences following amputation.

**RESULTS:** Results indicate that several variables were significantly related to resilience, to include employment status, pain status, and prosthetic use.

**CONCLUSION:** Recommendations for future research and practice are provided.

Keywords: Veterans, amputation, employment

## 1. Introduction

The U.S. has deployed more than 2.7 million Americans to Iraq and Afghanistan since 2001, and over half of these have been deployed more than once (Hautzinger et al., 2015). Due to medical advancements, as well as the improvement of protective gear, over 90% of injured OEF/OIF military

personnel have survived injuries that in prior conflicts would have been fatal (Lew et al., 2007; Hoge et al., 2006; IOM, 2013). Approximately 1,700 military service members have experienced trauma related amputation since 2002 due to combat exposure in Afghanistan and Iraq (Fischer, 2015). The majority of these involve lower extremity but may also include upper extremity and/or multiple limb amputations at rates higher than the civilian population (Krueger, Wenke, & Ficke, 2012).

OEF/OIF Veterans are also experiencing high rates of post-traumatic stress disorder (PTSD), depression, and substance abuse (Seal, 2007; Dursa, Reinhard,

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Barth, & Schneiderman, 2014). Additionally, a military culture to “man up” during difficulty contributes to the psychological functioning of service members, with residual effects experienced by Veterans. Furthermore, Veterans are committing suicide at higher rates than any other previous conflict (Tarabay, 2010). The complex interplay of these injuries and mental health conditions will likely have a prolonged impact upon the psychosocial, medical, and vocational experiences of OEF/OIF veterans, their families, and the communities in which they will live (Frain, Bishop, & Bethel, 2010).

A report from the Office of Internal Medicine (2013) cites the alleviation of health, economic, and social issues among Veterans as a significant and urgent need. Resilience and overall well-being have been identified by the U.S. Department of Defense (DoD) as a skill development need for military personnel and Veterans. Well-being Theory is framed within positive psychology and focuses upon the science of flourishing to include positive emotions, engagement, relationships, meaning and achievement (Seligman & Csikszentmihalyi, 2000). One aspect of flourishing is an individual’s resilience capacity (Huppert & So, 2013). Resilience is commonly described as the ability of an individual to “steer through and bounce back” from challenging life events, including trauma. Resilience is comprised of several abilities: emotion regulation, impulse control, empathy, optimism, causal analysis, self-efficacy, and social support seeking (Reivich & Shatte, 2002). Research demonstrates that resilience can be learned (Reivich & Shatte, 2002; Luthans et al., 2006).

Two convergent lines in the extant literature suggest that resilience is key to successful repatriation of our combat soldiers. First, the essence of the concept of resilience is overcoming challenges – both the kind of acute trauma that occurs in battle situations as well as the chronic challenges experienced by returning combat Veterans. Second, there is evidence that resilient individuals are less likely to incur PTSD and similar mental health conditions (Wisco et al., 2014; Tsai, Harpaz-Rotem, Pietrzak, & Southwick, 2012; Bonanno, 2004; Feder et al., 2009). The findings of a study of OEF/OIF Veterans suggests that interventions designed to bolster resilience and post-deployment support may help protect against traumatic stress and depressive symptoms, and improve psychosocial functioning in Veterans (Pietrzak et al., 2010). In particular, Veterans who experience disability may benefit from the development of resilience skills to promote adaptive

responses to the challenges presented (Hawley et al., 2016). However, the exploration of resilience among Veterans who experience amputation is limited to date.

Another aspect relevant to flourishing is employment. Individuals who have career wellbeing are more than twice as likely to be doing well in their lives overall (Gallup, 2010). Employment also facilitates social and community connections. Clark, Deiner, Gergellis & Lucas (2008) found that the long term impact of sustained unemployment (more than 1 year) may be the only major life event from which people do not fully recover within five years, this holds particularly true for men. Employment is a primary feature of our self-identity and self-efficacy. Employment in which individuals are actively engaged has been found to improve not only mental, but physical health as well as performance outcomes (Agrawal & Harter, 2009; Harter, Canedy, & Stone, 2008; Luthans, Norman, Avolio, & Avey, 2008; Luthans, Youssef-Morgan, 2017). Thus, psychological capital, including resilience, is a key feature of individual health as well as positive organizational behavior.

The purpose of this study is to explore the resilience of OEF/OIF Veterans with amputation, particularly as it relates to individual characteristics and employment. The following research questions are addressed in this study:

- 1) What is the resilience of OEF/OIF Veterans with amputation?
- 2) What is the relationship between employment and resilience?
- 3) What factors and individual characteristics predict resilience?

## 2. Methodology

The researchers completed both VCU and Veterans Administration IRB approval processes. Upon approval from both institutions, the researchers implemented data collection procedures, as follows.

### 2.1. Sample

The VA Corporate Data Warehouse was used to generate a list of Veterans to contact to complete the questionnaire. Names were identified in the search using ICD-9 diagnostic codes for major amputation levels (partial foot or partial hand amputation(s) were excluded), OEF/OIF service, and our defined age (18–55 years). The Veterans could have one or

more major amputations of the upper or lower limbs. The search yielded 870 mailing addresses, of which 154 letters were returned as undeliverable (i.e., the Veteran was no longer at the address and no valid forwarding address was listed). After reviewing the inclusion criteria and confirming contact information, approximately 716 veterans received the survey.

## 2.2. *Survey instrument*

To measure resilience the 10-item CD-RISC was used. This abbreviated version is based upon the 25-item CD-RISC developed by Connor and Davidson. The 10-item CD-RISC was developed by Campbell-Sills & Stein and consists of questions 1, 4, 6, 7, 8, 11, 14, 16, 17, and 19 from the original 25-item scale, with a mean range of 0–40. The 10-item CD-RISC retains good reliability with a Cronbach Alpha of .85 (Campbell-Sills & Stein, 2007). Initial results indicated a mean score of 31.8 for a General Population (SD 5.4) (Campbell-Sills, Forde, & Stein, 2009). Subsequent studies with a General Adult Population sample indicate a 10-item CD-RISC mean score range of 29 to 33.5 (Connor-Davidson, 2017). Additional studies with trauma and disability populations reflect mean score ranges of 20.5–31.3 (Connor-Davidson, 2017). For this current study, individuals who completed 7 or more items of the 10-item score had any missing items imputed using the mean score of the items completed.

Participant demographics, and individual characteristics including: type of amputation, items related to pain, prosthetic use, impact of amputation on quality of life including transportation, community activities and ability to work, were also collected.

Two rounds of data collection occurred to increase participant response rate. The initial data collection was web-based, while the second used both web-based recruitment as well as the mailing of survey hardcopies as recommended by Dillman (2009). The population was provided a hard copy of the survey via U.S. postal service including a postage paid return envelope. This mailing also included a letter directing individuals to a password protected website should he or she prefer to complete the survey online. This was followed by two rounds of follow-up reminder postcards, sent approximately 2 weeks apart. Web based surveys are notorious for low response rates, typically 11% less than mail and phone surveys, with one study reporting a 2% response rate (Archer, 2008; Petchenik & Wiseman, 2011).

## 2.3. *Measures*

In this survey, 165 Veterans completed the Employment and Life Experience of Veterans with Amputation survey. Demographic variables included age (18–30, 31–35, 36–45, 46+ years), race (White/Caucasian, Non-White), level of education (college, high school/technical training), marital status (married/partnered, widowed/divorced/separated, single), children (Yes, No), and employment (employed, unemployed, retired). Participants indicating self-employment were coded as employed and those identifying as seeking employment were considered unemployed. Participants that did not specify whether they were employed or unemployed were treated as missing.

Amputation related quality of life measures included an indication of pain other than in the affected limb (back, shoulder, other leg), difficulty participating in social and community activities, overall situation as an amputee, and per day spent wearing a prosthesis. These items were categorized into 3 levels: No/slight trouble, Moderate trouble, or Considerable/great deal of trouble.

Questions 2 and 7 included overall, ability to work, and quality of life. Overall and ability to work was converted to a 3-level ordinal variable (great/considerable, moderate, slight/no trouble) from its original (great, considerable, moderate, slight, no trouble). Quality of life was converted to a 3-level ordinal variable (great/considerable, moderate, slight/no reduction) from its original (great, considerable, moderate, slight, no reduction). Question 10 was converted to a 3-level ordinal variable (extremely good/good, moderate, poor/extremely poor) from its original (extremely good, good, moderate, poor, extremely poor). Question 12 was converted to a 2-level binary variable (greater or equal to 7 hours, less than 7 hours) from its original (0, 1–3, 4–6, 7–9, 10–12, 13–15, more than 15 hours).

Amputation characteristics considered were the time from injury (in years), amputation group (bilateral, above knee, below knee amputation, other injuries), first altered amputation group (lower extremity, other), second altered amputation group (bilateral, above/below knee amputation, other). Substance use was collected via self-report (Yes, No).

For the amputation group, participants who obtained an above knee aka transfemoral or a hip disarticulation were above knee amputees, below knee aka transtibial were below knee amputees, and partial foot excluding toe(s) only, hand excluding partial

finger(s) only, below elbow aka transradial, above elbow aka transhumeral, and shoulder disarticulation were other injuries. Participants who obtained either an above or below knee amputation on both left and right sides were bilateral amputees. The first altered amputation group consists of two levels, lower extremity (bilateral, above knee, below knee), and other injuries. The second altered amputation group consists of three levels, bilateral, above/below knee amputation, and other.

#### 2.4. Statistical methods

Means and standard deviations (SD) for CD-RISC scores were reported for each of the 10 CD-RISC items as well as the total score. Additionally, means and standard deviations for total CD-RISC scores were reported separately for each of the demographic, amputation related quality of life, and employment items. Unadjusted and adjusted models were used to predict total CD-RISC scores using a linear regression model. All demographic, amputation related quality of life indicators, and employment survey questions available were used in the model. Backward elimination in stepwise regression was used for the adjusted model. Differences and standard errors were reported for both unadjusted and adjusted models. All tests were performed at the 0.05 level with the backward elimination threshold set at  $P = 0.15$ .

### 3. Results

A total of 165 Veterans responded for a response rate of 23%. Of these, 73.7% ( $n = 121$ ) were completed and returned via U.S. Postal Service and 26.7% ( $n = 44$ ) were completed via the online format. Although this is less than the desired 30% for standard survey research, it is actually more reflective of a typical online survey response (Dillman, et al., 2013). Coupled with the probability that some Veterans may also be experiencing research fatigue, these aspects may account for the lower response rate. Of these respondents, 91.5% reported that their amputation was service connected. The majority experienced Lower Extremity amputation with 45.3% below the knee and 37.6% above the knee ( $n = 97$ ). Interestingly 48 individuals did not respond to this item, therefore 117 participants were used for this analysis. Many Veterans who experience amputation also experience secondary or co-occurring conditions as a result of their injury. Table 1 reports co-occurring conditions.

Table 1  
Co-occurring conditions

| Disability/Condition                           | Frequency* |
|------------------------------------------------|------------|
| Traumatic Brain Injury                         | 60.2%      |
| Post Traumatic Stress Disorder                 | 57.1%      |
| Musculoskeletal injury (other than amputation) | 36.6%      |
| Hearing                                        | 51.6%      |
| Vision                                         | 24.8%      |
| Spinal Cord Injury                             | 9.9%       |
| Depression                                     | 34.2%      |
| Anxiety                                        | 44.7%      |
| Substance Use                                  | 6.2%       |
| Burn                                           | 14.3%      |
| None                                           | 7.5%       |

\*Respondents checked all that applied. Amount will exceed 100%.

In terms of employment status, 151 (92.1%) did not return to active duty with 118 (79.2%) stating that they could not do so due to their disability. When responding to a binary item (employed/unemployed), 61 (39.3%) reported being employed, with 51 indicating full time employment. The largest employment sector of this sample were individuals ( $N = 20$ ) working in the Government. Ninety-eight (60.1%) indicated that they were unemployed. Parsing this further, of the unemployed category, 35% identified as being unemployed, with approximately 26% identifying as being retired.

The 10-item CD-RISC mean score for this sample of Veterans who experience amputation was 28.2, within mean score ranges identified in earlier research of traumatized populations (20 to 31). See Table 2.

Age, race, amputation group (above or below knee, bilateral etc.), and education were not found to be related to resilience at the 0.05 level. Variables with significance include employment ( $P = 0.008$ ); pain (Great vs Moderate  $P = <0.001$ ) (Great vs Slight  $P = 0.002$ ); Difficulties participating in social/community activities (Great vs Moderate & Great vs Slight  $P = <0.001$ ); perception of overall situation as an amputee (Average vs Good  $P = <0.001$ ) (Average vs Poor  $P = <0.001$ ); (Good vs Poor  $P = <0.001$ ), and duration of prosthetic use (equal to or less than 7 hours vs greater than 7 hours  $P = 0.007$ ).

Interestingly, and counter to prior resilience research on Veterans (Pietrzak & Southwick, 2011), Veterans who are Single (29.5) reported a slightly higher level of resilience than those who are Married/Partnered (28.4). However, this difference did not meet statistical significance. With a much higher mean than those who are Widowed, Divorced or Separated who reported the lowest level (25.8). See

Table 2  
Average and total resilience for CD-RISC items

| CD-RISC Item Content                                                                                     | Mean $\pm$ SD  |
|----------------------------------------------------------------------------------------------------------|----------------|
| Able to adapt when changes occur <sup>1</sup>                                                            | 2.9 $\pm$ 0.9  |
| Can deal with whatever comes in the way <sup>2</sup>                                                     | 2.9 $\pm$ 0.9  |
| Trying to see the humorous side of things when I am faced with problems <sup>1</sup>                     | 2.9 $\pm$ 1.0  |
| Having to cope with stress can make me stronger <sup>1</sup>                                             | 2.6 $\pm$ 1.1  |
| Tend to bounce back after illness, injury, or other hardships <sup>1</sup>                               | 2.9 $\pm$ 1.0  |
| Believing in achieving goals, even if there are obstacles <sup>1</sup>                                   | 2.9 $\pm$ 0.9  |
| Stay focused and think clearly under pressure <sup>3</sup>                                               | 2.7 $\pm$ 1.0  |
| Not easily encouraged by failure <sup>4</sup>                                                            | 2.6 $\pm$ 1.0  |
| Thinking of oneself as a strong person when dealing with life's challenges and difficulties <sup>1</sup> | 3.1 $\pm$ 0.9  |
| Able to handle unpleasant or painful feelings like sadness, fear, and anger <sup>2</sup>                 | 2.7 $\pm$ 1.1  |
| Total score                                                                                              | 28.2 $\pm$ 7.8 |

<sup>1</sup>N = 161, <sup>2</sup>N = 162, <sup>3</sup>N = 160, <sup>4</sup>N = 159.

Table 3 for a summary of demographics, characteristics and additional survey questions.

Variables predicting resilience include employment, pain in both the residual limb and non-residual limb, difficulty participating in social and community activities and summary of overall situation as an amputee (See Table 4). Although not enough evidence existed at the 0.05 level to detect a difference ( $P=0.061$ ), Veterans with employment had a nominally higher resilience compared to those without employment and those who were retired. Veterans who participated in social activities and that rated their overall situation higher had better resilience than those who did not participate in social activities and those with worse overall situations.

Lastly, of those Veterans who were employed, 8 (13%) responded they disliked their job, 43 (69%) responded they liked their job, and the remaining 11 (18%) neither disliked or liked their job. The mean CD-RISC score varied amongst these groups ( $P=0.023$ ), with those disliking their job having a lower resilience score than both those who were neutral or liked their job (24.4 (SD = 7.8), 32.1 (SD = 7.4), 31.2 (SD = 6.1), respectfully. Additionally, 44 (72%) indicated that the job they were employed used their skills, strengths, and training, with these subjects having a nominally higher mean CD-RISC score (31.5 (SD = 6.1)) than those that indicated they were not using their skills strengths, and training (27.6 SD = 8.2) ( $P=0.051$ ).

#### 4. Discussion and implications for practice

Veterans experiencing less pain, having more prosthetic usage, employment, social and community activities and higher perception of overall situation as an amputee reported higher levels of resilience.

Exploring in depth the variability of mean scores across items, if Veterans reported a slight impact across characteristics, mean scores actually are within the range of a general population (i.e. 30.4 to 32.6 mean score for participants in this study in comparison to a general population range of 29–33.5). This trend is replicated with the item “Summary of overall situation as an amputee” (i.e. from Poor 22.4 to Good 32.6).

Characteristics typically associated with the experience of amputation do appear to impact resilience as well as employment and life. Although it should be noted that the sample mean score of 28 falls just slightly lower than the general population. If the ability to work was affected by pain (Slight trouble 31.8 mean score to Great trouble 24 mean score); if pain affected quality of life (Slight reduction 31.9 to Great reduction 23.7) and if individuals experienced additional pain such as back, shoulder, other limb (Slight trouble 30.4 to Great trouble 25.4) the mean scores of resilience decreased notably by approximately 5 to 8 points. Overall, if individuals reported “Great Trouble” or “Great Reduction” across items the mean score of 20.4–25.4 represents a significant decrease in resilience. Darter et al. (unpublished) conducted a literature review and reported that almost all Veterans experience some type of amputation related pain that could influence return to work (RTW) and overall functionality. Early assessments of physical functioning and pain are significant predictors of later RTW (McKenzie, et.al., 2006).

Those Veterans using a prosthesis for 7 or more hours indicated higher levels of resilience. This is most probably due to a likelihood of increased functionality, mobility, involvement and presence in society. Schoppen (2001) found that daily use was higher among employed versus unemployed individuals, however this was not a predictive variable of

Table 3  
Summary of CD-RISC scores by various demographics, individual characteristics, and perceived function

| Characteristic                                                                          | Levels                         | N (%)     | CD-RISC    |
|-----------------------------------------------------------------------------------------|--------------------------------|-----------|------------|
| <i>Demographics</i>                                                                     |                                |           |            |
| Age                                                                                     | 18–30 years                    | 38 (24%)  | 28.4 (6.9) |
|                                                                                         | 31–35 years                    | 56 (35%)  | 28.9 (7.5) |
|                                                                                         | 36–45 years                    | 48 (30%)  | 28.9 (8.1) |
|                                                                                         | 46+ years                      | 19 (11%)  | 23.9 (8.8) |
| Employment                                                                              | Employed                       | 62 (39%)  | 30.3 (7.0) |
|                                                                                         | Unemployed                     | 56 (35%)  | 26.8 (8.4) |
|                                                                                         | Retired                        | 42 (26%)  | 27.1 (7.6) |
| Race                                                                                    | White                          | 128 (82%) | 28.7 (7.2) |
|                                                                                         | Non-White                      | 29 (18%)  | 27.2 (9.7) |
| Amputation Group                                                                        | Bilateral                      | 51 (31%)  | 29.5 (6.7) |
|                                                                                         | Above Knee                     | 30 (19%)  | 27.3 (9.2) |
|                                                                                         | Below Knee                     | 54 (33%)  | 26.8 (8.0) |
|                                                                                         | Other                          | 27 (17%)  | 29.6 (7.5) |
| Amputation Group (Altered 1)                                                            | Bilateral                      | 51 (31%)  | 29.5 (6.7) |
|                                                                                         | Above/Below Knee               | 84 (52%)  | 27.0 (8.4) |
|                                                                                         | Other                          | 27 (17%)  | 29.6 (7.5) |
| Amputation Group (Altered 2)                                                            | Lower Extremity                | 135 (83%) | 27.9 (7.8) |
|                                                                                         | Other                          | 27 (17%)  | 29.6 (7.5) |
| Substance use                                                                           | Yes                            | 10 (6%)   | 25.6 (7.4) |
|                                                                                         | No                             | 154 (94%) | 28.4 (7.8) |
| Education                                                                               | College degree                 | 77 (48%)  | 28.5 (8.2) |
|                                                                                         | High school/Technical training | 84 (52%)  | 28.0 (7.5) |
| Marital Status                                                                          | Married/Partnered              | 108 (67%) | 28.4 (8.0) |
|                                                                                         | Single                         | 28 (17%)  | 29.7 (5.8) |
|                                                                                         | Widowed/Divorced/Separated     | 25 (16%)  | 25.8 (8.6) |
|                                                                                         |                                |           |            |
| Time from injury                                                                        | 2–5 years                      | 38 (23%)  | 28.6 (7.1) |
|                                                                                         | 6–10 years                     | 75 (46%)  | 27.7 (8.2) |
|                                                                                         | >10 years                      | 49 (30%)  | 28.7 (7.7) |
| Experienced other pain (back, shoulder, other leg)?                                     | Slight trouble                 | 31 (19%)  | 30.4 (5.9) |
|                                                                                         | Moderate Trouble               | 59 (37%)  | 30.4 (7.2) |
|                                                                                         | Great trouble                  | 71 (44%)  | 25.4 (8.2) |
| Other pain affected ability to work?                                                    | Slight trouble                 | 61 (38%)  | 31.8 (6.0) |
|                                                                                         | Moderate Trouble               | 38 (24%)  | 28.9 (7.4) |
|                                                                                         | Great trouble                  | 62 (38%)  | 24.0 (7.7) |
| Other pain affected quality of life?                                                    | Slight reduction               | 65 (40%)  | 31.9 (6.1) |
|                                                                                         | Moderate reduction             | 40 (25%)  | 28.6 (6.7) |
|                                                                                         | Great reduction                | 57 (35%)  | 23.7 (8.0) |
| Difficulty participating in social and community activities?                            | Slight trouble                 | 82 (54%)  | 31.5 (6.7) |
|                                                                                         | Moderate Trouble               | 44 (27%)  | 27.5 (6.6) |
|                                                                                         | Great trouble                  | 36 (19%)  | 21.5 (7.2) |
| Difficulties participating in social and community activities affected ability to work? | Slight trouble                 | 106 (67%) | 30.4 (7.2) |
|                                                                                         | Moderate Trouble               | 30 (19%)  | 26.4 (6.4) |
|                                                                                         | Great trouble                  | 23 (14%)  | 20.4 (7.2) |
| Difficulties participating in social and community activities affected quality of life? | Slight reduction               | 88 (55%)  | 30.6 (7.6) |
|                                                                                         | Moderate reduction             | 40 (25%)  | 27.2 (5.9) |
|                                                                                         | Great reduction                | 33 (20%)  | 22.8 (7.5) |
| Summary of your overall situation as an amputee?                                        | Poor                           | 36 (22%)  | 22.4 (8.2) |
|                                                                                         | Average                        | 69 (43%)  | 27.7 (6.5) |
|                                                                                         | Good                           | 56 (35%)  | 32.6 (6.5) |
| On average, how many hours per day do you wear your prosthesis?                         | ≥7 hours                       | 108 (68%) | 29.4 (7.4) |
|                                                                                         | <7 hours                       | 52 (32%)  | 25.8 (8.2) |

Return to Work. Therefore, prosthetic use, including fit, physical and psychological comfort is paramount to facilitate not only physical wellbeing but that of social/community inclusion. Prosthetic use, particularly given technological advances enhances a sense of positive identity and self as well as increased

integration and inclusion. A preliminary examination of the relationship between pain and device use found that those whose device use and phantom pain severity were inversely related, and with greater device use were more likely to remain employed (Whyte, 2002).

Table 4  
Adjusted analysis predicting CD-RISC

| Characteristic                                               | Comparison               | Diff (SE)    | <i>p</i> <sup>a</sup> | <i>p</i> <sup>b</sup> |
|--------------------------------------------------------------|--------------------------|--------------|-----------------------|-----------------------|
| Employment                                                   | Employed vs. Not Working | 2.19 (1.23)  | 0.077                 | 0.061                 |
|                                                              | Employed vs. Retired     | 3.04 (1.37)  | 0.028                 |                       |
|                                                              | Not Working vs. Retired  | 0.85 (1.39)  | 0.540                 |                       |
| Pain                                                         | Great vs. Moderate       | -2.45 (1.27) | 0.056                 | 0.081                 |
|                                                              | Great vs. Slight         | 0.33 (1.66)  | 0.845                 |                       |
|                                                              | Moderate vs. Slight      | 2.77 (1.58)  | 0.082                 |                       |
| Other pain (non-residual limb)                               | Great vs. Moderate       | 2.21 (1.36)  | 0.107                 | 0.024                 |
|                                                              | Great vs. Slight         | -2.03 (1.62) | 0.214                 |                       |
|                                                              | Moderate vs. Slight      | -4.24 (1.56) | 0.008                 |                       |
| Difficulty participating in social and community activities? | Great vs. Moderate       | -4.79 (1.63) | 0.004                 | <0.001                |
|                                                              | Great vs. Slight         | -7.63 (1.64) | <0.001                |                       |
|                                                              | Moderate vs. Slight      | -2.84 (1.35) | 0.037                 |                       |
| Summary of your overall situation as an amputee?             | Average vs. Good         | 1.53 (1.31)  | 0.246                 | 0.010                 |
|                                                              | Average vs. Poor         | 3.53 (1.50)  | 0.021                 |                       |
|                                                              | Good vs. Poor            | 5.06 (1.64)  | 0.003                 |                       |

<sup>a</sup>*p*-value corresponding to each pairwise comparison; <sup>b</sup>*p*-value corresponding to omnibus test of no pairwise differences for each characteristic

Given the importance of employment to one's identity and sense of meaning, as well as the vicarious benefits associated with relational opportunities found in most employment settings, it is not unexpected that being employed would impact resilience. In this sample 62 participants were employed (30.3 mean), 56 unemployed (26.8) and 42 retired (27.1). Luthans et al. (2006, 2008) have noted the importance of psychological capital, including resilience and positive employment performance outcomes. Interpersonal or relational activities impact the physical and psychological health of an individual. They may also contribute to a sense of meaning and purpose. The intersection of career, social and community aspects is well documented (Rath & Harter, 2010).

This study is an initial assessment of amputation, resilience and employment of OEF/OIF Veterans. Given the small sample size, further research expanding the population to a larger and more representative sample is warranted. Finally, data obtained from this study were based on Veteran self-report. Future studies would benefit from using diagnostic measures and other corroborating evidence from family members as well as qualitative methods to further explore the narrative of Veterans. Therefore the following recommendations utilizing mixed-method research and practice are offered:

- 1) Exploration of experiences and barriers to employment of unemployed Veterans.
- 2) Exploration of Return to Work and promising practices for facilitating Return to Work. Darter, Hawley, Armstrong, Avellone and Wehman (accepted) conducted a literature review which indicated the majority of indi-

viduals with an amputation will not return to their pre-injury employment, overall RTW rates fluctuated across studies as well as populations (e.g., civilian vs. military populations). The age of the amputee, his/her level of education, his/her degree of pain and amputation related complications all impacted return to work.

- 3) Exploration of retirement including the impact of benefits upon a decision to retire, particularly within prime working ages. The sample in this study included only 19 Veterans age 46 or higher, with a total of 42 retired. This is not reflective of a general population career trajectory. Some Veterans may have actually served the required years and chosen to retire. For others, benefits may act as a disincentive to Return to Work.
- 4) Exploration of promising pain management strategies including multiple and alternative strategies beyond pharmaceutical responses. The uncertainty of the progressive health concerns associated with an amputation may influence perception of ability to work as well as access to employment opportunities.
- 5) Exploration of those reporting higher levels of resilience to look at promising practices as well as psycho-social characteristics of individuals that enhance resilience. Development of, and access to, replacement activities which encourage inclusion and relationships for those who are unemployed for sustained periods of time or retired. These may include peer coaching groups, employment support groups, social and/or volunteer activities etc.

- 6) Development and implementation of educational, training and networking opportunities that are long term, sustainable, inclusive of support needs, and designed to enhance skills associated with resilience, and biopsychosocial aspects including pain management and employment. Such psychological capital (including resilience) skill development may also positively impact (Luthans et al., 2006, 2017) work performance outcomes.

## 5. Conclusion

Many Veterans, particularly those who have acquired disabilities, are experiencing challenges to community integration. Veterans with amputation often experience increasing health concerns associated with the amputation and co-occurring disabilities. Understanding the potential implications to work and life perspectives may alleviate challenges and facilitate the ability to constructively respond to those challenges. Pain, prosthetic use, employment status, social/community connection and overall sense of one's experience influenced resilience in this sample of Veterans. Adaptive features of resilience include, yet are not limited to realistic optimism, empathy, social connection, the ability to reframe, and emotion regulation. Research has found that most people are resilient (APA, 2017; Bonanno, 2004). However, supports and interventions for Veterans that focus upon employment, relationships and health may lead to higher levels of sustainable well being. The intersection of employment and wellbeing is evident (Luthans et al., 2006, 2008; Rath & Harter, 2010). Albeit, one cannot infer causality in terms of resilience, that is: are resilient people more likely to be employed, or does employment result in higher reports of resilience? Nonetheless, supporting Veterans through opportunities to learn new skills that foster growth, the ability to use their strengths, and to contribute through employment opportunities that are valued, will serve to increase not only individual well-being, but that of the communities in which Veterans live.

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## Conflict of interest

We, the authors, affirm that we have no financial affiliation (including research funding) or involvement with any commercial organization that has a direct financial interest in any matter included in this manuscript.

## References

- Agrawal, S., & Harter, J. K. (2009). *Engagement at work predicts change in depression and anxiety status in the next year*. New York, NY: Gallup Press.
- Archer, T. M. (2008). *Response rates to expect from Web-based surveys and what to do about it*. *Journal of Extension*. Retrieved from <http://www.joe.org/joe/2008june/rb3.php>
- Bonano, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 1(59), 22-28.
- Campbell-Sills, L., & Murray, B. (2007). Psychometric analysis and refinement of the connor-davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, 20(6), 1019-1028.
- Campbell-Sills, L., Forde, D. R., & Stein, M. B. (2009). Demographic and childhood environmental predictors of resilience in a community sample. *Journal of Psychiatric Research*, 43(12), 1007-1012.
- Clark, A. E., Diener, E., Georgellis, Y., & Lucas, R. E. (2008). Lags and leads in life satisfaction: A test of the baseline hypothesis. *The Economic Journal*, 118(529), 222-243.
- Connor-Davidson Resilience Scale User Guide. (2017). *Table 1.b. Mean (SD) CD-RISC 10-Item Scores in General Population*. Retrieved from <http://www.connordavidson-resiliencescale.com/user-guide.php>
- Connor-Davidson Resilience Scale User Guide. (2017). *Table 3.b. Mean (SD) CD-RISC 10-Item Scores in Post-Traumatic Stress Disorder and Subjects Exposed to Severe Trauma*. Retrieved from <http://www.connordavidson-resiliencescale.com/user-guide-2.php>
- Darter, B. J., Hawley, C. E., Armstrong, A. J., Avellone, L., & Wehman, P. (2018). Factors influencing functional outcomes and return-to-work after amputation: A review of literature. *Journal of Occupational Rehabilitation*. <https://doi.org/10.1007/s10926-018-9757-y>



- Davidson, J. R., Payne, V. M., Connor, K. M., Foa, E. B., Rothbaum, B. O., & Herzberg, M. A. (2005). Trauma, resilience, and salivary cortisol: Effects of treatment on posttraumatic stress disorder. *International Clinical Psychopharmacology*, 20, 43-48.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Mail and Internet Surveys: The Tailored Design Method*, Third edition, New York, John Wiley & Sons.
- Dursa, E. K., Reinhard, M. J., Barth, S. K., & Schneiderman, A. I. (2014). Prevalence of a positive screen for PTSD among OEF/OIF and OEF/OIF-era Veterans in a large population-based cohort. *Journal of Traumatic Stress*, 27, 542-549.
- Feder, A., Nestler, E. J., & Charney, D.S. (2009). Psychobiology and molecular genetics of resilience. *Nature Reviews Neuroscience*, 6(10), 446-457.
- Frain, M. P., Bishop, M. & Bethel, M. (2010). A roadmap for rehabilitation counseling to serve military veterans with disabilities. *Journal of Rehabilitation*, 76(1), 13-21.
- Fischer, H. A. (2015). *Guide to US Military Casualty Statistics: Operation Freedom's Sentinel, Operation Inherent Resolve, Operation New Dawn, Operation Iraqi Freedom, and Operation Enduring Freedom*. Washington, DC: Congressional Research Service.
- Harter, J. K., Canedy, J., & Stone, A. (2008). *A longitudinal study of engagement at work and physiologic indicators of health*. Presented at the 2008 Work, Stress and Health Conference, Washington, D.C.
- Hautzinger, S., Howell, A., Scandlyn, J., Wool, Z., & Zogas, A. (2015). *Costs of War: US Veterans & Military Families*. Watson Institute International & Public Affairs, Brown University. Retrieved from: <http://watson.brown.edu/costsofwar/costs/human/veterans>
- Hawley, C. E., Armstrong, A. J., Czarnota, J., & Fields, K. (2016). Factors influencing the quality of life of OEF/OIF Veterans. *Journal of Applied Rehabilitation Counseling*, 47(4), 28-35.
- Hoge, C. W., Auchterlonie, J. L., & Milliken, C. S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *Journal of the American Medical Association*, 295, 1023-1032.
- Huppert, F. A., & So, T. C. (2013). Flourishing Across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research*, 110, 837-861.
- Institute of Medicine. (2013). *Returning Home from Iraq and Afghanistan: Readjustment Needs of Veterans, Service Members, and Their Families*. Washington, DC.
- Krueger, C. A., Wenke, J. C., & Ficke, J. R. (2012). Ten years at war: Comprehensive analysis of amputation trends. *Journal of Trauma and Acute Care Surgery*, 73, 438-444.
- Lew, H. L., Otis, J. D., Tun, C., Kerns, R. D., Clark, M. E., & Cifu, D. X. (2009). Prevalence of chronic pain, posttraumatic stress disorder, and persistent postconcussive symptoms in OIF/OEF veterans: Polytrauma clinical triad. *Journal of Rehabilitation Research and Development*, 46(6), 697-702.
- Luthans, F., Vogelgesang, G. R., & Lester, P. B. (2006). Developing the psychological capital of resiliency. *Human Resource Development Review*, 5, 25-44.
- Luthans, F., Norman, S. M., Avolio, B. J., & Avey, J. B. (2008). The mediating role of psychological capital in the supportive organizational climate-employee performance relationship. *Journal of Organizational Behavior*, 28, 219-238.
- Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological capital: An evidence-based approach. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 339-366.
- McKenzie, E. J., Bose, M. J., Kellam, J. F., Pollak, A. N., Webb, L. X., & Swiontkowski, M. F. (2006). Early predictors of long-term work disability after major limb trauma. *Journal of Trauma*, 61(3), 688-694.
- Pietrzak, R. H., & Southwick, S. (2011). Psychological resilience in OEF/OIF Veterans: Application of a novel classification approach and examination of demographic and psychosocial correlates. *Journal of Affective Disorders*, 133(3), 560-568.
- Rath, T., & Harter, J. (2010). *Wellbeing: The Five Essential Elements*. New York, NY: Gallup Press.
- Reivich, K., & Shatte, A. J. (2002). *The Resilience Factor: Seven keys to finding your inner strength and overcoming life's hurdles*. New York, NY: Three Rivers Press.
- Schoppen, T., Boonstra, A., Groothoff, J. W., de Vries, J., Goeken, L. N., & Eisma, W. H. (2001). Employment status, job characteristics, and work-related health experience of people with a lower limb amputation in The Netherlands. *Archives of Physical Medicine and Rehabilitation*, 82(2), 239-245.
- Seal, K. H., Bertenthal, D., Miner, C. R., Sen, S., & Marmar, C. (2007). Bringing the war back home: Mental health disorders among 103,788 US veterans returning from Iraq and Afghanistan seen at Department of Veterans Affairs facilities. *Archives of Internal Medicine*, 167, 476-482.
- Seligman, M., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55(1), 5-14.
- Tarabay, J. (2010). Suicide rivals the battlefield in toll on U.S. military. *National Public Radio*. Retrieved from [www.npr.org/templates/story/story.php?storyId=12786046](http://www.npr.org/templates/story/story.php?storyId=12786046)
- Tsai, J., Harpaz-Rotem, I., Pietrzak, R. H., & Southwick, S. M. (2012). The role of coping, resilience, and social support in mediating the relation between PTSD and social functioning in veterans returning from Iraq and Afghanistan. *Psychiatry*, 75(2), 135-49.
- Whyte, A. S., & Carroll, L. J. (2002). A preliminary examination of the relationship between employment, pain and disability in an amputee population. *Disability and Rehabilitation*, 24(9), 462-470.
- Wisco, B. Marx, B. P., Wolf, E. J., Miller, M. W., Southwick, S., & Pietrak, R. H. (2014). Posttraumatic stress disorder in the US veteran population: Results from the National Health and Resilience in Veterans Study. *Journal of Clinical Psychiatry*, 75(12), 1338-1346.