Predicting Student Veterans’ GPA

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Research on understanding the behavioral, mental, and social needs of veterans is presently lacking (Livingston, Havice, Cawthon, & Fleming, 2011). Suicidal thoughts, anxiety, and depression are problems student veterans are more likely to encounter compared to non-traditional and traditional college students (Rudd, Goulding, & Bryan. 2011). Likewise, health risk behaviors (Widome, Lask, Gulden, Fu, & Lust, 2011), and trauma and/or Post-traumatic Stress Disorder (PTSD; DiRamio, Ackerman, & Mitchell, 2008; Rudd et al., 2011) are added problems faced by student veterans. DiRamio et al. (2008) states that student veterans experience challenges because they don’t feel understood by those around them; failure to establish relationships results in social isolation (Branker, 2009; Elliot, Gonzalez, & Larsen, 2011).

The challenges faced by student veterans might be responsible for the research findings indicating lower GPAs when compared to non-veteran students (Durdella & Kim, 2012). Post-traumatic stress disorder (PTSD), family support, and social support are identified areas of interest for veterans (Rudd et al., 2011; Tsai, Harpaz-Rotem, Pietrzak, & Southwick, 2012). Colleges/universities catering for student veterans must be capable of meeting their needs (Rudd et al., 2011; Widome et al., 2011), which includes ensuring their success by understanding and supporting them as students (Durdella & Kim, 2012). This study will seek to answer the following question: Can student veterans’ cumulative GPA be predicted from, Post-traumatic stress disorder (PTSD), student stress, life stress, family support, and social support, where family support and social support act as moderators on each of the other predictors?

Method

Participants

Soldiers who leave combat and enroll in post-secondary institutions as students are defined as student veterans (DiRamio et al., 2008). They will comprise the participants in this
study, and will be recruited from a college/university campus in the United States through postings, announcements, advertisements and referrals from on-campus counseling and military student offices. Participants in the study must have experienced combat missions and have a diagnosis of Post-traumatic Stress Disorder (PTSD) and/or have PTSD symptoms. Participants will include both male and female student veterans, between the ages of 25-35 years old (Jesnek, 2012); they will not be excluded on the basis of ethnicity, education, and/or social economic status. Exclusion of participants will occur if they have a current psychotic disorder diagnosis, possess an organic mental disorder, presently in psychotherapy, and/or on psychotropic medication. From the sample of student veterans recruited and the selection criteria above, approximately 150 student veterans will be randomly selected to participate in the study based on Green (1991) and Warner’s (2013) recommendations.

Measures

Participants will be administered the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 2002) during the initial assessment, to confirm criteria for PTSD and/or PTSD symptomology. According to the American Psychiatric Association (2013), PTSD is defined as a psychiatric disorder resulting in feelings of intense fear, helplessness, and horror from exposure to stressors.

PTSD. This is predictor 1, and will be measured using the PTSD Checklist Military version (PCL-M; Weathers, Litz, Herman, Huska, & Keane, 1993).

PCL-M. A 17-item self-report tool with a five-point Likert scale (1-not at all to 5-extremely); 50 is the cut-off score recommended for making a PTSD diagnosis (Bliese et al., 2008; Forbes, Creamer, & Biddle, 2001). It has an alpha coefficient is 0.96 (Keen, Kutter, Niles, & Krinsley, 2008), and strong convergent validity (Wilkins, Lang, & Norman, 2011).
Student stress. This is predictor 2, comprising of cognitive and behavioral experience processes stemming from both mental stress sources and mental stress in relation to college/university reactions (Ji & Zhang, 2011). It will be measured using the College Student Stress Scale (Feldt, 2008).

College student stress scale. A brief 7-item questionnaire, measuring student’s perceived stress in adjusting to college. It has an internal consistency of 0.81, and good construct validity (Feldt & Koch, 2011).

Life stress. This is predictor 3, and it examines the degree to which situations in the life of an individual are identified as being stressful. It will be measured using the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983).

PSS. A 14-item self-report measure that examines an individual’s level of perceived stress over the last month using a five-point Likert type scale (0=never to 4=very often), where higher scores indicate higher levels of stress. It has adequate reliability, alpha=0.81, concurrent validity, and external validity (Cohen et al., 1983; Remor, 2006).

Family support. This is predictor 4, and it encompasses aspects of the family, from partners’ relationship, parent-child relationships, employment, and basic life and personal resources (Cassidy, Lawrence, Vierbuchen, & Konold, 2013). It will be measured using the Family Inventory of Resources and Stressors (FIRST; Lawrence, 1998).

FIRST. A tool with 107-items, including 102 structured items using a four point Likert scale (1, strongly agree; to 4, strongly disagree). It has adequate internal consistency, alpha greater that .70, and good concurrent and discriminant validities (Cassidy et al., 2013).

Social support. This is predictor 5, and it focuses on the presence or accessibility of individuals who can be relied on, and who lets us feel cared for, valued, and loved (Sarason,
Levine, Basham, & Sarason, 1983). It will be measured with the Social Support Inventory (SSI; Timmerman, Emanuels-Zuurveen, & Emmelkamp, 2000).

SSI. A 20-item, five point Likert scale (*1, much too little support; to 5, much too much support*). It has satisfactory internal consistencies, alpha values from 0.70 to 0.86, with good convergent and divergent validities (Timmerman et al., 2000).

Student veterans’ GPA. This is the outcome measure, and it is calculated by taking the number of grade points earned by a given student over a specified period of time and dividing that number by the total number of credits taken by the student (Uribe & Garcia, 2012). It will be measured using the cumulative GPA of the student veteran at the college/university that the study is conducted.

GPA. This measure is the cumulative grade point average for each participant in the study on a scale of 0-lower GPA to 4-higher GPA. It appears to have good predictive validity and reliability (Trail et al., 2008). Individual interviews and testing will be administered in comfortable, well-lit, and spacious confidential rooms on the college/university campus.

Variables

This study will use a within-subjects design (Heppner, Wampold, & Kivlighan, 2008). The independent variables for this study include five predictors, two of which act as moderators: 1) PTSD, 2) student stress, 3) life stress, 4) family support, and 5) social support. It is expected that family support and social support predictors will act as moderators, interacting with each of the other predictors and influencing the outcome variable (Warner, 2013). The dependent/outcome variable will be each student veteran’s cumulative GPA score.

Procedures
Student veterans who volunteer to participate in this study, will first be administered the SCID to determine PTSD criteria. From the pool of eligible participants, i.e., those who meet criteria to participate in the study, approximately 150 student veterans will be randomly selected as participants of the study. Participants will be tested on all five predictor measures, and their cumulative GPA will be taken from their college/university academic records. Data collection will occur on the same date and time for all participants.

**Proposed Statistical Analysis**

Multiple regression analysis with more than two predictors, including the interaction of two quantitative predictor variables (Warner, 2013) will be used to evaluate whether the entire set of variables contain sufficient information to predict the cumulative GPA of student veterans at an identified college/university. The regression analysis will also identify the strength of the moderators: family support and social support on the other predictors, i.e., their predictive power on student veterans’ GPA. The scores on each predictor will be centered before forming the product term representing their interaction. Predictor variables will be entered into the regression equation using the standard/simultaneous regression procedure (Warner, 2013).

For the multiple regression statistic to be employed, various assumptions need to be met. First, histograms for each of the predictor variables and the outcome variable will be created to examine the shape of the distribution of the scores. It is expected that all of the quantitative variables will have approximately normal distribution shapes. If outliers are identified that might violate this assumption, data transformations such as logs may be used to remedy problems; if the outliers are extreme, they might be dropped from the data set, allowing for an approximate normal distribution to be established. Second, scatter plots will be obtained for each pair of quantitative variables; these scatter plots are expected to show linear relations between variables,
homogenous variance, and no bivariate outliers. If extreme scores are observed, log transformation may be employed to reduce their impact. If multivariate outliers are detected, they will be accounted for by examining plots of residuals from multiple regression and/or examining information related to individual cases using Mahalonobis $D$ or leverage statistics.

Third, the homogeneity of regression assumption will be accounted for, i.e., it is expected that family support and social support predictors will moderate PTSD, student stress, and life stress predictors, influencing student veterans’ GPA. Therefore, scatter plots will be created to determine the presence of interactions among predictors, indicating that this assumption is violated. However, the regression model will be correctly specified, including the interactions between each moderator and the other predictors in the regression equation (Warner, 2013).

**Validity Critiques**

The PCL-M, College Student Stress Scale, PSS, FIRST, and SSI contain questions that adequately measure the constructs that they purport to measure as determined from previous studies, indicating construct validity, content validity, and face validity (Blanchard, Jones-Alexander, Buckley, & Fonoris, 1996; Cassidy et al., 2013; Feldt & Koch, 2011; Keen et al., 2008; Remor, 2006; and Timmerman et al., 2000). The scales also demonstrate good criterion validity, i.e., the tests can predict the constructs they were intended to measure with a good degree of accuracy; good concurrent validity when compared with other validated scales; adequate levels of convergent validity, when tests were compared with similar tests measuring the same construct; and good discriminant validity (Cassidy et al., 2013; Feldt & Koch, 2011; Remor, 2006; Timmerman et al., 2000; Weathers et al., 1993; and Wilkins et al., 2011). In relation to predictive validity, the present study will seek to determine if these scales can predict student veterans’ cumulative GPA. As such, predictive validity is to be addressed in this study.
In relation to statistical validity, assumptions for multiple regression statistic will be met, including homogeneity of variance, thus minimizing Type I error. This study seeks to achieve a statistical power of 0.8, an alpha of 0.05, with $R^2$ for main effects only at .05, and $R^2$ for the model with main effects and interaction at 0.10; although 143 student veterans are needed to achieve the stated power, this study will have 150 student veterans, which will further increase the statistical power, while minimizing Type II error (Warner, 2013).

In relation to internal validity, history and maturation should not be an issue because all participants will be tested at the same time. Testing and instrumentation are not threats because participants will only be tested on the measures once. Regression towards the mean is not a threat in this study because participant selection is not based on pretest scores; rather it is based on meeting criteria for PTSD. Selection bias will be controlled for using random selection. Contamination through treatment diffusion is not a threat in this study because there is only one group of participants and no treatment is involved. Attrition is a possible threat, however, since all participants will only be tested once, and at the same time, this threat is minor. All participants will be blind to what is assessed in the study, to control for reactivity. The generalizability of the results will be limited, only applying to student veterans on college/university campuses in the United States that are characteristically similar to the student veterans used in this study. If all the predictor and moderator variables: PTSD, student stress, life stress, family support, and social support significantly account in predicting student veterans’ cumulative GPA, then the case will be made to have these measures applied to student veterans, allowing colleges/universities to better understand this population. As such, colleges/universities can meet the needs of student veterans providing them with more opportunities for academic success.
References


Lawrence, E. C. (1998). *The family inventory of resources and stressors (FIRST).* A copy can be retrieved from University of Virginia website:

http://curry.virginia.edu/academics/directory/edith-c.-lawrence


### Appendix

### Table 1

**Addressing the Validity of the Proposed Measure**

<table>
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<tr>
<th>Type of Validity</th>
<th>Definition</th>
<th>Application to Proposed Measure</th>
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<tbody>
<tr>
<td><strong>Construct Validity</strong></td>
<td>Construct validity assesses the variables used to characterize hypothetical constructs in the study to determine the accuracy with which they capture those constructs (Heppner et al., 2008).</td>
<td>All the measures have been identified as having questions that measure the constructs that they are intended to measure.</td>
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<td><strong>Content Validity</strong></td>
<td>This “refers to the extent to which the items reflect an adequate sampling of the characteristic” (Girden &amp; Kabacoff, 2011, p. 8).</td>
<td>All the measures contain questions that adequately address the constructs they are intended to measure indicating good content validity.</td>
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<tr>
<td><strong>Criterion Validity</strong></td>
<td>“Refers to the extent to which test scores correlate with a behavior (criterion) the test supposedly measures (concurrent validity) or the extent to which test scores predict that behavior (predictive validity)” (Girden &amp; Kabacoff, 2011, pp. 8-9).</td>
<td>Other studies indicated that these measures can predict the constructs they were intended to measure with a moderate degree of accuracy; i.e., they have good criterion validity.</td>
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<td><strong>Concurrent Validity</strong></td>
<td>“The correlation of a measure with performance on another measure or criterion at the same point in time” (Kazdin, 2003, p. 573).</td>
<td>Most of the measures have been identified as having good concurrent validity based on comparisons with other validated scales.</td>
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<tr>
<td><strong>Predictive Validity</strong></td>
<td>“The ability of a test to predict a future behavior or future group membership that should occur if the test is a valid measure of what it purports to measure” (Warner, 2013, p. 1109).</td>
<td>The present study will seek to determine if the predictor variables have predictive validity, i.e., if they can predict student veterans’ GPA, compared to the actual GPA of the student veteran. As such, predictive validity is to be determined in this study.</td>
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<tr>
<td><strong>Face Validity</strong></td>
<td>Similar to content validity, i.e., it focuses on “the degree to which it is obvious what attitudes or abilities a test</td>
<td>Based on the questions contained in each measure, it appears that all scales have good face validity.</td>
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<td>Measures from the content of the questions posed” (Warner, 2013, p. 1087).</td>
<td>All the measures used in this study have been identified as having at least moderate convergent validity, when compared with other tests that measure the same constructs.</td>
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<td><strong>Convergent Validity</strong></td>
<td>Examines “the relationship between scores on the testing instrument and scores on other instruments intended to measure the same and other constructs … there should be a high correlation between instruments that measure the same construct” (Heppner et al., 2008, p. 322).</td>
<td>Most of the measures used in this study were identified as having good discriminant validity. When compared with other tests that had similar constructs they correlated strongly, and compared to different constructs they correlated poorly.</td>
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<tr>
<td><strong>Discriminant Validity</strong></td>
<td>This form of validity is said to exist if, “the correlation of measures of different constructs… [are] smaller than correlations of measures of the same construct” (Heppner et al., 2008, p. 322).</td>
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<tr>
<th>Type of Threat</th>
<th>Definition</th>
<th>How it will be Addressed</th>
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<tr>
<td>History</td>
<td>“Any event occurring in the interim that directly or indirectly could affect the behavior being measured and therefore could account for results” (Girden &amp; Kabacoff, 2011, p. 4).</td>
<td>All participants will be tested at the same time; just a minor threat to this study.</td>
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<td>Maturation</td>
<td>“Any change within the participant that occurs during the interim and can just as easily account for posttest performance” (Girden &amp; Kabacoff, 2011, p. 4).</td>
<td>All participants will be tested at the same time, there is no post-testing; just a minor threat to this study.</td>
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<tr>
<td>Testing</td>
<td>“This refers to posttest performance that results from pretest experience” (Girden &amp; Kabacoff, 2011, p. 4).</td>
<td>Not an issue, all participants will be tested once.</td>
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<td>Regression</td>
<td>“This is a predictable shift in posttest scores when participants were specifically selected because their pretest scores were extremely high or low. Posttest scores are predicted to be less extreme regardless of treatment effects” (Girden &amp; Kabacoff, 2011, p. 4).</td>
<td>Not a threat in this study; participants are not selected based on high/low pretest scores. Selection is based on meeting PTSD criteria/symptomology and being student veterans.</td>
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<td>Selection Bias</td>
<td>“This refers to the assignment of participants to the various test conditions on a non-random basis. Difference in performance may be associated with a participant characteristic instead of, or along with, the independent variable” (Girden &amp; Kabacoff, 2011, p. 5).</td>
<td>Random selection will be used to select the 150 participants from the eligible pool of student veterans who meet criteria; there is no need for random assignment because there is only one group in this study.</td>
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<td>Contamination</td>
<td>Also known as diffusion of treatment, “is the unintentional spread of treatment to a control group (or groups) when participants receive information withheld from them (e.g., through conversation with experimental participants) that results in a smaller difference among group performances at posttreatment assessment” (Girden &amp; Kabacoff, 2011, p. 5).</td>
<td>This is not a threat in this study because all participants will be tested on all the measures, at the same time. There is just a single group of participants, and there is no treatment introduction in this study.</td>
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### Attrition

Also known as mortality or attrition, “is the loss of particular participants from a group (or groups) in such a way that remaining participants no longer can be considered to be initially equivalent with respect to the dependent variable” (Girden & Kabacoff, 2011, p. 5).

This is a minor threat to the present study, however, due to the large number of participants, and the single testing period, this threat is only a minor possibility.

### Instrumentation

“This refers to any change in the measuring instrument and/or assessor from pretest to posttest that can just as easily explain a change in scores” (Girden & Kabacoff, 2011, p. 4).

This is not a threat in this study, all participants will be tested once, no post-testing is involved.

### Combination of Selection and Other Threats

This refers to other possible confounds that could be present in the study and account for results (Girden & Kabacoff, 2011).

The fact that this study includes single testing and one group of participants greatly minimizes validity threats.

### Diffusion or Imitation of Treatment

This might involve compensatory rivalry, where participants in the control group engage in behaviors that attempt to exceed performance of an experimental group, reducing posttreatment effects; or it might include resentful demoralization, where the performance level of the control group is lowered, increasing the differences between post-treatment group means because they were not provided with the treatment (Girden & Kabacoff, 2011).

This is not a threat to this present study because there is only one group of participants and no treatment is involved that will result in diffusion or imitation affecting post-testing results.

### Special Treatment or Reaction

This may result in the Hawthorne effect, where participants experience positive changes/outcomes from being assigned to the treatment group, rather than from experiencing the treatment itself; or this might result form experimenter expectancy, where the researcher’s expectations for certain results (un)intentionally influence participants behaviors (Girden & Kabacoff, 2011).

This is not a threat to the present study because there is only one group of participants, and facilitators will be trained to follow protocol and not engage in special treatment of participants.