



Comparing Educational Frameworks in Military Training Courses for Effects on Healthy Behavior Adoption in Army National Guardsmen

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ABSTRACT

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The purpose of this study was to compare the effects of various educational frameworks including Resiliency Theory (RT), Adult Learning Theory (ALT), and Active Teaching and Learning Strategies (ATLS) on Army National Guardsmen's (ARNG) perceptions of self-efficacy, grit, and resiliency as part of Holistic Health & Fitness (H2F) Programming addressing healthy behavior change. The investigation established three hypotheses with associated research questions. The study's design was as a quantitative, quasi-experimental, ex post facto study of two samples using pre- and post-intervention survey screenings. A total of 57 service members belonging to a control group n=37 (RT only) and an intervention group n=20 (RT, ALT, and ATLS) were studied. Data was gathered using the following three instruments: the General Self-Efficacy Scale (GSE), The Grit Scale, and The Brief Resiliency Scale (BRS). Statistical methods depending on normality of data, such as Analysis of Variance and t-Testing were selected to compare the mean outcomes for pre- and post-intervention data for each group. It was shown that the combination of RT, ALT, and ATLS was more effective in producing larger effect sizes of statistically significant increases in self-efficacy and grit. While not statistically significant the experimental group also demonstrated larger changes in resiliency as well. The research also indicated these outcomes were not found to be linked to service member sex or age bracket for either group. The study's results led to multiple recommendations for educational framework modification when addressing healthy behaviors in the Army National Guard.

KEYWORDS:

Educational Frameworks, Healthy Behavior

INTRODUCTION

Army National Guardsmen have demonstrated a four percent larger trend in obesity over their Active-Duty counterparts (APHC, 2022). The rate for admin flags due to obesity across the 54 States, Territories, and District of the National Guard Bureau was 3.9 percent of the total force's 335,973 Soldiers (APHC, 2022). Soldiers that exceed the doctrinally allowable levels of body-composition can be separated from service. The cost to replace soldiers separated from service was ~\$180,000 (HQFLARNG, 2020).

A fiscal risk of \$2.358 Billion has been associated to unhealthy behaviors that promote obesity in service members. Multiple Army National Guard entities from the 54, have implemented healthy behavior modification to improve overall readiness to deploy. Multiple research groups have previously studied resiliency training from one of these interventions and linked resiliency to improved performance in fitness testing and body composition screening (Deuster & Silverman, 2013; Hong, *et al.*, 2018; Howard, *et al.*, 2022; Lines, *et al.*, 2019; Kashani, *et al.*, 2016).

The obesity rate for the United States is approximately 27 percent (APHC, 2022) demonstrating that while the Army National Guard rate of obesity is higher than that of the Active Duty Army, it is five percent lower than the general U.S. population. However, the Armed Forces are a subset of the American population, and National Guardsmen spend more time embedded within the general U.S. population than they do surrounded by their Active-Duty counterparts. This lends credence to the general population

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trends. Large scale research (n=117,676) conducted by Park, Peterson, and Seligman (2006) found that self-control was the lowest overall character strength in the U.S population. The researchers believed this to be an area for which change could be made regarding Army National Guardsmen.

The authors of this study sought to examine the role of three constructs on improving healthy behaviors in Army National Guardsmen. These constructs were self-efficacy, grit, and resiliency. Self-efficacy is defined as one's belief in their ability to achieve a goal (Devovan, Dagnall, & Drinkwater, 2022). The researchers interpreted this construct as an enabler for healthy behavior initiation. Grit has been defined as one's ability to sustain efforts in intensity and focus toward goal achievement (Devovan, Dagnall, & Drinkwater, 2022; Duckworth & Quinn, 2009; Schimschal, *et al.*, 2021). The researchers interpreted this construct as an enabler for health behavior maintenance and sustainment that is used when obstacles and set-backs present. Resiliency has been defined as the long-term adaptation of flourishing in adversity, which is suggested to support decision making that aligns with health goals and behaviors (Devovan, Dagnall, & Drinkwater, 2022; Howard, *et al.*, 2022; Lines, *et al.*, 2019). The authors believed the interaction of these constructs could shape healthy behavior adoption.

Denovan, Dagnall, and Drinkwater (2022) posed that there are multiple constructs intertwined and affecting one another regarding resiliency; these include constructs such as mental toughness, self-efficacy, grit, and resiliency. This construct of resiliency is seen as a process, it is theorized that other components of the construct may also be necessary to improve to help shape more immediate changes in health decision making (Devovan, Dagnall, & Drinkwater, 2022; Howard, *et al.*, 2022). More specifically, Howard, *et al.* (2022) discussed the role of self-efficacy as a supporting factor of resiliency, which was echoed by Denovan, Dagnall, and Drinkwater (2022) in their discussion of the two factors enabling one another.

The Adult Learning Theory addresses keys to successful integration of assumptions to better enable the Adult Learner, including learner inclusion in the educational process, leveraging past experiences, and establishing immediacy of use of knowledge through relevance and applicability of concepts (Malik, 2016; McCall *et al.*, 2018). Service members of the Armed Forces have been previously identified to act as Adult Learners even if they do not meet the general age range of adult learners of over 25-years old (Howard, *et al.*, 2022). Due to these concepts this theory was selected by the researchers for inclusion into study's framework.

The modern view of Resiliency Theory looks at an adaptation process to stressors that allows for one to develop strategies for coping with stressors that can enable a sense of thriving despite adversity and one's own sets of traits (Devovan, Dagnall, & Drinkwater, 2022; Howard, *et al.*,

2022; Van Breda, 2018). The concept that one's ability to make healthy decisions can be improved through an intervention targeting Resiliency Theory supports positive adaptation and adoption of healthy behaviors. Considering these concepts, the researchers decided it would be appropriate to combine the two theories into their framework.

This study compared the service member self-reported data regarding their self-efficacy, grit, and resiliency between two groups, one that attended a resiliency theory-based intervention (n=37) and one that attended an intervention that combined both resiliency theory and Adult Learning Theory delivered through active teaching and learning strategies (n=20). The researchers examined pre-existing data from training programs conducted in the previous fiscal year to evaluate the frameworks' effects on the constructs of the study. The study also examined the effects of both sex and age brackets on the noted outcomes to draw the strongest conclusions from the research's findings.

RESEARCH QUESTIONS

This investigation was guided by the following research questions:

1. What is the difference in the mean perception scores of Self-Efficacy for Army National Guardsmen taught healthy behavior change using a combined framework of Adult Learning Model, Active Teaching/Learning Strategies, and Resiliency Theory when compared a framework of only Resiliency Theory?
2. What is the difference in the mean perception scores of Grit for Army National Guardsmen taught healthy behavior change using a combined framework of Adult Learning Model, Active Teaching/Learning Strategies, and Resiliency Theory when compared a framework of only Resiliency Theory?
3. What is the difference in the mean perception scores of Resiliency for Army National Guardsmen taught healthy behavior change using a combined framework of Adult Learning Model, Active Teaching/Learning Strategies, and Resiliency Theory when compared a framework of only Resiliency Theory?

HYPOTHESES

The below listed hypotheses were tested at the 0.05 significance level.

1. There is a larger and statistically significant improvement in perception of Self-Efficacy using the General Self-Efficacy Scale (GSE) for Army National Guardsmen of the experimental group when compared to those of the control group.
2. There is a larger and statistically significant improvement in perception of Grit using the Grit Scale for Army National Guardsmen of the

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experimental group when compared to those of the control group.

3. There is a larger and statistically significant improvement in perception of Resiliency using the Brief Resiliency Scale (BRS) for Army National Guardsmen of the experimental group when compared to those of the control group.

MATERIALS AND METHODS

The study adopted a quantitative, quasi-experimental, ex post facto format to examine and compare the pre-intervention and post-intervention survey data of a control group that received Resiliency Theory-based framework of training alone and an experimental group that received a combined framework of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies. The study population consisted of the two hundred fifty-four (254) Army National Guardsmen trained in the Army's Resiliency Theory course and the one hundred and seven (107) Army National Guardsmen trained in the combined framework course that included Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies. The sample size consisted of fifty-seven (57) service members trained in fiscal year 22 (FY22) broken down into a control group of thirty-seven (37) service members trained in Resiliency Theory framework alone, and an experimental group of twenty (20) service members trained in the combined framework of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies.

The three instruments included in the study to examine service member perception of self-efficacy, grit, and resiliency were all found to be valid and appropriate to implement in testing the hypotheses of the study. The GSE was established to have a Cronbach's Alpha ranging between 0.76 and 0.90 which proved it had a strong internal reliability and has been shown to have validity in the favorable psychometric measures of work satisfaction and positive emotions (Schwarzer, 2012; Schwarzer & Jerusalem 1995). The Grit Scale was established to have a Cronbach's Alpha rating ranging from 0.89-0.93 for internal consistency and validity in measurements of perseverance and interest toward task performance (Duckworth & Quinn, 2009; Zyl, *et al.*, 2022). The BRS was established to have a Cronbach's Alpha ranging from 0.80-0.91 for internal consistency and strong support for both discriminant and convergent validity when measuring resiliency as a whole construct (Smith, *et al.*, 2008).

While both the control and experimental group received Resiliency Theory-based training using the Army's Master Resiliency Training (MRT) curriculum, the experimental group alone received this training packaged within the Adult Learning Theory concepts delivered using Active Teaching and Learning Strategies. The pre-

intervention and post-intervention survey results for both the control and experimental group were collected. These data were then examined to establish the mean values per group, per survey, and per measurement point as a measure of central tendency. These data were then analyzed for normality using the Shapiro-Wilk test. The results of normality testing directed the data to be further analyzed using either a Two-Factor ANOVA for data with normal distribution or a Paired Means t-Test for statistical significance of outcomes. The findings were used to test each research question's hypothesis by first comparing the F/t-Values to the F/t-Crit values established by each test, if the F/t-Value was larger than the established F/t-Crit the Hypothesis could be accepted. In the case of t-Testing, the two-tailed t-Crit was used to capture bidirectional change associated to the intervention. Secondly, the p-values of the test were examined to comply with the set measure of 0.05 level of significance, if this measure was met then statistical significance of findings was declared. In the case of t-Testing, the two-tailed p-value was used to capture bidirectional change associated to the intervention. Finally, a Pearson Correlation was conducted to verify the power of correlation, if the Pearson Correlation value was above 0.50 then a strong correlation was declared. The last statistical analysis done on the data was Chi Square testing to rule in or out the effects of sex and age bracket on the findings, where if the p-value of the Chi Square test exceeded 0.05 then the effects of either independent measure could be rejected.

PRESENTATION OF RESULTS

The interpretation of the analysis of the study's hypotheses are listed by research question immediately following the corresponding table. However, normality data and independence testing are presented first for both groups using Shapiro-Wilk and Chi Square data, respectfully. These data directed the discussed outcomes for each research question.

Data normality results directed the selection of ANOVAs or t-Testing for each research question. The control group's Shapiro-Wilk testing data for normality was as follows: Self-Efficacy was not normally distributed ($W=0.879586$, $P\text{-Value} < 0.05$) thus a t-Test was selected for analysis, Grit was not normally distributed ($W=0.930463$, $P\text{-Value} < 0.05$) thus a t-Test was selected for analysis, and Resiliency was normally distributed ($W=0.976344$, $P\text{-Value} > 0.05$) thus an ANOVA was selected for analysis. The experimental group's Shapiro-Wilk testing data for normality was as follows: Self-Efficacy was not normally distributed ($W=0.924405$, $P\text{-Value} < 0.05$) thus a t-Test was selected for analysis, Grit was normally distributed ($W=1.048416$, $P\text{-Value} > 0.05$) thus an ANOVA was selected for analysis, and Resiliency was normally distributed ($W=1.010687$, $P\text{-Value} > 0.05$) thus an ANOVA was selected for analysis.

Test for independence of data was used to verify the results of the ANOVAs or t-Testing to be independent of sex

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and age bracket. The Chi Square Test for Independence results for the control group (n=37) accounted for n=25 Males and n=12 Females, with $X^2(2, N=37) = 0.0394, P = 0.980493$. The Chi Square Test for Independence results for the experimental group (n=20) accounted for n=13 Males and n=7 Females, with $X^2(2, N=20) = 0.18756, P = 0.910483$. Both P-Values exceeded 0.05, sex was statistically proven to have no effect on the noted outcomes for either group. The effects of age-bracket were screened globally for the two groups where the Chi Square Test for Independence results accounted for n=27 aged 20-29 years old, n=21 aged 30-39

years old, and n=9 aged 40+ years old, with $X^2(3, N=57) = 0.08027, P = 0.994095$. The P-Value exceeded 0.05, age brackets were statistically proven to have no effect on the noted outcomes for both the control and experimental groups.

Research Question 1: What is the difference in the mean perception scores of Self-Efficacy for Army National Guardsmen taught healthy behavior change using a combined framework of Adult Learning Model, Active Teaching/Learning Strategies, and Resiliency Theory when compared a framework of only Resiliency Theory?

Table 1: Comparison of Descriptive statistics and statistical analysis of self-efficacy between groups using the General Self-Efficacy Scale (GSE)

| Group | N | Δ | M(SD) | F/t | F/t-Crit | P-Value | Pearson Correlation |
|--------------|----|----------|------------|------|----------|---------|---------------------|
| Control | 37 | 0.02 | 3.29(0.38) | 0.29 | 2.03 | 0.77 | 0.47 |
| Experimental | 20 | 0.27 | 3.30(0.46) | 2.81 | 2.09 | 0.01 | 0.58 |

The results in Table 1 demonstrate that the experimental group experienced a larger effect size between pre-intervention and post-intervention screening for self-efficacy. The control group's results, 0.02 ($SD=0.38$), $T(1,36)=0.29, p=0.77$, did not suggest any influence between the Resiliency Theory-based training and their change in self-efficacy. The experimental group's results, 0.27 ($SD=0.46$), $T(1,19)=2.81, p=0.011$, proved that combined intervention of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies had a strong correlation to the statistically significant impact on their self-efficacy.

Hypothesis 1: There is a larger and statistically significant improvement in perception of Self-Efficacy using the General Self-Efficacy Scale (GSE) for Army National Guardsmen of the experimental group when compared to those of the control group.

Considering the statistically significant improvement of self-efficacy with strong correlation shown in Table 1 for the experimental group compared to the lack of statistical significance in the control group there was one group that was effective at improving self-efficacy. A statistically significant relationship existed between the healthy behavior change intervention of the combined framework and the noted changes in self-efficacy. Thus, the null hypothesis was rejected.

Research Question 2: What is the difference in the mean perception scores of Grit for Army National Guardsmen taught healthy behavior change using a combined framework of Adult Learning Model, Active Teaching/Learning Strategies, and Resiliency Theory when compared a framework of only Resiliency Theory?

Table 2: Comparison of Descriptive statistics and statistical analysis of Grit between groups using the Grit Scale

| Group | N | Δ | M(SD) | F/t | F/t-Crit | P-Value | Pearson Correlation |
|--------------|----|----------|------------|-------|----------|---------|---------------------|
| Control | 37 | 0.06 | 3.75(0.55) | 0.92 | 2.02 | 0.37 | 0.83 |
| Experimental | 20 | 0.44 | 3.72(0.56) | 16.91 | 4.38 | 0.0006 | 0.58 |

The results in Table 2 demonstrate that the experimental group experienced a larger effect size between pre-intervention and post-intervention screening for grit. The control group's results, 0.06 ($SD=0.55$), $T(1,36)=0.92, p=0.37$, did not suggest any influence between the Resiliency Theory-based training and their change in grit. The experimental group's results, 0.44 ($SD=0.56$), $F(1,19)=16.91, p=0.0006$, proved that combined intervention of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies had a strong correlation to the statistically significant impact on their grit.

Hypothesis 2: There is a larger and statistically significant improvement in perception of Grit using the Grit Scale for Army National Guardsmen of the experimental group when compared to those of the control group.

Considering the statistically significant improvement of grit with strong correlation shown in Table 2 for the experimental group compared to the lack of statistical significance in the control group there was one group that was effective at improving grit. A statistically significant relationship existed between the healthy behavior change

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intervention of the combined framework and the noted changes in grit. Thus, the null hypothesis was rejected.

Research Question 3: What is the difference in the mean perception scores of Resiliency for Army National

Guardsmen taught healthy behavior change using a combined framework of Adult Learning Model, Active Teaching/Learning Strategies, and Resiliency Theory when compared a framework of only Resiliency Theory?

Table 3: Comparison of Descriptive statistics and statistical analysis of Resiliency between groups using the Brief Resiliency Scale (BRS)

| Group | N | Δ | M(SD) | F/t | F/t-Crit | P-Value | Pearson Correlation |
|--------------|----|------|------------|------|----------|---------|---------------------|
| Control | 37 | 0.20 | 3.91(0.60) | 5.88 | 4.11 | 0.020 | 0.65 |
| Experimental | 20 | 0.32 | 3.73(0.78) | 4.34 | 4.38 | 0.051 | 0.70 |

The results in Table 3 demonstrate that the experimental group experienced a larger effect size between pre-intervention and post-intervention screening for resiliency. The control group's results, 0.20 ($SD=0.60$), $F(1,36)=5.88$, $p=0.020$ and Pearson Correlation of 0.65, suggested a strong correlation with statistical significance for the influence between the Resiliency Theory-based training and their change in resiliency. The experimental group's results, 0.32 ($SD=0.78$), $F(1,19)=4.34$, $p=0.051$ and Pearson Correlation of 0.70, demonstrated a strong correlation but failed to establish a statistically significant relationship between the combined intervention of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies and their perception of resiliency.

Hypothesis 3: There is a larger and statistically significant improvement in perception of Resiliency using the Brief Resiliency Scale (BRS) for Army National Guardsmen of the experimental group when compared to those of the control group.

Considering the statistically significant improvement of resiliency with strong correlation shown in Table 3 for the control group compared to the lack of statistical significance in the experimental group there was one group that was more effective at improving resiliency. A statistically significant relationship existed between the Resiliency Theory-based training and perception of resiliency. Meanwhile, the combined framework failed to provide a statistically significant change in resiliency. Thus, the null hypothesis was accepted.

DISCUSSION OF RESULTS

The results of the research demonstrated that both the control group (Resiliency Theory specific training) and the experimental group (combined framework of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies) had a positive impact on service member perceptions of self-efficacy, grit, and resiliency between pre-intervention and post-intervention screenings. The study found that service members that received healthy behavior training that incorporated a combined framework of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies outperformed their

Resiliency Theory alone contemporaries with respect to both self-efficacy and grit. While the study did find a large effect size change between the experimental group's Resiliency testing, it could not be found to be statically significant. Thus, regarding Resiliency as a specific psychometric property, nothing can be drawn from this study. The effects of both sex and age bracket were also statistically ruled out in this analysis adding validity to the findings. It is reasonable to infer from this study's findings that healthy behaviors training courses for Army National Guardsmen could benefit from incorporating the combined framework.

These findings align with the previous research of Howard, *et al.* (2022), who examined the effects of Adult Learning Theory and Resilience Theory upon service members' ($n=87$) perception of Resiliency and application of Sport Psychological skills such as Energy Activation, Emotion Control, Imagery, and Goal Setting with respect to physical performance. Multiple research groups including Deuster and Silverman (2013), Hong, *et al.* (2018), and Lines, *et al.* (2019) discussed that improvements in an individual's psychometric properties, such as self-efficacy, enabled modulation of motivation and behavior change in support of one's health goals.

The study expanded the body of research in this topical area by defining a broader view of resiliency. Howard, *et al.* (2022) discussed the view that self-efficacy and grit acted as subcomponents to improvement of grit but did not examine the changes in either of those in their study. Meanwhile, Denovan, Dagnall, and Drinkwater (2022) debunked the misconception that resiliency, self-efficacy, and grit act in adversary manners toward one another, they established a general non-cognitive construct of their interactions. The researchers of this study developed a philosophy of the three constructs acting upon a continuum to develop healthy behaviors. The results of this study neither confirmed nor disproved the researchers' philosophy. This data revealed that despite both groups gaining increases in the measured constructs, the combined framework resulted in better all-around outcomes toward Army National Guardsmen's adoption of healthy behaviors.

CONCLUSION/POLICY RECOMMENDATION

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The results of this study suggest that military courses addressing healthy behavior change, with specific focal points on enhancing self-efficacy and grit, would benefit greatly from a curricular design that combined the frameworks of Resiliency Theory, Adult Learning Theory, and Active Teaching and Learning Strategies. Future research should continue to expand the data sets and population size to include participation from service members outside of the Army National Guard; as well as examine populations across longer term follow-ups of six-months and one-year time points. Other National Guard entities from the 54 States, Territories, and District should seek to modify their program delivery to increase overall fitness of the force and decrease administrative flagging rates.

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