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## Longitudinal Association Between Self-Esteem in Adolescence and Posttraumatic Stress Disorder in Older Adults: A Cohort Study

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Longitudinal Association Between Self-Esteem in Adolescence and  
Posttraumatic Stress Disorder in Older Adults:  
A Cohort Study

John Anthony Blue Star

A dissertation submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy

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## ABSTRACT

### Longitudinal Association Between Self-Esteem in Adolescence and Posttraumatic Stress Disorder in Older Adults: A Cohort Study

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*Background:* Posttraumatic-Stress Disorder (PTSD) is less common in older adults than in younger adults, and little is known about specific risk factors for PTSD in older adults. We investigated the association between self-esteem in late adolescence and PTSD in older adults.

*Method:* Using a cohort design, 1,436 individuals who had been assessed approximately 40 years earlier in their junior and senior year of high school with the Rosenberg Self-Esteem Scale (RSES) were evaluated for PTSD using the PTSD Checklist (PCL-17).

*Results:* Fully controlled logistic regression models indicated that lower self-esteem in late adolescence predicted PTSD in the overall sample of older adults but not in the veterans-only subgroup.

*Limitations:* The main limitations include self-completed measures to estimate PTSD diagnosis and lack of specific information on traumatic events.

*Conclusions:* Our findings suggest that lower self-esteem from a young age may be a risk factor for PTSD in older age.

Keywords: posttraumatic stress disorder, self-esteem, cohort study, older adults, risk factors, military veterans

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Longitudinal Association Between Self-Esteem in Adolescence and  
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A Cohort Study

Psychological consequences of trauma are well described. Even before posttraumatic stress disorder (PTSD) became an official diagnosis, soldiers could be considered “shell-shocked” or labeled with “war neurosis.” PTSD did not appear as an official diagnosis until the third edition of the Diagnostic and Statistical Manual of Mental Disorders (*DSM-III*, 1980), in large part as a reaction to the condition of Vietnam veterans (Johnson & Thompson, 2008). Indeed, it was the effects of combat that paved the way for recognition of psychopathological symptoms of trauma. It was also recognized that exposure to other types of trauma was associated with PTSD, including rape and sexual abuse, car accidents, torture, natural disasters, and other events and for many years (including at the latest wave of this study) stipulated to be accompanied by “intense fear, helplessness, or horror” (according to the diagnostic criteria at the last wave of this study; American Psychiatric Association, 2000).

While considerable research explores the risk and protective factors for posttraumatic-stress disorder (PTSD) in the general population, less research has investigated specific vulnerability factors associated with PTSD in older adults. Across age groups, only small subgroups of persons who experience a traumatic event proceed to develop PTSD. In the U.S., lifetime prevalence of exposure to such an event has been estimated to be 51% for women and 60% for men (Breslau et al., 1998), whereas the National Comorbidity Study – Replication (NCS-R) estimated that the lifetime prevalence for PTSD was between 6% and 7% in the United States (Kessler et al., 2005). This discrepancy in the ratio of trauma exposure to PTSD prevalence suggests the operation of risk and protective factors associated with PTSD.

Epidemiological studies indicate that older adults are the age group least likely to be diagnosed with PTSD. In a representative study of the U.S., individuals over age 60 years had the lowest current prevalence of PTSD when compared to other age groups at 2.5% (Kessler et al., 2005), which suggests that older age (or a correlate specific to older age) may protect against the onset of PTSD or maintenance of symptoms.

Despite few investigations about vulnerability factors for PTSD in older adults, several risk factors have been implicated for PTSD in older adults, including trauma severity, (Green, 1994; Hoven et al., 2005; Ozer, Best, Lipsey, & Weiss, 2008), military service (Magruder & Yeager, 2009; Sutker & Allain, 1996), female sex (Breslau, Davis, Peterson, & Schultz, 1997; Brewin, Andrews, & Valentine, 2000), and lower socioeconomic status (Bolin & Klenow, 1995; Brewin et al., 2000; Parto, Evans, Zonderman, 2011; Pietrzak, Goldstein, Southwick, & Grant, 2012a; Schnurr, Lunney, & Sengupta, 2004). There is also evidence that a prior history of trauma is associated with PTSD later on in life after exposure to new trauma (Stein et al., 2002), which may be especially relevant to older adults such as veterans, who may have had combat exposure when they were younger. Onset of PTSD in older veterans may have occurred in the more immediate wake of war or may have late onset, including first becoming evident in old age (Davison et al., 2006). Lower educational attainment apart from socioeconomic status has also been implicated as a risk factor, albeit with mixed results (Brewin et al., 2000; Chen, Shen, & Chen, 2012; deRoos-Cassini, Mancini, Rusch, & Bonanno, 2010; Tran, Glück, & Lueger-Schuster, 2013). Several of these predictors occur during adolescence and young adulthood, illustrating that traits and experiences across the lifespan may affect psychopathology in later life. Most research investigating predictors of PTSD in older adults has focused on veterans, likely in part due to a greater PTSD prevalence among veterans (8.5% to 19.3%; Magruder &



Yeager, 2009) compared to a PTSD prevalence of 6% to 7% in the general US population (Kessler et al., 2005), but more research is required to understand specific risk factors for PTSD and its persistence not only in the veteran but also in the general older-adult population.

Low self-esteem has been implicated as a possible risk factor for the development of PTSD but has not been specifically examined in older adults. Self-esteem is an evaluative process by which people “like” themselves based on self-knowledge (Brown and Marshal, 2006). Rosenberg (1965) defined self-esteem as a “favorable or unfavorable attitude toward oneself.” Global self-esteem is typically measured by self-report, thus reflecting how individuals evaluate themselves in terms of their own worth. High self-esteem has been associated with a variety of positive factors, including academic and occupational success, psychological well-being, assertiveness, and persistence after failure in adolescents and adults (Baumeister, Campbell, Krueger, & Vohs, 2003; Sarkova et al., 2013). Further, low self-esteem is associated with the development of psychopathology (Zeigler-Hill, 2010) and other behavioral variables such as risk aversion (Josephs, Larrick, Steele, & Nisbett, 1992). Most research has focused on the association between self-esteem and depression (Orth, Robins, & Roberts, 2008); however, other psychopathology, including anxiety, has been considered. A recent meta-analysis of longitudinal studies across ages revealed self-esteem was associated with anxiety significantly predicted anxiety with a weighted mean effect size of  $-.10$  (Sowislo & Orth, 2013).

### **Self-Esteem Across The Lifespan**

While self-esteem can vary depending on life-stage, high self-esteem at one point predicts high self-esteem at another (Robins & Trzesniewski, 2005). The rank-order stability of self-esteem is comparable to other measured traits, including the “Big Five” personality traits of Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience

(Roberts & DelVecchio, 2000). Self-esteem during adolescence tends to decline but increases and then stabilizes during the transitioning to adulthood (Robins, Trzesniewski, & Tracy, 2002). Adult self-esteem levels off and then eventually increases, reaching peak levels on average in the mid-60s before sharply declining in the 70s and 80s. Men and women have a similar trajectory of self-esteem through life, with women reporting comparatively lower self-esteem beginning at adolescence through adulthood (Robins & Trzesniewski, 2005). This discrepancy between genders lasts until older age, when men and women report approximately the same levels of self-esteem.

Early-life constructs like self-esteem may give further insight into psychopathology in later adulthood. For example, a longitudinal study of college students in 1966 found an association between positive self-appraisals (akin to high self-esteem) with lower neuroticism and higher self-esteem 20 years later (Lipkus & Siegler, 1995). However, studies have had mixed results examining the association between low self-esteem during adolescence and psychopathology in adults. A prospective, longitudinal study provided evidence that individuals with lower self-esteem in adolescence were 1.26 times more likely to be diagnosed with major depression disorder in adulthood and 1.60 times more likely to develop an anxiety disorder than adolescents who reported higher self-esteem (Trzesniewski et al., 2006). Low adolescent self-esteem also predicted poor physical health, worse economic prospects, and a higher likelihood of conviction of a crime. Boden, Fergusson, & Horwood (2008) found a similar effect, but the results for self-esteem were non-significant in the fully adjusted model. The authors concluded that self-esteem during adolescence did not directly cause later psychopathology but more appropriately could be considered a “risk marker” for possible future issues. One possibility could be that adolescents with healthy self-esteem are more likely to engage in tasks and

activities, thus receiving additional reinforcing feedback from others. The enhanced self-efficacy in responding well to challenges and tasks may then generalize to the belief in the ability to better manage trauma reducing the likelihood of PTSD development.

### **Self-Esteem and PTSD**

In cognitive models, negative schemata about the self, others, or the world are considered causal in the development of psychopathology. Trauma may damage the self-schema resulting in low self-esteem, contributing both to the onset and maintenance of PTSD (Dunmore, Clark, & Ehlers, 1999). However, the vulnerability model of self-esteem considers low self-esteem before stressors to be a risk factor for the development of psychopathology (Beck, 1967). In the wake of a difficult circumstance, individuals with low self-esteem may have fewer coping resources to counteract stressors, in part, because of the belief that they are not as skilled as others to deal with problems. Social-cognitive theory of PTSD postulates that in otherwise functional mental processing, trauma exposure may shape the resulting memory and hinder integrating the memory (Hollon & Kriss, 1984; Resick, 2001). Through assimilation, an individual's pre-trauma beliefs may become entrenched, resulting in viewing the trauma only through the lens of that schema. For example, if an individual had the preexisting schemas of "I am worthless" or "I cannot do anything right," the traumatic event may be recalled as evidence of worthlessness and propensity to fail, thus decreasing the likelihood of normal recovery. While the theory does not emphasize how pre-trauma schemata necessarily cause traumatic reaction, it is possible that already maladaptive cognitions about the self increase the likelihood of resulting psychopathology.

Despite the emphasis of the vulnerability and the social-cognitive models on maladaptive views of self before trauma exposure, few studies have empirically investigated the association between pretrauma self-esteem and PTSD. Bryant and Guthrie (2007) prospectively measured

negative self-appraisals prior to trauma exposure in a group of fire fighters that predicted subsequent PTSD symptoms after traumatic events. In another study, self-esteem in children between ages nine and 13 years before the September 11, 2001, terrorist attacks was retrospectively assessed by self and parent report and compared with PTSD symptoms six months after the attacks (Lengua, Long, Smith, & Meltzoff, 2005). Pre-attack self-esteem was associated with subsequent PTSD symptoms, providing some evidence that higher self-esteem before trauma exposure may protect against PTSD. In another study with New York City adult residents (Adams & Boscarino, 2006), self-esteem was assessed one year and two years after the World Trade Center attack. Low self-esteem was associated with PTSD at both time points. It appeared that post-trauma self-esteem increase was associated with remission, while self-esteem decrease was associated with increased reported severity of PTSD symptoms.

PTSD is often comorbid with at least one other psychiatric disorder (Zatzick et al., 1997), especially major depression (Breslau, Davis, Andreski, & Peterson, 1991; Creamer, Burgess, & McFarlane, 2001). Low self-esteem is commonly considered a symptom of major depression, but there is also evidence that low self-esteem may precipitate anxiety and stress disorders in accordance with the vulnerability model (Sowislo & Orth, 2013). While there is substantial evidence for pre-trauma depression as a risk factor for the development of PTSD (Kleim, Ehlers, & Glucksman, 2007; O'Donnell, Creamer, & Pattison, 2004; Pine, Cohen, Johnson, & Brook, 2002), it is unclear whether low global self-esteem early in life predicts PTSD later in life, in which case low self-esteem may contribute to a greater vulnerability for the development of PTSD in older adults.

## **Current Study**

Given the association between self-esteem and current psychopathology and the associations between self-esteem and later psychopathology, the main intents of this study were to determine if current low self-esteem is associated with PTSD in older adults and whether self-esteem in adolescence is a risk factor for PTSD in older adulthood. As adolescence has long been considered an important age of transition into adulthood (Hall, 1904) and an important time to consider self-esteem for adult outcomes, our cohort was assessed shortly before eligibility to enter the Vietnam War. Based on findings associating self-esteem with a variety of psychological outcomes, including PTSD (Adams & Boscarino, 2006; Boscarino & Adams, 2009; Bradley & Follingstad, 2003; Lengua et al., 2005; Trzesniewski et al., 2006), we expected that low self-esteem would be concurrently associated with PTSD in community-dwelling older adults. We also hypothesized that low self-esteem in late adolescence would predict PTSD in older age. Since Vietnam War veterans in our study likely have unique trauma histories with possibly distinct reactions due to the frequency and intensity of combat exposure during the Vietnam War (Caputo, 1977), we additionally investigated these associations with only the veterans in our community sample to see if they differed. We also hypothesized that combat exposure in young adulthood would be associated with PTSD among veterans, as demonstrated in previous research.

In order to not neglect individuals who may have subclinical symptoms of PTSD (posttraumatic stress syndrome; PTSS) but who may still be experiencing a related stress reaction, we also investigated scores on the PTSD measure as a continuous variable regardless of whether a cutoff for PTSD was reached. This approach is justified because the categorical distinction between PTSD and no-PTSD is often difficult to detect, and PTSD may be better

explained on a continuum (Erickson, Hedges, Call, & Bair, 2013). In addition, treatment for PTSD is also effective for individuals with subthreshold PTSD who may still be experiencing clinical impairments (Cukor, Wyka, Jayasinghe, & Difede, 2010; Foa, Hembree, & Rothbaum, 2007).

## **Method**

### **Participants**

Participants were originally recruited for a longitudinal, state-wide study of 6,729 juniors and seniors from a stratified random selection of Washington public high schools in 1966. This study was designed to assess the early-life course experiences of men and women starting in their adolescence and young adulthood. About 50 percent of the young men in this sample went into the military shortly after high school, and 50 percent of those young men served in Vietnam combat or combat support units. These former students were followed-up in 1980 (ages 33-37), and 90 percent participated in a telephone interview (Otto & Call, 1981). In 2010, the current follow-up was completed when most eligible respondents were about 64 to 65 years old (56% response rate). Consistent with mortality rates for this cohort, 636 of the original respondents had died or were too ill to participate in 2010.

Two versions of the 1966 survey were administered during school hours with roughly half of the high schools receiving the version relevant to our study ( $N = 3,084$ ). The version used in our study assessed adolescent self-esteem in 1966 while the other survey form did not. The 2010 data collection for our study was conducted by mail questionnaire with telephone surveys completed for those respondents who could not complete a mail survey. A \$2 honorarium was included in the original mailing to maximize survey response, resulting in 1,436 respondents in our analytic sample. The vast majority identified themselves as Caucasian ( $n = 1,418, 98.7\%$ ).

Data weights adjusting for non-response were incorporated in all models using the complex samples estimators (StataCorp, 2013). All phases of this follow-up study had Institutional Review Board approval.

### **Instrumentation**

**PTSD Checklist (PCL-17).** The PCL-17 was administered only during the current wave of our study. This self-report questionnaire is designed to assess the current presence of PTSD and severity of symptoms in clinical and research settings. It contains questions concerning the 17 PTSD symptoms found in the DSM-IV-TR (2000) diagnostic criteria. The respondents were asked to report on symptoms that had bothered them over the previous month on a Likert scale ranging from 1 to 5. This measure is often used in place of a diagnostic interview in research and clinical setting when an interview cannot be administered. General properties of the PCL for male veterans demonstrate good reliability (Cronbach's  $\alpha = .96$ ) (Keen et al., 2008). Convergent validity has been determined by comparison to several other PTSD measures and a clinical interview ( $r = 0.79$ ), demonstrating respectable validity.

The diagnostic utility and factor structure has been assessed for the use of the PCL-17 with older adults (ages 60 to 92), and a cut-off score of between 37 and 39 was found to be in the optimal range for identifying PTSD in this population (Pietrzak, Van Ness, Fried, Galea, & Norris, 2012b). We elected to use the slightly more conservative score of 39 or more to be considered a PTSD case. This cut-off score has also been supported in other validation and psychometric studies using the PCL with older adults (Cook, Elhai, & Areán 2005; Hudson, Beckford, Jackson, & Philpot, 2008). To assess subclinical PTSD (PTSS), we compared the same predictor variables in each of the previous regressions using the PCL score as a continuous variable, while excluding PTSD-positive cases ( $PCL \geq 39$ ), and adding the stipulation that at

least a moderate score of three was found on one of the eight variables on the PCL mentioning a stressful event in order to approximate distress occurring from a possible trauma.

**Rosenberg Self-Esteem Scale (RSES).** The RSES (Rosenberg, 1965) was administered in its full, 10-question format during adolescence, and three of the original questions were assessed in the current wave for cross-sectional examinations in older age. The RSES is a widely used self-report measure of global self-esteem. While the original version was based on a 4-point Likert scale without a neutral response, a current, commonly used version uses a 5-point scale of agreement with statements related to self-worth (e.g. “Strongly disagree,” “Disagree,” “Neither agree nor disagree,” “Agree” and “Strongly agree”). Half of the questions are positive, and the other five are negatively stated and reverse coded. Examples of questions include, “I feel that I have a number of good qualities” and “I certainly feel useless at times.” An analysis on the psychometric properties of a 4-point Likert version RSES on a US sample with mixed demographics (Sinclair et al., 2010) found high internal consistency (Cronbach’s  $\alpha = .91$ ), adding evidence of good reliability.

### **Statistical Analysis**

To prepare the data for analysis, we addressed missing data for those who completed the latest wave survey with multiple imputations using chained equations (Enders, 2010). Twenty versions of the dataset with all variables from this study and estimates of the missing data were produced with regression-based procedures. Analyses were then performed on each dataset and results were combined using statistical software (StataCorp, 2013). Our analysis focused on adolescent self-esteem collected in the 1966 survey (Initial Time Wave) and PTSD assessed in the recent 2010 survey (Current Time Wave). We tested our hypotheses on two groups for potential PTSD and PTSS including the full community sample, which was composed of the



entire analytic sample at the Current Time Wave and a veteran-only subgroup, a subset of the full community sample composed only of veterans. We ascertained the point prevalence of PTSD in the full community sample for comparison with the national prevalence (Kessler et al., 2005). We also determined the point prevalence of PTSD for veterans separately.

Using multiple regression, we first assessed the cross-sectional association of concurrent self-esteem with PTSD and PTSS in the community sample controlling for current annual income including all earnings and sources of investments (ranges between \$5,000 and \$175,000 or more), educational attainment (8th grade or less, some high school, high school graduate, some college, or college graduate), marital status (married or not married), and sex. For the longitudinal, community sample analysis, we tested the association between the early life predictors of adolescent self-esteem, veteran status (veteran or never served in the military), self-rated school aptitude (reading ability, fact memorization, writing papers, note taking, test taking, and class participation), GPA (last report card at the Initial Time Wave in junior or senior year of high school), and educational attainment, while controlling for current income, currently being married, and sex as predicting PTSD and PTSS in older age. We used the same procedures with the veteran-only longitudinal analysis (excluding sex as an independent variable since the veterans were mostly male), while additionally investigating combat exposure as a young adult as a predictor variable for PTSD and PTSS. We estimated exposure to trauma for those who served in a combat or war zone (combat-related trauma exposure) on a continuum of serving in a combat-support unit (less exposure), combat unit (most exposure), or “other” capacity in a combat or war zone. The “other” category was relatively small ( $n = 9$ ) and decidedly incorporated into the combat support unit. Finally, for the community sample, we tested for an

interaction between self-esteem and sex within our cross-sectional and longitudinal models in predicting a PTSD diagnosis.

## Results

Demographic and clinical variables for the Current Time Wave are shown for the community sample and veteran-only subgroup in Table 1. Sex was close to equally represented with 762 females (53%) and 674 males (47%) in our analytic sample. Most of the participants identified themselves as married ( $n = 1,142$ , 79%) in the full sample, with a similar distribution for the veterans ( $n = 278$ , 81%). Males and females were similar in reporting symptoms meeting criteria for PTSD in the full sample, with males comprising 48% and females comprising 52% of the PTSD-positive group of the community sample, respectively. Differences between the men and women PTSD prevalence were not significant ( $p = .80$ ). In our sample, 343 participants (24%) were veterans, a group that contained only nine women. The veteran-only subgroup had a higher point prevalence of PTSD (10%) than the community sample overall (7%). The average total household income at Current Time Wave was in the \$80,000 to \$89,999 range for both the community sample and the veteran-only group. The modal level of highest education in the full community sample and veteran-only subgroup was high school diploma, with a similar distribution of highest educational attainment overall.

Bivariate analyses between each predictor variable in our study and PTSD were performed to determine uncontrolled significance (Table 2). Most study variables had statistically independently significant associations with PTSD, except for sex in both the full community sample and the veteran-only subgroup, income in the full community sample, and GPA in the veteran-only subgroup. The binary PTSD dependent variable models across the study are reported in odds-ratios.

Table 1

*Descriptive Statistics of Study Variables by Sample Group (Current Time Wave): Percentages*

	Full Community Sample	Veteran-Only Subgroup
Sex Across Groups		
Male	47	97
PTSD		
Male, PTSD Positive	48	97
Married	79	81
Income		
< \$20,000	7	06
\$20,000-39,999	13	12
\$40,000-59,999	17	22
\$60,000-79,999	19	19
≥ \$80,000	44	41
Educational Attainment		
8 <sup>th</sup> Grade or Less	1	1
Some High School	17	20
High School Diploma	35	42
Some College	31	27
College Graduate	17	11
Veterans		
Combat Unit	-	24
Combat Support Unit	-	28
Neither Unit	-	48
<i>N</i>	1,436	343

*Note.* The Community Sample includes both the veterans and non-veterans combined

Table 2

*Bivariate Associations of Each Study Variable with PTSD: Odds Ratios*

	PTSD-Positive	
	Full Community Sample	Veteran-Only Subgroup
Concurrent Self-Esteem	.20***	.24***
Adolescent Self-Esteem	.55**	.49*
Educational Attainment	.66***	.66*
Being Female	.95	1.14
Married	.57*	.44*
Income	.98	.89*
Veteran	1.56*	--
School Aptitude	.68*	.52*
GPA	.67**	.73
N	1,436	343

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 3 reports cross-sectional associations with PTSD and PTSS within the community sample of older adults. As expected with current understanding of PTSD and concurrent self-esteem, lower self-esteem scores were associated with PTSD ( $OR = .21, p < .001$ ). Lower education was also associated with PTSD. Contrary to the typical differences in sex prevalence, sex in this sample was not associated with PTSD. Income was also not significantly associated with PTSD. For the PTSS analysis, lower self-esteem was significant ( $b = -2.43, p < .001$ ). The other variables were non-significant in predicting PTSS (educational attainment, being female, being married, and income).

Table 3

*Cross-Sectional Associations of PTSD and PTSS for the Full Community Sample (Current Time Wave Only)*

	PTSD <sup>a</sup>	PTSS <sup>b</sup>
Concurrent Self-Esteem	.21***	-2.43***
Educational Attainment	.74*	.12
Being Female	.79	.64
Married	.75	-1.18
Income	.99	.01
N	1,436	223

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

<sup>a</sup> Odds ratios from logistic regression.

<sup>b</sup> Unstandardized coefficients from OLS regression.

Table 4 presents the results of the longitudinal community sample of PTSD and PTSS. In this sample, adolescent self-esteem measured decades earlier predicted a diagnosis of PTSD later in life (OR = .61,  $p < .05$ ). Highest educational income continued to predict PTSD (OR = .71,  $p < .01$ ). Income, veteran-status, sex, being married, school aptitude, and GPA were all non-significant in the model. The PTSS analysis showed no significant associations with the predictor variables of adolescent self-esteem, educational attainment, veteran-status, sex, current income, being married, school aptitude, or GPA. For both the cross-sectional and longitudinal community models, there was no interaction between sex and self-esteem despite differences in lifetime global self-esteem between males and females found in some studies (e.g., Robins et al., 2002).

Table 4

*Longitudinal Predictors of PTSD and PTSS for the Full Community Sample*

	PTSD <sup>a</sup>	PTSS <sup>b</sup>
Adolescent Self-Esteem	.61*	-1.12
Educational Attainment	.71**	.20
Being Female	1.12	.49
Married	.64	-.93
Income	.99	-.01
Veteran	1.52	-1.24
School Aptitude	1.17	.88
GPA	.91	-.77
N	1,436	223

Note. \*  $p < .05$ , \*\*  $p < .01$ .

<sup>a</sup> Odds ratios from logistic regression.

<sup>b</sup> Unstandardized coefficients from OLS regression.

The veteran-only group presented in Table 5 was predominantly male; therefore, we excluded sex from the longitudinal model. Unlike the other models, adolescent self-esteem was not statistically significant in predicting PTSD in older adult veterans. The only statistically significant predictor of PTSD in veterans was combat exposure (OR= 2.20,  $p < .001$ ). The PTSS model revealed no significant associations among the predictor variables. Combat exposure appears to uniquely discriminate PTSD in our veteran-only subgroup as a predictor from PTSS.

Table 5

*Longitudinal Predictors of PTSD and PTSS for the Veteran-Only Subgroup*

	PTSD <sup>a</sup>	PTSS <sup>b</sup>
Adolescent Self-Esteem	.68	-.55
Educational Attainment	.89	-.49
Married	.52	.60
Income	.93	-.003
School Aptitude	.70	.77
GPA	1.48	-.09
Combat Exposure	2.20***	.23
N	341	56

*Note.* \*\*\*  $p < .001$

<sup>a</sup> Odds ratios from logistic regression.

<sup>b</sup> Unstandardized coefficients from OLS regression.

### Discussion

This study's main purpose was to understand the relationship between low self-esteem and PTSD in later life. The PTSD point prevalence of 7% in our overall sample was higher than other U.S. estimates of PTSD in older adults (2.5%, Kessler et al., 2005). We hypothesized that PTSD would have a higher prevalence due, in part, to a sizable proportion of veterans in our overall community sample. However, while the veteran-only subgroup had a higher prevalence of PTSD than the overall community sample (10% vs. 7%, respectively), being a veteran did not predict the presence of PTSD or PTSS in the longitudinal, community model. It is also possible that this finding may be explained by different diagnostic procedures for PTSD used between this study (self-administered questionnaire) and the Kessler et al. (2005) study (structured interview).

As hypothesized, current PTSD in the community sample was cross-sectionally associated with low self-esteem. This supports the newly specified PTSD symptom in the DSM-5 of “Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world” (American Psychiatric Association, 2013). It is well established that PTSD contributes to a sense of worthlessness, especially in cases where the victim of a trauma believes he or she is at fault (e.g. sexual assault; Dunmore et al., 1999). Further, our main hypothesis that lower self-esteem from adolescence in the overall community sample was associated with PTSD later in life was also supported. This result indicates that lower self-esteem may have an enduring impact on the susceptibility and maintenance of PTSD beyond specific trauma context wounding self-esteem. Lower self-esteem predicted PTSS in older adults concurrently, but adolescent self-esteem did not predict PTSS in the longitudinal model. This may suggest that lower self-esteem in adolescence is more predictive of traumatic reactions in older adults specific to PTSD than general stressful reactions.

There are several possible implications for the association of self-esteem in adolescence with later life. First, this finding is consistent with the vulnerability model (Beck, 1967) and suggests that low self-esteem is a general risk factor for PTSD. According to this model, low self-esteem may contribute to a lack of coping resources in the wake of stressful events (Zeigler-Hill, 2010). Individuals with lower self-esteem may subjectively experience stressful events more traumatically, although we could not assess this hypothesis in the present study. Frazier et al. (2011) explained that optimism and self-esteem are positively related and when diminished contribute to a more severe interpretation of the stressful event. This subjective experience of trauma may be more associated with subsequent posttraumatic reaction than the “objective” severity of an event (Brewin et al., 2000; Zoellner, Rabe, Karl, & Maercker, 2008).



Cognitive models usually specify low self-esteem as a risk factor for depression, but our findings suggest that individuals with lower self-esteem may also have a vulnerability to PTSD. A cognitive self-schema of worthlessness may predispose an individual to traumatic interpretations of events that support the belief. Our findings may also contribute to the social cognitive information processing model of PTSD specifying that beliefs about the self may perpetuate a traumatic reaction through the process of assimilation. An individual's memory and interpretation of a traumatic event become shaped by preexisting schema and the information is too difficult to process. Unlike cognitive theory, social-cognitive information theory does not implicate pretrauma beliefs about the self as necessarily causal, but our findings suggest low self-esteem may increase the risk.

Sex did not predict PTSD or PTSS in our models. This finding corresponds with a large community study in Germany that also found no differences in the rate of PTSD between sexes in individuals over 65 (Spitzer et al., 2008), justifying further investigation into sex differences in PTSD presentation in older adults. Our findings suggest that sex may not be associated with PTSD in older adults. Likewise, we expected to find an interaction between sex and self-esteem in predicting PTSD, but we did not. Future research efforts aimed at studying sex differences of PTSD vulnerability with low self-esteem may be warranted. Income was not a significant predictor for PTSD or PTSS in any model. This finding was dissimilar from previous studies that have shown an association between lower socioeconomic status or income and PTSD (Bolin & Klenow, 1995; Brewin et al., 2000; Parto et al., 2011; Pietrzak et al., 2012a; Schnurr et al., 2004). Lower educational attainment predicted PTSD in the community sample, but not PTSS, a finding that contributes to a mixed literature (Brewin et al., 2000; Chen et al., 2012; deRoos-Cassini et al., 2010; Tran et al., 2013). GPA in high school and self-rated aptitude in academic

subjects did not predict PTSD or PTSS in any of the models, indicating that having more education was more important in our sample than performance and perceptions of ability while in high school.

This is also the first study to examine the relationship between self-esteem prior to military service and PTSD in older age using a longitudinal design. Approximately 10% of the veterans in the sample met our criteria for PTSD, comparable to previous findings of PTSD prevalence between 8.5% and 19.3% among Vietnam veterans (Magruder & Yeager, 2009). Self-esteem assessed in late adolescence before military service was not associated with PTSD or PTSS in older veterans. While these results do not address the relationship between self-esteem in late adolescence and the initial development of PTSD (PTSD was not an official diagnosis during or immediately after Vietnam), they suggest that persisting PTSD in older veterans may be more related to other factors than to self-esteem. While we did not assess specific traumatic events, it is possible that pretrauma risk factors such as self-esteem are mitigated by the more severe and frequent exposure to trauma found in combat, such as failure to find common sex differences in risk factors among veterans across studies (Brewin et al., 2000). Accordingly, level of combat exposure was significantly associated with a diagnosis of PTSD among veterans in our sample.

Understanding how early life-constructs and traits predict later life psychopathology may help to explain smaller prevalence rates of disorders in older age such as PTSD. This line of research may also aid in the prevention and treatment of PTSD. Efforts to directly manipulate self-esteem in the absence of psychopathology has had limited and sometimes detrimental effects depending on the targeted outcome (Baumeister et al., 2003). Pretrauma prevention efforts for PTSD are still new and not well-established in the literature (Skeffington et al., 2013), but should

be influenced by the understanding of risk and protective factors. While our study focused on better understanding influences on PTSD in older age, future research should also explore different age groups as self-esteem may have distinct associations with PTSD in other life stages. For example, adults in their 60s typically have nearly the highest lifetime self-esteem (Robins et al., 2002), which may in part account for some of the lowest typical prevalence of PTSD (Kessler et al., 2005). This may support the stress-buffering hypothesis of self-esteem that considers high self-esteem a protective factor for psychopathology related to environmental stress (Zeigler-Hill, 2010).

Our study has a number of strengths. This is the first study to assess the role of late adolescent self-esteem in relation to later-life PTSD by cohort design, in this case over 40 years later. The longitudinal design allowed for a greater understanding of how self-esteem can affect individuals over a lifetime. Our study also benefited from the use of well-established, standardized measures with a large number of individuals. We also used multiple imputations to account for missing data, a robust technique for use in large-scale studies.

Several limitations in our study require consideration. We obtained the diagnosis for PTSD by self-completed questionnaire and not by a diagnostic interview. We also did not assess specific traumas accounting for PTSD symptoms limiting our understanding of the onset and course of PTSD in our sample. While this was a cohort design, it is not entirely prospective in nature because we do not know if participants met criteria for PTSD at the Initial Time Wave during adolescence (PTSD was also not yet an official diagnosis). Depression was not assessed at the Initial Time Wave, a known predictor variable for chronic PTSD (Kleim et al., 2007). This would have helped establish lower self-esteem as a predictor variable of PTSD independent of early-life depression. Finally, there may be other covariates that better explain the effects of

self-esteem on PTSD as in other studies (e.g., leading to the potential for residual confounding). Future studies should also focus on self-esteem immediately prior to traumatic events to the extent possible as to further understand how self-esteem relates to the development of PTSD; however, this may be easier accomplished in high-risk employment (e.g., military, policemen, etc.) than in community samples.

In sum, PTSD in older age is associated with lower concurrent self-esteem and with lower self-esteem in adolescence. Our findings suggest that lower self-esteem may be a risk factor for having PTSD in older age, an age group less likely to be diagnosed with PTSD compared to younger age groups. However, the veteran subgroup did not exhibit the same association between adolescent self-esteem and PTSD in older age. We also did not find any interaction between sex and self-esteem in predicting PTSD in the overall community sample, despite common differences in PTSD prevalence by sex (Breslau et al., 1997; Brewin et al., 2000) and self-esteem differences between sexes (Robins et al., 2002). Understanding risk and protective factors for PTSD may contribute to the prevention and treatment of PTSD in older adults.

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