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A Life-span Perspective on Combat Exposure and PTSD Symptoms in Later Life: Findings From the VA Normative Aging Study

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Abstract

Purpose of the Study: We tested a life-span model of combat exposure on posttraumatic stress disorder (PTSD) symptoms in later life, examining the direct and indirect effects of prewar, warzone, and postwar factors.
Design and Methods: The sample included 947 male World War II and Korean War veterans from the VA Normative Aging Study (*M*age = 65, *SD* = 7). They completed mail surveys on childhood family environment, military service and postwar experience, stressful life events, and PTSD symptoms (response rates > 80%).
Results: We constructed an initial path model testing cumulative advantage and disadvantage pathways. Although all hypothesized relationships were significant, the model was not a good fit to the data. Subsequent models showed that all three life-span periods had both direct and indirect effects on PTSD symptoms and that there were interesting cross-links between the two sets of pathways.
Implications: The life-span perspective provides a useful heuristic to model various developmental effects on later-life outcomes. A supportive childhood family environment can have lifelong protective effects, whereas a conflictual one can set up lifelong patterns of pessimistic appraisals.

Key Words: Combat exposure, Childhood family environment, Social support, Homecoming, PTSD symptoms

Military service is an important developmental experience that has lifelong effects on veterans' lives (Aldwin, Levenson, & Spiro, 1994). Nearly half of all men aged 65 and older have had military experience, and half of those may have experienced combat (Spiro & Karel, 2013). Thus, combat exposure and its effects are "hidden variables" in the lives of older men (Spiro, Schnurr, & Aldwin, 1997). Combat exposure and other stress warzone experiences can have a negative impact on veterans' lives (Renshaw, 2011;

Vinokur, Pierce, Lewandowski-Romps, Hobfoll, & Galea, 2011; Vogt et al., 2011). Many combat veterans develop posttraumatic stress disorder (PTSD) as a result, although the exact number varies by conflict (Spiro, Settersten, & Aldwin, 2015). Many continue to experience the deleterious effects of PTSD in later life (King, King, Vickers, Davison, & Spiro, 2007; Spiro et al., 1994). There are also positive effects of military service throughout adulthood (Aldwin et al., 1994; MacLean & Elder, 2007), and more work is

needed to understand the positive and negative pathways through which military service may have long-term effects, especially in later life.

Life-span developmental theory holds that development consists of both gains and losses (Baltes, 1987). Further, it focuses on plasticity and interindividual differences in development, although earlier influences can exert long-term effects through probabilistic pathways. A life-span developmental perspective on effects of military service is needed to understand individual differences in the long-term effects of combat (Spiro et al., 2015).

A Life-span Approach to the Long-term Effects of Military Service

Prewar, warzone, and postwar variables can have both direct and/or mediated effects on the long-term effects of combat exposure on well-being in late life (Brewin, Andrews, & Valentine, 2000; King, Vogt, & King, 2004; Ozer, Best, Lipsey, & Weiss, 2008). Prewar variables include childhood trauma (Smid, Kleber, Rademaker, van Zuiden, & Vermetten, 2013; Vinokur et al., 2011), family cohesion (Vogt et al., 2011), and age at entry (McLean & Elder, 2007). Warzone variables include not only combat exposure and appraisals of military experience (Aldwin et al., 1994) but also protective factors such as unit cohesion (Lee, Vaillant, Torrey, & Elder, 1995). Postwar variables commonly include the homecoming experience (Lee et al., 1995), additional stressful life events (King, King, Fairbank, Keane, & Adams, 1998), and social support (Vogt et al., 2011).

Kraemer, Stice, Kazdin, Offord, and Kupfer (2001) argued for consideration of more complex relationships between risk factors and pathways to outcomes. Several recent studies on the effects of military service have examined such relationships. Vinokur and colleagues (2011) found that combat exposure directly affected PTSD symptoms, resource losses, and job burnout at baseline and had a number of direct and indirect effects on the same variables 14 months later. Renshaw (2011) examined combat preparedness, combat exposure, and postbattle effects on PTSD symptoms in a cross-sectional study. They found that the effects of combat and preparedness on PTSD symptoms were mediated through the perceived threat of the situation, but postbattle experiences had direct effects. Vogt and colleagues (2011) expanded on Renshaw's study by including childhood family functioning and prior stressors, as well as combat exposure and perceived threat. In addition, they added postdeployment stress and social support. Their complex model indicated both direct and indirect effects. King, King, Foy, and Gudanowski (1996) found an indirect effect between younger age at entry and PTSD symptoms through combat exposure in Vietnam veterans.

Life-span developmental theory is particularly advantageous in organizing our understanding and synthesis of the multiple pre, during, and postcombat variables and their relative contribution to late life PTSD. Plasticity and probabilistic effects of early childhood characteristics on lifelong trajectories can be couched in terms of cumulative advantage/disadvantage theory (Dannefer, 2003; London & Wilmoth, 2006). This theory proposes that early childhood factors set up chains of events that lead to either positive or negative developmental pathways (Aldwin, Levenson, & Kelly, 2009). For example, Smid and colleagues (2013) found that early childhood trauma had effects on posttraumatic stress through its effects on both deployment and postdeployment stressors. Similarly, deployment stressors increase the risk of postdeployment distress through their effects on these later stressors.

Vogt and colleagues have been advancing the field by including protective factors as well as risk factors in their models. Vogt and Tanner (2007) found that the protective effect of a cohesive childhood family environment on PTSD was mediated by postwar social support, as well as by postwar stressors. Further, exposure to combat indirectly predicted PTSD through postwar stressors (see also Vogt et al., 2011).

An important gap in these life-span studies, however, is lack of consideration of protective effects of some warzone factors. In particular, unit cohesion (Brailey, Vasterling, Proctor, Constans, & Friedman, 2007; McTeague, McNally, & Litz, 2004) may be a salient factor to include, as well as both positive (and negative) appraisals of military service (Aldwin et al., 1994; Elder & Clipp, 1988).

Present Study

The cumulative advantage perspective is depicted in the top part of Figure 1. Positive early childhood environments typically lead to better attachment, which in turn leads to more positive interactions with others, and ability to form close friendships and gain social support in adulthood (Southwick, Douglas-Palumberi, & Pietrzak, 2014). These individuals may be more likely to report unit cohesion and more optimistic appraisals of military service, which in turn lead to better support and fewer PTSD symptoms in later life.

The lower portion of Figure 1 depicts cumulative disadvantage theory. Adverse early childhood environments promote pessimism (Taylor & Stanton, 2007), which might lead to negative appraisals of situations such as military service. Individuals who have negative appraisals might have poorer homecomings, which lead to more stressful life events, and greater likelihood of PTSD symptoms in later life.

We hypothesize that cohesive family interactions in childhood will drive the cumulative advantage pathway, protecting veterans from PTSD symptoms in later life, whereas conflictual family interactions will drive the cumulative disadvantage pathway, increasing the risk.

Method

Sample and Procedure

The sample consisted of male veterans participating in the VA Normative Aging Study (NAS), a longitudinal study
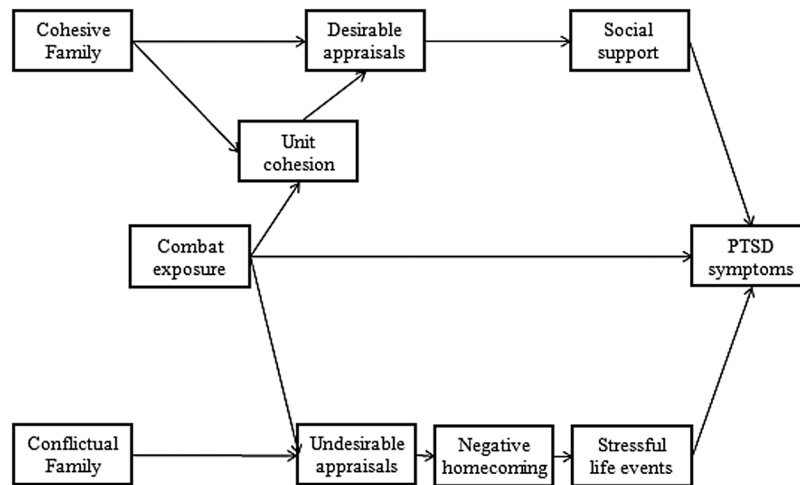
Figure 1. Theoretical model based on cumulative advantage/disadvantage theory.

begun in the 1960s (Spiro & Bossé, 2001). More than 6,000 men were recruited and screened between 1961 and 1970, and 2,280 men met the criteria of absence of serious chronic physical and mental disease (Bossé, Ekerdt, & Silbert, 1984). NAS men receive health examinations every 3 years and are sent mail surveys periodically.

Data for the current study were drawn from three mail surveys, two of which focused on military service. The Military Experience Survey was mailed in 1990 to 1,742 men; 1,444 (82.9%) responded. A short follow-up survey was mailed in 1991 to 1,725 men; 1,396 (80.9%) responded. Demographics and stressful life events were drawn from the 1988 Social Support Survey, which was closest in time (and prior) to the Military Surveys. This was mailed to 1,799 men; 1,490 (82.8%) responded. Nine hundred and forty-seven men responded to all three surveys.

Excluded men were slightly older and had more negative homecoming experiences and PTSD symptoms, as well as lower desirable appraisals and social support, *t*s range from −2.04 to 5.91, *p* values <.05. There were no other differences in demographic data or study variables.

In 1990, the men were 47–92 years old (*M* = 65, *SD* = 7). When they entered the military, most (88.2%) were not married. Close to half of them served in the Army (47.8%); the rest served in the Navy (29.9%), Air Force (19.7%), Marines (7.0%), or Coast Guard (2.7%); some men served in more than one branch of the armed services, so the sum > 100%. More than one third (39.2%) of the men served under combat conditions, largely during World War II or Korean War.

Measures

Prewar variables
Age at entry into military service ranged from 14 to 37 years (*M* = 20.67, *SD* = 3.60). Most were enlisted men at entry (88.8%), with a relatively small number of noncommissioned (NCOs; 3.5%) and commissioned officers (6.2%); we dichotomized rank into enlisted versus NCOs and officers.

Childhood family environment was assessed by Family Environment Scale (FES; Moos & Moos, 1981), a measure assessing the social and environmental characteristics of families. The men indicated whether each item was characteristic of their family of origin (i.e., childhood). The FES consists of 40 dichotomous items organized into 10 subscales. We used two subscales, each having four items: *Cohesive* (e.g., "Family members really help and support each other") and *Conflictual* (e.g., "We fight a lot in our family"). The FES has demonstrated reasonable reliability and validity (Moos, 1990).

Warzone variables
Combat exposure was assessed using Keane and colleagues' (1989) 7-item Combat Exposure Scale (CES), with items rated on a 5-point Likert scale (e.g., "Were you ever under enemy fire?"). Scores were computed following Keane and colleagues, weighting items according to severity. For men who completed only five or six items, scores were computed using mean substitution. The CES has good internal reliability and test–retest stability (Keane et al., 1989).

Unit cohesion during military service (Lee et al., 1995) was assessed by three questions rated on a 7-point Likert scale; higher scores indicate higher cohesion. These questions came from a scale rating men's attitudes toward the military, for example, "How did you feel about belonging to this outfit?" Scores were summed.

Appraisals of military service were measured by 28 items, based on Elder and Clipp (1988). Items were rated on a 4-point scale ranging from 0 (*not at all*) to 3 (*a lot*). *Desirable appraisals* were composed of 14 items, for example, "broader perspective." *Undesirable appraisals* consisted of 14 items, for example, "disrupted my life." Previous work has shown that these appraisals are related to PTSD symptoms in later life (Aldwin et al., 1994).

Postwar variables
Negative homecoming experiences were assessed using five items based on Laufer, Yager, Frey-Wouters, and Donellan

(1981). Response options ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Items included "People at home just didn't understand what I had been through in the armed forces" and "In general, my feelings about my military service after being discharged were very positive." Two items were reverse coded, and item responses were then summed.

Later-life stressful life events **were assessed using the** Elder's Life Stress Inventory (ELSI; Aldwin, 1990) was used to assess major life events during the past year. The ELSI consists of 29 stressful events, such as death of a spouse, which could have occurred in the past year. The ELSI has reasonable validity in terms of self-rated health (Aldwin, 1990) and also predicts mortality (Aldwin et al., 2011).

Social support after homecoming was assessed using five items, which asked how frequently the respondent spoke about their military experience to family and friends, an indicator of social support (Elder & Clipp, 1988; Settersten, 2006). Each question was rated on a 4-point Likert scale (1 = *never*, 2 = *used to but stopped*, 3 = *occasionally*, and 4 = *frequently*).

PTSD symptoms

PTSD symptoms were assessed by the 35-item Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1988). Items were rated on a 5-point Likert scale (1 = *not at all true of them*, 5 = *extremely true of them*). Higher scores indicated greater PTSD symptoms. The Mississippi Scale has good internal consistency, test–retest stability, and construct and discriminant validity (Keane et al., 1988). Sample items include "Unexpected noises make me jump," "I lose my cool over minor everyday things," and "I have nightmares of experiences in the military that really happened."

Analyses

Missing data

Overall, 4% of values were missing in the study variables; however, the two FES scales had a much higher rate of missingness, about 14%. To include cases with missing data, we used multiple imputation. We imputed 20 data sets with Stata 11 (StataCorp, 2009), using Graham's (2009) process for multiple imputation. All variables, including the dependent variable, were included in the imputation model. The value of a categorical variable, rank at entry, was imputed without rounding.

Path analysis

King and colleagues (1996) pointed out that path analysis is an effective method to reveal multifaceted relationships among a large number of variables. The path model was developed on the historical ordering of prewar, warzone, and postwar variables, although the data used for this study are cross-sectional and retrospective (see Vukšić-Mihaljević, Mandić, Benšić, & Mihaljević,

2000). Path models were estimated with Mplus, Version 7.0 (Muthén & Muthén, 2012), using maximum likelihood estimation. Fit was evaluated using a variety of goodness of fit indices, including Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA; Kline, 2005), Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC; Muthén & Muthén, 2012).

We started with an initial model (Model 0) based on Figure 1. Goodness of fit indicators and modification indices (MIs > 3.84) were used to revise the model. This was done in three stages: first adding the suggested path from the prewar variables (Model 1), then the suggested paths from the warzone variables (Model 2), and finally the suggested paths from the postwar variables were examined in the final model (Model 3).

Results

Correlations Among Study Variables

Scale characteristics and correlations are displayed in Table 1. Most Cronbach's alphas exceeded .70. All of the prewar, warzone, and postwar variables (except age at entry) were significantly correlated with PTSD symptoms, in expected directions (Table 2). Thus, we omitted age at entry from further consideration.

The protective variables from all three stages, family cohesion, unit cohesion, desirable appraisals, and social support, were negatively related to PTSD symptoms; and they were positively correlated with one another and negatively correlated with risk factors. Risk variables, including conflictual families, combat exposure, undesirable events, and negative homecoming, were positively correlated with PTSD symptoms; they were positively correlated with one another and negatively with protective variables.

Combat exposure was associated with both higher levels of desirable and undesirable appraisals, as well as with unit cohesion. This supports our earlier observations that there are positive aspects of combat supporting personality growth in factors such as mastery, spirituality, and close relationships (Aldwin et al., 1994).

Testing a Life-span Model

We constructed an initial path model to examine both positive (cumulative advantage) and negative (cumulative disadvantage) pathways from prewar and warzone variables to PTSD symptoms in later life. This model was based on the theoretical model in Figure 1 and specified that each variable affected only the next variable in a simple pathway approach. This strict interpretation of a cumulative advantage/disadvantage model assumed continuous mediated effects. This model was then revised by adding additional paths, based on a combination of factors including large modification indices (MI > 3.84;

Table 1. Summary Statistics for Scales of Prewar, Warzone, and Postwar Variables (*n* = 947)

Scales	*n* of items	*M*	*SD*	Range	α
Prewar variables					
Family Environment Scale					
Cohesive FES	4	3.09	1.08	0 / 4	.55
Conflictual FES	4	0.94	1.16	0 / 4	.70
Age at entry	1	20.67	3.60	14 / 38	N/A
Rank at entry	1	1.10	.30	1 / 2	N/A
Warzone variables					
Combat exposure	7	5.70	9.42	0 / 41	.93
Unit cohesion	3	17.34	2.59	3 / 21	.74
Desirable appraisals	14	27.76	8.48	0 / 42	.91
Undesirable appraisals	14	7.01	6.05	0 / 42	.83
Postwar variables					
Negative homecoming	5	9.62	2.61	5 / 20	.66
Stressful life events	30	2.38	2.31	0 / 17	N/A
Social support	5	11.12	3.66	0 / 20	.77
PTSD symptoms	35	57.33	10.34	35 / 175	.84

Note: Rank at entry: 1 = Enlisted man, 2 = Noncommissioned and commissioned officer. FES = Family Environment Scale; PTSD = posttraumatic stress disorder.

Table 2. Correlations Among Prewar, Warzone, and Postwar Variables after Multiple Imputation (*n* = 947)

	Prewar variables				Warzone variables				Postwar variables			
	1	2	3	4	5	6	7	8	9	10	11	12
1. Cohesive FES	—											
2. Conflictual FES	−.32***	—										
3. Age at entry	.11***	−.04	—									
4. Rank at entry	.08*	.00	.17***	—								
5. Combat exposure	.06†	−.02	−.03	.01	—							
6. Unit cohesion	.24***	−.06†	−.06†	.04	.18***	—						
7. Desirable appraisals	.12***	−.01	−.20***	.05	.18***	.42***	—					
8. Undesirable appraisals	−.02	.07*	.30***	.02	.28***	−.19***	.03	—				
9. Negative homecoming	−.17***	.12***	.03	−.04	.06†	−.24***	−.12***	.32***	—			
10. Stressful life events	−.08*	.10**	−.09**	−.01	−.06†	−.04	.04	.15***	.15***	—		
11. Social support	.14***	−.03	.03	.06†	.03	.12***	.25***	.06†	−.13***	.07*	—	
12. PTSD symptoms	−.24***	.21***	.05	−.08*	.25***	−.17***	−.10**	.41***	.34***	.21***	−.13***	—

Notes: FES = Family Environment Scale; PTSD = posttraumatic stress disorder.
†*p* < .10. **p < .05. ***p < .01. ****p < .001.

Breckler, 1990), and allowing paths between the positive and negative pathways. Successive models tested adding paths from prewar (Model 1), warzone (Model 2), and then postwar variables to PTSD symptoms (Model 3; Table 3).

In the baseline model (Model 0), most of the hypothesized pathways were significant (Figure 2). For the cumulative disadvantage pathways, conflictual FES was associated with undesirable appraisals, which in turn was associated with negative homecoming, then stressful life events, and PTSD symptoms. For the cumulative advantage pathways, cohesive FES was associated with better unit cohesion (but not with desirable appraisals). Nonetheless, unit cohesion was associated with desirable appraisals, which in turn was associated with higher social support, which led to lower

PTSD symptoms. Combat exposure had a direct effect on PTSD symptoms. However, model fit indices indicated that this model was not a good fit to the data (Table 3).

In Model 1, we deleted the nonsignificant path from cohesive FES to desirable appraisals and added four paths stemming from the prewar variables: cohesive FES to social support, negative homecoming, and PTSD symptoms, and conflictual FES to PTSD symptoms. Adding these four paths significantly increased model fit (Table 3).

In Model 2, we added seven paths stemming from the warzone variables, improving the model fit (Table 3). Combat exposure was significantly associated with desirable appraisals, which in turn were negatively associated with PTSD symptoms. However, it was negatively associated with stressful life events. Unit cohesion was negatively

Table 3. Sequential Chi-Square Difference Tests for Path Models (*n* = 947)

Model	Model fit							Δ from base			Δ from previous		
	χ^2	df	RMSEA	SRMR	CFI	AIC	BIC	χ^2	df	*p* Value	χ^2	df	*p* Value
Base model	417.411	32	.11	.10	.63	41,553.24	41,703.16						
Model 1	319.996	29	.10	.07	.72	41,461.82	41,626.26	97.415	3	<.001			
Model 2	77.869	22	.05	.04	.95	41,233.70	41,431.98	339.542	10	<.001	242.127	7	<.001
Final model	32.695	19	.03	.03	.99	41,194.52	41,407.32	384.716	13	<.001	45.174	3	<.001

Notes: Base model = Hypothesized base path model.

Model 1: delete 1 path (cohesive FES to DA) and add 4 paths (cohesive FES to SS & NHE & PTSD; and conflictual FES to PTSD).

Model 2: add 7 paths (CE to DA; CE to SLE; UC to UA; UC to NHE; DA to PTSD; UA to SLE; and UA to PTSD).

Final model: add 3 paths (SS to NHE; SS to SLE; and NHE to PTSD).

AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CE = combat exposure; CFI = Comparative Fit Index; DA = desirable appraisal; FES = Family Environment Scale; NHE = negative homecoming experience; PTSD = posttraumatic stress disorder; RMSEA = Root Mean Square Error of Approximation; SLE = additional stressful life event; SRMR = standardized root mean square residual; SS = social support; UA = undesirable appraisal; UC = unit cohesion.
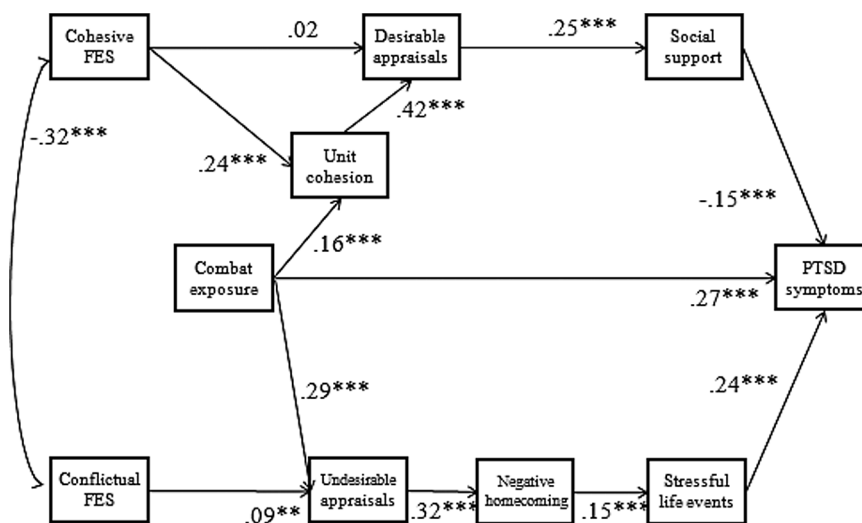

Figure 2. Base model with standardized parameter estimates. Model fit: χ^2(32, *n* = 931) = 417.411, *p* < .001, RMSEA = .11, SRMR = .10, and CFI = .63. **p < .01. ***p < .001.

associated with both undesirable appraisals and negative homecoming. Undesirable appraisals were positively related with stressful life events and directly associated with PTSD symptoms.

In Model 3 (the final model), we added pathways for the postwar variables, improving the fit (Table 3 and Figure 3). Social support was inversely related to negative homecoming, but it was slightly related to higher life events. Negative homecoming was directly related to PTSD symptoms.

Table 4 presents the direct and indirect effects from the final model. There was a direct effect from cohesive FES to PTSD, *B* = –.140, and a total indirect effect of –.066, for a total effect of –.206, *p* < .001. Cohesive FES had indirect effects on PTSD via unit cohesion and social support. Some of these indirect effects of cohesive FES occurred through decreasing the likelihood of negative homecoming—in other words, cumulative advantage and disadvantage pathways were not independent.

Conflictual FES also had direct, *B* = .105, and indirect effects, *B* = .049, for a total effect of .149, *p* < .001 on PTSD. All of the indirect pathways were through undesirable

appraisals. The magnitude of the effect of conflictual FES appeared smaller than that of cohesive FES. Both FES measures had stronger direct effects than indirect effects.

Discussion

We utilized a life-span approach to model the effects of combat exposure on PTSD symptoms in later life, testing cumulative advantage/cumulative disadvantage models. We initially specified a positive set of pathways, from family cohesion in childhood (prewar) to unit cohesion and positive appraisals of military service in the warzone, to social support in the postwar period, which was hypothesized to be a protective factor against PTSD symptoms. In contrast, the cumulative disadvantage pathway led from conflictual families to negative appraisals of military service, which was thought to predict a negative homecoming, leading to more stressful life events in the postwar period, which was thought to be a risk factor for PTSD symptoms in later life. The initial model showed that all of the hypothesized paths were significant. Combat exposure was an independent
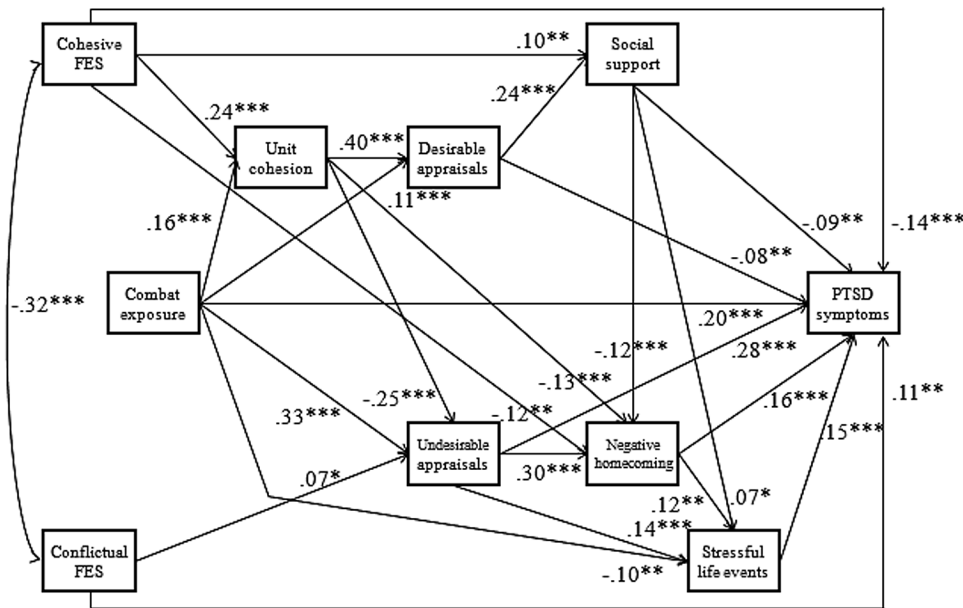
Figure 3. Final model with standardized parameter estimates. Model fit: $\chi^2(19, n = 931) = 32.965$, $p < .05$, RMSEA = .03, SRMR = .03, and CFI = .99. $*p < .05$. $**p < .01$. $***p < .001$.

Table 4. Direct and Indirect Effects of Prewar, Warzone, and Postwar Variables on PTSD Symptoms ($n = 947$)

Variables	Effects		
	Direct	Indirect	Total
Cohesive FES to PTSD	–.140***	–.066***	–.206***
FES → UC → DA → PTSD		–.008**	–.008**
FES → UC → DA → SS → PTSD		–.002**	–.002**
FES → UC → DA → SS → NHE → PTSD		.000**	.000**
FES → UC → DA → SS → NHE → SLE → PTSD		.000*	.000*
FES → UC → DA → SS → SLE → PTSD		.000†	.000†
FES → UC → UA → PTSD		–.016***	–.016***
FES → UC → UA → NHE → PTSD		–.003***	–.003***
FES → UC → UA → NHE → SLE → PTSD		.000*	.000*
FES → UC → UA → SLE → PTSD		–.001**	–.001**
FES → UC → NHE → PTSD		–.005**	–.005**
FES → UC → NHE → SLE → PTSD		–.001*	–.001*
FES → SS → PTSD		–.010*	–.010*
FES → SS → NHE → PTSD		–.002*	–.002*
FES → SS → NHE → SLE → PTSD		.000†	.000†
FES → SS → SLE → PTSD		.001†	.001†
FES → NHE → PTSD		–.018**	–.018**
FES → NHE → SLE → PTSD		–.002*	–.002*
Conflictual FES to PTSD	.105**	.025*	.129***
FES → UA → PTSD		.020*	.020*
FES → UA → NHE → PTSD		.003*	.003*
FES → UA → NHE → SLE → PTSD		.000†	.000†
FES → UA → SLE → PTSD		.001†	.001†

Notes: DA = desirable appraisal; FES = Family Environment Scale; NHE = negative homecoming experience; PTSD = posttraumatic stress disorder; SLE = additional stressful life event; SS = social support; UA = undesirable appraisal; UC = unit cohesion.
$†p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

risk factor for PTSD symptoms, consistent with previous research (Brewin et al., 2000; King et al., 2004; Stein, Tran, Lund, Haji, Dashevsky, & Baker, 2005). However,

the model fit statistics indicated that this simple cumulative advantage/disadvantage model was not a good fit to the data, so we examined additional models.

The final model resulted in two overarching findings. First, all of the variables in the model had direct and indirect effects through the hypothesized pathways. For example, unit cohesion and positive appraisals of military service had protective effects on PTSD symptoms in later life, as well as indirect effects through postwar social support. Similarly, negative appraisals of military service and negative homecoming variables directly increased vulnerability to PTSD symptoms in later life, as well as having indirect effects through postwar stressful life events. It is especially interesting that the direct effects of the family variables were considerably stronger than the indirect effects.

Second, the two hypothesized pathways, cumulative advantage and cumulative disadvantage, were not independent. There were considerable inter-relationships between the two paths, in ways that were not always intuitively obvious. For example, the inverse associations between unit cohesion and negative appraisals of military service, as well as negative homecoming, does make sense, in that individuals who garnered more support during the war may have been less likely to perceive their military service in a negative light and had more positive homecoming experiences. It also makes sense that individuals who were able to talk to their friends and family about their military service have a more positive homecoming experience. Coleman and Podolskij (2007) found that reminiscing about the war with family and friends was a source of strength for veterans in difficult times.

But why was support positively associated with stressful life events? A possible explanation is that the stressful life event measure that we used, the Elders Life Stress Inventory, included several network stressor items, so men with larger networks may also have had more network stressors (see Hay & Diehl, 2010).

Combat exposure was associated with undesirable appraisals, as well as with unit cohesion and desirable appraisals. Perhaps overcoming the shared adversity of combat strengthened social bonds and led to higher unit cohesion and more positive appraisals of their military service. This supports the contention by Aldwin and Stokols (1988) that the same event can have both positive and negative outcomes, depending upon contextual factors. However, combat exposure was also negatively related to postdeployment stressors. Perhaps the combat experience put other problems into perspective, making it less likely that these veterans would even perceive something as a problem (Aldwin, Sutton, Chiara, & Spiro, 1996).

Our findings of the protective effects of childhood family cohesion support Southwick and colleagues' (2014) hypothesis that more resilient individuals are more likely to successfully form close relationships with others. Individuals with more adverse childhood environments, in contrast, were more likely to appraise their military service in a negative light, supporting Taylor and Stanton's (2007) model of adverse early childhood environments engendering more pessimistic appraisals.

Limitations and Future Studies

Some caveats need to be considered in interpreting these results. First, the sample was largely White and middle class, and thus the findings cannot be generalized to more diverse samples which include women or ethnic/racial minorities or perhaps those from different wars. Further, the NAS men were selected for good physical health and thus may not be representative of World War II veterans as a whole. The model may not apply to populations in greater psychological distress. Compared with Vietnam war veterans, returning World War II soldiers were more accepted by their society and welcomed as heros who won the war in Europe and Japan. Thus, they had a more positive homecoming experience (Settersten, 2006).

Second, causal directionality cannot be determined because the present study was largely a retrospective examination of military service. Even though the paths in path analysis were based on the historical ordering, it does not prove causality. PTSD symptoms can be associated with poor social support (Vogt, King, & King, 2014). It is possible that current PTSD symptoms influence respondents' recollections of events earlier in their lives, including their warzone experience, homecoming, and even early childhood experiences (but see Brewin, 2003). In a prior study, Aldwin and colleagues (1994) found that controlling for current depressive symptoms did not alter the relationships among appraisals and PTSD symptoms. A prospective study supported the idea that an adverse early childhood can result in a cumulative disadvantage dynamic, doubling the risk for the development of PTSD in early adulthood (Koenen, Moffitt, Poulton, Martin, & Caspi, 2007). Further, we used modification indices to revise the path models, which may capitalize on chance. However, all of the changes were theoretically meaningful, mitigating that possibility (Wang & Wang, 2012).

Third, the development and maintenance of PTSD symptoms changes over time, but change was not addressed in this study. Future work should examine the trajectories of PTSD, for example, sudden onset, gradual onset, and/or late onset (Aarts et al., 1996; King et al., 2007). Longitudinal studies that can shed light on causal directionality, as well as change over time, are needed.

Finally, there were significant limitations in our measures. A few items overlapped between measures—items concerning nightmares occurred in both the negative appraisals of military service and the measure of PTSD symptoms. Rescoring them omitting the overlapping items did not appreciably alter the correlations. Therefore, we decided to leave in the standard scoring for comparability and generalizability to other studies. The measure of postwar social support in this study was limited to the assessment of frequency of talking about military experience to family and friends. Nonetheless, this variable was inversely associated with PTSD symptoms in later life, suggesting a protective effect, although causal directionality cannot be assumed. Guided reminiscence of wartime experiences

might be helpful in older veterans (Coleman & Podolskij, 2007) and other traumatized older adults (O'Rourke et al., 2015) who are struggling with mental health issues

In summary, this study had several strengths, including the use of both vulnerability and resilience factors, as well as a sufficient range of variables relevant to life-span models. Future research should focus on more ethnically and socioeconomically diverse samples, as well as those that include women, and utilize longitudinal, prospective research designs. Nonetheless, this is one of the first studies to take a truly life-span developmental approach to the structural relationships between prewar, warzone and postwar factors, with protective and vulnerability factors at all three stages.

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