

Combat Exposure, Perceived Benefits of Military Service, and Wisdom in Later Life

Findings From the Normative Aging Study

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Stress, even extremely traumatic stress, may pose both risks and benefits. Although combat can have lifelong negative consequences, the perception of positive benefits from military experience can mitigate the negative effects of combat on mental health. However, little research has examined the impact of trauma earlier in life on the development of positive adaptation, such as wisdom, later in life. The authors examined whether combat exposure and the perception of benefits from military experience, assessed in 1990, were associated with greater wisdom in later life, assessed in 2001 in 615 men from the Normative Aging Study men (mean age 74 years, $SD = 6.8$ years). A quadrilinear relationship between combat exposure and wisdom was found. Moderate levels of combat were associated with higher levels of wisdom. The perception of benefits and coping predicted wisdom. Thus, how one appraises and copes with problems may be more important in the prediction of positive adaptation than the simple occurrence of stress.

Keywords: *wisdom; coping; combat trauma; perceived benefits; self-transcendence*

There is a significant body of research examining the developmental effects of military service (Clipp and Elder 1996; Elder 1974; Elder and Clipp 1989; Maas and Settersten 1999). It has been suggested that military service is a “hidden variable” in men’s aging (Spiro, Schnurr, and Aldwin 1997) that may continue to have important influences on current behavior (e.g., Falk, Hersen, and Van Hasselt 1994). Although there is ample evidence that the experience of combat can have deleterious psychological effects (e.g., Centers for Disease Control and Prevention 1988; Clipp and Elder 1996; Kulka et al. 1990), there is evidence of positive effects as well (Aldwin, Levenson, and Spiro 1994; Elder and Clipp 1989; Lyons 1991; Monks 1957; Wolfe et al. 1993). However, less is known about other variables, such as appraisal and coping, that may mediate both negative and positive outcomes. Moreover, a relatively new field of positive psychology is beginning to explore a variety of positive psychological states and traits as well as the factors that may mediate positive outcomes (Bonanno 2004).

Stress-Related Growth

Although the field of psychology has focused on pathology resulting from adversity, a growing body of literature demonstrates that positive outcomes are also possible (Aldwin 1994; Haggerty et al. 1994; Linley and Joseph 2004; Tedeschi, Park, and Calhoun 1998b). This phenomenon has been called “stress-related growth” (SRG; Aldwin and Levenson 2004) or “post-traumatic growth” (Tedeschi and Calhoun 2004), “thriving” (Ickovics and Park 1998), and “benefit finding” (Stanton, Bower, and Low forthcoming). It is both a process and an outcome initiated by an individual to cope with traumatic events so intense that they have been dubbed “seismic events” (Tedeschi, Park, and Calhoun 1998a), although others have cautioned that even more mundane stressors can result in growth and/or developmental change (Aldwin and Levenson 2004). In the process of adapting to the stress or trauma, an individual develops new resources and capabilities, may experi-

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ence a change in values and priorities, and in extreme cases develops a new sense of self or worldview.

In describing how self-concept and personality are changed by trauma, Epstein (1991) likened it to an “atom smasher” that alters assumptions about the world:

The person who experiences a trauma has no choice but to either grow from or be diminished by the experience, as the experience is too potent to be ignored. To successfully master a trauma, it is necessary to accommodate a personal theory of reality so that it can assimilate the trauma in a manner that makes life livable and worthwhile. This means cutting the inductively-derived beliefs from the traumatic experience down to size, so that they are recognized as only representative of part of reality, not all of it, and modifying the extant personality structure accordingly. (p. 84)

Although having one’s worldview threatened by a traumatic event may promote positive, transformational change in some, it may cause lifelong debilitating mental health problems in others. This prompts investigation into how an intense stressor such as trauma can have such divergent effects. Several theories offer explanations for this phenomenon.

In considering how systems promote change, Maruyama (1963) hypothesized two types of processes. Deviation-countering processes function as negative feedback loops that act like a thermostat to return conditions to homeostasis. On the other hand, deviation-amplifying processes involve positive feedback loops that promote and intensify change. Adapting this model to understanding the long-term outcomes of stress, Aldwin and Stokols (1988) proposed that the relative balance between the deviation-countering and the deviation-amplifying processes determines the positive or negative outcome of long-term change.

Deviation-countering processes inhibit change by facilitating the return to the state that existed prior to the stressor. Deviation-amplifying processes, however, can promote either negative or positive change. Aldwin and Sutton (1998) observed that positive changes could include a transformation in perspective and an increase in self-knowledge: “Perhaps the most common finding in the literature on PTG [posttraumatic growth] is that individuals report a change in their perspective on life, either in terms of their hierarchy of values or in their perceptions of situations” (p. 57).

Quantum-change theory offers a similar explanation for positive growth in the wake of traumatic events (Miller 2004). Analogous to quantum change in physics, this concept describes distinctive and sudden transformational change. A qualitative study of individuals who reportedly experienced quantum change found that about half “were clearly in crisis or had hit bottom in

some sense at the time of their transformation” (p. 458). Miller described two types of quantum change, the mystical or epiphany type, which usually lasts only a few minutes, and the insightful type, which is more related to insight or knowing and may have a longer duration. Both result in a permanent change in perspective or worldview. However, relatively few studies have examined the pathways through which SRG occurs.

Perceived Benefits

Appraisals are possible mediators of both the short and long-term effects of stress and trauma. Lazarus and Folkman (1984) made a distinction between “primary appraisals” and “secondary appraisals,” both of which occur during or immediately following an event. Although primary appraisals involve judgments about one’s immediate safety, secondary appraisals involve assessments regarding the resources and possible choices available in response to the event. A third type of appraisal consists of the retrospective evaluation of the effect of an experience after it has occurred (Janoff-Bulman 1992). These types of retrospective appraisals, called “perceived benefits” or “tertiary appraisals,” begin after an event is over and can continue over the course of many years (Dohrenwend et al. 2004; Stanton et al. forthcoming). Janoff-Bulman and Berg (1998) suggested that when these long-term appraisals are mainly negative, they contribute to maladaptive outcomes:

For survivors who have painfully experienced disillusionment, the malevolence and meaninglessness of the universe is acknowledged in the new assumptive world. If these negative views are wholly embraced and therefore overwhelm the survivor’s new assumptive world, the result will be profound anxiety and despair. (p. 42)

On the other hand, a positive retrospective outlook on traumatic events may buffer their negative effects. Dohrenwend et al. (2004) found that Vietnam veterans with low-salience positive appraisals of their past military service had lower levels of post-traumatic stress disorder (PTSD) than veterans with both low- and high-salience negative appraisals, suggesting that mainly positive appraisals are evidence of successful adaptation rather than defensive denials that have been associated with maladaptive outcomes.

Similar evidence has been found in the Normative Aging Study (NAS). Although the NAS men have reported significant combat stress, they have low levels of PTSD (Spiro, Schnurr, and Aldwin 1994). In an examination of whether appraisals of desirable and undesirable effects of military service mediated the effect of combat stress on PTSD, Aldwin et al. (1994) found that although lifelong negative consequences of combat exposure were

observed, the perception of positive benefits from the stressful experience mitigated the effects. Furthermore, Aldwin and Levenson (2005) found that perceived benefits moderated the impact of combat exposure on current physical health status in a sample of elderly British veterans. Although these studies examined the ability of perceived benefits to mediate or moderate the effects of combat, the present study examined whether this type of perceived benefit can also promote positive adaptation in later life, specifically, the development of wisdom.

Wisdom

Elder and Clipp (1989) identified a number of positive outcomes of military service, including the ability to cope with adversity, self-discipline, and a broader perspective on life, personal characteristics commonly considered attributes of a wise person (cf. Helson and Srivastava 2002; Holliday and Chandler 1986; Orwoll and Perlmutter 1990). Thus, it seems relevant to examine combat in the broader perspective of recent studies in the conceptualization and measurement of wisdom.

A growing interest in wisdom has generated numerous approaches that encompass cognitive (Baltes and Staudinger 2000; Labouvie-Vief 1990; Sternberg 1998), personological (Holliday and Chandler 1986; Orwoll and Perlmutter 1990), and transcendent (Curnow 1999; McKee and Barber 1999) approaches to wisdom. Cognitive approaches to wisdom focus on the development of higher cognitive abilities and general social competence, including practical knowledge, procedural knowledge, life-span perspective, relativism, and comfort with uncertainty (Baltes and Staudinger 2000). Personological approaches examine attributes of an individual, such as kindness, compassion, sense of justice, and openness to experience (Helson and Wink 1992; Orwoll and Perlmutter 1990). In contrast, the transcendent approach focuses more on definitions of self, positive emotions as well as emotional stability, and a sense of interconnectedness (Cloninger, Svrakic, and Przybeck 1993; Levenson et al. forthcoming; Piedmont 1999).

Self-transcendence has been hypothesized to be a critical aspect of wisdom and adaptation in later life (Levenson et al. 2005; Reed 1986, 1991; Wink and Helson 1997). For example, Tornstam (1994, 1997, 1999) argued that the disengagement process noted originally by Cumming and Henry (1961) was not necessarily a sign of alienation but rather could reflect a withdrawal into retrospection and contemplation in service of development in later life. Consistent with McKee and Barber's (1999) definition of *wisdom*, self-transcendence involves "seeing through illusion," the illusion created by the cultural conditioning and self-limiting belief structures that form one's

assumptive world (Janoff-Bulman 1992). “The transcendence of one’s subjectivity and projection is likely to decrease one’s ego-centeredness and allow one to see reality more clearly” (Ardelt 1997:16). This transcendence of ego-centeredness may lead to a deeper understanding of the suffering of others, resulting in increases in caring, compassion, and empathy toward others (Ardelt 1997; Csikszentmihalyi and Rathunde 1990; Pascual-Leone 1990).

Although there is a common view that wisdom increases with age (e.g., Assmann 1994; Birren and Fisher 1990; Labouvie-Vief 1990; Taranto 1989), cross-sectional studies have been decidedly mixed as to whether wisdom increases with age (Baltes and Staudinger 2000). There are several possible explanations for these findings. Although Baltes and Staudinger suggested that it is because wisdom is a multidimensional construct with components that are not necessarily age related, others have focused on individual differences in the development of wisdom and have sought to determine which factors in early life promote wisdom in later life. Ardel (2000) found that wisdom in later life was unrelated to the quality of childhood or personality characteristics in young adulthood, but Helson and Srivastava (2002) found that both practical and transcendent wisdom in midlife was predicted by an open and complex personality identified 30 years earlier.

Wisdom may also result from the successful resolution of crises and hardship (Ardelt 1998; Linley 2003; Wink and Helson 1997). For example, Bluck and Glück (2004) conducted a retrospective study in which they asked individuals to recount the types of circumstances that contributed to the development of wisdom. Nearly all of the circumstances were difficult life situations. If one aspect of SRG is an increase in coping skills, then it is reasonable to expect that individuals who successfully cope with serious problems will develop better coping skills that might generalize to other situations as well. Thus, wisdom can be viewed as both a process of growth through coping with life’s difficulties and an outcome of that growth (Linley 2003).

The Present Study

The present study examined whether combat exposure and the perception of the positive effects of military service in earlier life are associated with wisdom in later life. In particular, we examined whether individuals who experienced war trauma in their past and who appraised their military experiences positively in 1990 reported higher levels of wisdom, assessed in 2001. Furthermore, we expected that perceived benefits of military service would moderate the impact of combat exposure on wisdom, such that individuals

with high exposure and high benefits would be more likely to be higher in wisdom in later life. Furthermore, we explored whether some of the effects of combat exposure and perceived benefits on wisdom in later life are mediated through concurrent coping strategies.

Method

Sample and Procedure

The data were from the NAS, a longitudinal study of normal aging in men established at the Boston VA Outpatient Clinic in the early 1960s (Bossé, Ekerdt, and Silbert 1984). The NAS participants were screened for the absence of serious physical or mental illness between 1961 and 1970 and assembled into a panel of 2,280 initially healthy participants. The majority of the participants were veterans, most serving during World War II or Korea (see Spiro et al. 1994 for more details).

Measures were administered by mail in 1990 and 2001. In 1990, we mailed a survey to 1,742 active NAS men, of whom 83% responded. Of the 1,445 respondents, 1,389 were veterans. Respondents were similar to non-respondents in both demographic and mental health variables (cf. Spiro et al. 1994). This survey included measures of combat exposure (Keane et al. 1989) and of the positive and negative effects of military service. In 2001, 1,366 men were sent a survey that included the Adult Self-Transcendence Inventory (ASTI; Levenson et al. 2005). However, of these participants, 39 were deceased, 7 were too sick to participate, and 5 had dropped out of the study. Of the 1,315 eligible participants, 774 (59%) responded.

Responders to the 2001 survey were slightly younger (mean age = 73 years) than nonresponders (mean age = 74 years), $F(1, 1,364) = 3.22, p = .07$. Responders reported better health, $\chi^2(n = 1,098) = 28.85, p < .001$, and were less likely to be widowed, $\chi^2(n = 1,056) = 4.95, p < .05$. Controlling for age, responders were healthier, $F(1, 1,095) = 18.49, p < .001$, and were slightly more satisfied with life than nonresponders, $F(1, 1,096) = 3.63, p = .057$.

In 2001, a majority (80%) of these men were married, 10% were widowed, 5% were divorced, 2% had never been married, and 1% were separated. Most were retired (72%), 5% were working full-time, and the remaining men worked part-time. Most of the participants were European Americans.

The sample for the present study consisted of 615 men who responded to both surveys and had complete data on the ASTI. In 2001, their mean age was 74 years ($SD = 6.8$ years), with an age range from 56 to 95 years.

Measures

The 1990 survey collected information on military service, including type, location, and duration; degree of combat exposure; and beliefs about the impact of military service. The 2001 survey included questions about current employment and marital status, a measure of self-transcendent wisdom, and a coping measure.

Demographics. Marital status was determined by asking the participants to choose one among the following five categorical variables: married, divorced, widowed, separated, and never married. Employment status was determined by asking the participants to choose the statement that best described their current work or retirement situation. The choices were “Retired, and not employed at all”; “Retired, but still employed part-time”; “Retired, but still employed full-time”; “Working part-time and have never retired”; “Working full-time and have never retired”; and “Unemployed and have never retired.” These statements were coded into six categorical variables.

Military service. The 1990 survey included questions on dates of service, branch, and rank at entry and exit. Dates of service were used to define service during World War II (1941 to 1946), the Korean War (1950 to 1955), and the Vietnam War (1968 to 1975) (cf. Beebe and Simon 1969). Nearly all (95%) of these men were veterans: 46% were World War II veterans, 32% were Korean War veterans, and 7% had been veterans of both World War II and Korea. Only 2% were Vietnam veterans. The remaining men who were veterans did not serve during wartime. Of the veterans, 45% served in the Army, 27% in the Navy, 18% in the Air Force, 6% in the Marines, and 3% in the Coast Guard. Over half of the men (56%) enlisted, 34% of the men were drafted, and the remainder entered from Reserve Officers’ Training Corps, the National Guard, or the reserves. Whereas 86% of the sample entered the service as enlisted men, 57% of the sample had achieved the rank of officer (either noncommissioned or commissioned) on discharge. A third of the sample (33%) were awarded at least one citation or medal.

In addition, we asked a series of questions in a brief follow-up interview about what the men’s service roles had been. Nearly half (41%) filled general noncombatant support roles, a third (33%) filled general combat roles, 15% were shipboard, and the remainder served as trainers or medics. One participant served as a chaplain.

Combat exposure. The Combat Exposure Scale (Keane et al. 1989) is a seven-item scale that assesses several dimensions of combat exposure using a five-point, Likert-type scale indicating the frequency, quantity, and intensity of the experience, for example, "Did you ever go on combat patrols or have other very dangerous duty?" (1 = *no*, 2 = *1-2 times*, 3 = *3-12 times*, 4 = *13-50 times*, and 5 = *51+ times*). Other questions include "Were you ever under enemy fire?" "Were you ever surrounded by the enemy?" "What percentage of the men in your unit were killed, wounded, or missing in action?" "How often did you fire rounds at the enemy?" "How often did you see someone hit by incoming or outgoing rounds?" and "How often were you in danger of being injured or killed?"

Combat exposure scores were computed following Aldwin et al. (1994). Unit-weighted items were summed using a 75% criterion to compensate for missing data. The resulting scores ranged from 0 to 27, with a mean of 3.41 ($SD = 5.93$). The α reliability was .92.

In this sample, almost half (43%) of the men reported some combat experience. Nearly a quarter (22%) of the men were involved in at least one major battle, and 68% of these experienced between two and nine battles during their military careers. Far fewer of the sample (16%) reported being involved in a collective killing action such as a bombing raid, and only 7% reported having knowingly killed someone personally. Although this percentage seems low, it is in accordance with Marshall's (1947) classic study, which showed that fewer than 10% of the soldiers actually fired their weapons in battle during World War II.

Positive and Negative Effects of Military Service. This 28-item scale was developed by Aldwin et al. (1994) based on the work of Elder and Clipp (1989). The scale has an equal number of positive and negative items indicating the perceived consequences of military service. The desirable experiences include such items as "learned to cope with adversity," and "a broader perspective on things," and the undesirable experiences include items such as "disrupted my life" and "waste of time, boredom." Each item is rated on a four-point, Likert-type rating scale ranging from 0 (*not at all*) to 3 (*a lot*). Unit-weighted items were summed using a 75% criterion to compensate for missing data. The two scales demonstrated good internal reliability ($\alpha = .90$ for desirable, $\alpha = .80$ for undesirable). The mean for desirable effects was 26.61 ($SD = 9.26$), and the mean for undesirable effects was 6.32 ($SD = 5.69$).

Coping. The Brief California Coping Inventory (BCCI), a 46-item version of the California Coping Inventory (Aldwin, Sutton, and Lachman

1996), was used to assess coping. Participants were asked to identify the most stressful thing that had occurred to them in the past month and how they coped with the stressor using a four-point scale (0 = *did not do at all*, 3 = *did a lot*). If they did not report a stressful event, they did not complete the inventory. This resulted in a reduction of the sample size from 615 to 387. The BCCI consists of five subscales: Positive Action (“Did you assert control over the situation?”), Negative Action (“Did you try to make the other person(s) feel guilty?”), Prayer (“Did you pray for guidance?”), Withdrawal (“Did you isolate yourself from others?”), and Substance Use (“Did you have a little something to calm yourself down?”). For the purposes of this study, we focused on the Positive Action ($M = 21.83$, $SD = 10.76$) and Negative Action ($M = 6.32$, $SD = 5.57$) subscales. These two subscales exhibited acceptable reliability (Positive Action $\alpha = .87$, Negative Action $\alpha = .77$).

Wisdom. Wisdom was assessed with the ASTI (Levenson et al. 2005), which consists of 18 Likert-scaled items ranging from 1 (*disagree strongly*) to 4 (*agree strongly*). The directions state, “We would like to know whether your view of life is different today than it was ten years ago. We would appreciate your reading the statements listed below and indicating the extent to which you agree with each one.” Sample items include “My sense of self is less dependent on other people and things,” and “Material things mean less to me.” To differentiate Tornstam’s (1994) hypothesis that self-transcendence is distinct from withdrawal based on alienation, alienation items were included, such as “I feel that my life has less meaning” and “I feel more isolated and lonely.”

Levenson et al. (2005) confirmed that the ASTI has a two-factor structure, one for self-transcendence and the other for alienation. Subsequently analyses in the NAS men confirmed this factor structure (Jennings et al. 2003) as well as its predictive validity. Thus, two subscales were created on the basis of the factor analysis. Unit-weighted items were summed using a 75% criterion to compensate for missing data. If 75% or more of the items were present, we computed the mean item response (after recoding if necessary) and multiplied by the number of items in the scale. The ASTI subscales exhibited modest internal reliability ($\alpha = .75$ and $.64$ for transcendence and alienation, respectively). The mean for self-transcendence was 33.42 ($SD = 5.09$), and the mean for alienation was 12.09 ($SD = 3.31$).

Table 1
Intercorrelations Among Variables

Variable	1	2	3	4	5	6	7	8
1. Age	—	.35***	-.05	.30***	-.07	-.09	.04	.13**
2. Combat exposure		—	.09*	.35***	.01	-.02	.03	.08†
3. Desirable effects			—	.13**	.22***	.05	.14***	-.07
4. Undesirable effects				—	.05	.03	.06	.15***
5. Positive action coping					—	.41***	.21***	-.08
6. Negative action coping						—	-.01	.15**
7. Self-transcendent wisdom							—	.06
8. Alienation								—
<i>M</i>	74.00	3.41	26.61	6.32	21.83	6.32	33.42	12.09
<i>SD</i>	6.81	5.93	9.26	5.69	10.76	5.57	5.09	3.31

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Results

As expected, combat exposure was related to both desirable ($r = .09$, $p < .05$) and undesirable ($r = .35$, $p < .001$) effects. Contrary to expectation, however, combat exposure was unrelated to wisdom in late life ($r = .03$), although it was modestly related to alienation ($r = .08$, $p = .07$; see Table 1). However, the perception of desirable effects was related to wisdom ($r = .14$, $p < .001$). Furthermore, undesirable effects were related to alienation ($r = .15$, $p < .001$). Age was not related to wisdom, nor was it related to perceiving desirable effects. However, it was positively related to combat exposure ($r = .35$, $p < .001$), undesirable effects ($r = .30$, $p < .001$), and alienation ($r = .13$, $p < .01$). Thus, older individuals were more likely to have experienced combat and its undesirable effects and to be alienated in later life.

It is possible that a nonlinear relationship between combat trauma and wisdom existed that was not adequately reflected in the correlation coefficient. Thus, we used hierarchical regression analysis to examine the effect of combat and combat squared, centering combat first to control for multicollinearity. The change in R^2 for the squared term was .007, which was marginally significant, $F(2, 560) = 3.68$, $p = .056$. We divided the sample by quartiles, where 1 = no combat, 2 = a little combat, 3 = some combat, and 4 = high levels of combat, and plotted the effects of combat exposure on wisdom. As Figure 1a illustrates, those with a little combat experience appeared to be higher in wisdom in late life, whereas those with either no combat or high combat exposure were lowest.

We also examined whether there was a curvilinear relationship between combat exposure and alienation in later life, using the same procedure. However, in this instance, the squared term was not significant, change in $R^2 = .002$, $F(2, 608) = 1.13$, $p = ns$. Inspection of the curve, however, suggested a difference between those without any combat and those with any at all (see Figure 1b), which was confirmed using a dichotomous analysis of variance, $F(1, 556) = 4.17$, $p < .05$.

To test our hypothesis that perceiving desirable effects of military service would moderate the effect of combat exposure on wisdom, we computed a hierarchical regression analysis with wisdom as the dependent variable, with combat exposure in the first step of the equation, the desirable effects of military service in the second, and an interaction term (Desirable Effects \times Combat Exposure) in the third step. The predictor variables were centered to avoid multicollinearity. However, contrary to our expectations, the interaction term was not significant, change in $R^2 = .001$, $F(3, 557) = 5.75$, $p = ns$.

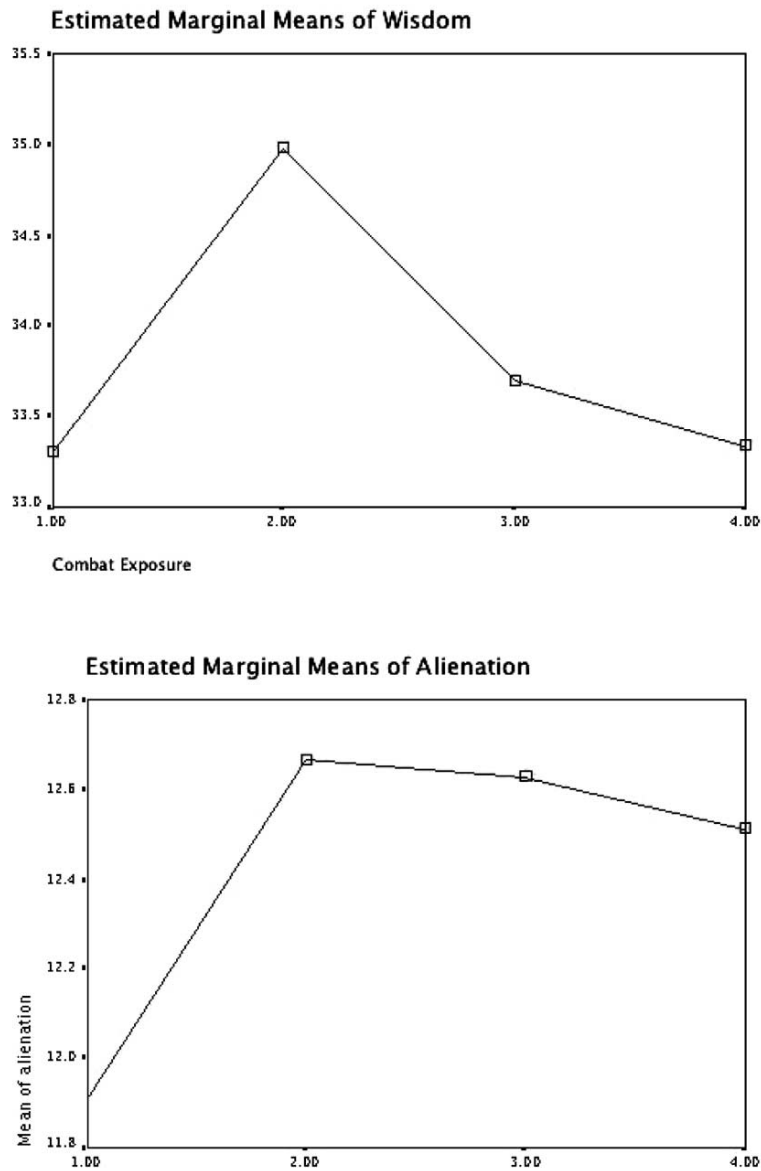
Exploratory Analyses

As mentioned earlier, coping skills are thought to develop as a function of SRG. Thus, we sought to explore whether the impact of perceiving the benefits of military service on wisdom in later life might be mediated through the use of coping strategies. Indeed, in a previous study, we found a relationship between self-transcendence and positive coping (Jennings et al. 2003).

Thus, we analyzed data for 387 men who in 2001 had completed the BCCI in response to recent stressors. First, we examined the types of problems the men reported. Not surprisingly, a quarter of the men (25%) reported problems related to their own health. Other common concerns were their spouses' health and general hassles (8% and 9%, respectively), followed by transportation problems (5%) and conflicts with spouses (3%). The remainder reported an assortment of miscellaneous stressors.

We computed a hierarchical regression analysis to examine the possible mediating effects of coping between perceiving desirable effects of combat exposure in 1990 and wisdom scores in 2000. In model 1, we entered only desirable effects, and in model 2, we added positive and negative action coping strategies. As Table 2 illustrates, the β value for desirable effects in model 1 was .17 ($p = .01$). However, adding the coping strategies to the equation in model 2 decreased this only slightly ($\beta = .12$, $p < .05$). Both coping strategies had independent effects, with positive action being positively related to wisdom ($\beta = .25$, $p < .001$) and negative action being inversely related to it ($\beta = -.14$, $p < .05$).

Figure 1
Nonlinear trends in wisdom and alienation by combat exposure



Note: 1 = no combat, 2 = a little combat, 3 = some combat, and 4 = high levels of combat.

Table 2
Hierarchical Regression Analysis
Predicting Self-Transcendent Wisdom

Variable	Model 1			Model 2		
	β	ΔR^2	ΔF	β	ΔR^2	ΔF
Desirable effects	.17**	.03	10.37**	.12*		
Positive action coping				.25***		
Negative action coping				-.14*	.05	9.65***

Note: Model 1: total $R^2 = .03$, $F(1, 365) = 10.37$, $p < .01$; model 2: total $R^2 = .08$, $F(3, 363) = 10.05$, $p < .001$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

The aim of the present study was to explore the relationship between combat exposure in earlier life and wisdom in later life. We had hypothesized that perceiving benefits of military service would moderate the impact of combat on wisdom. However, contrary to our hypotheses, combat exposure was not linearly related to wisdom in later life, nor did perceived benefits moderate this effect. However, there was an interesting nonlinear trend that suggested that those with low levels of combat exposure were highest in wisdom scores, whereas those with either no combat or high combat were lowest. This was in stark contrast to the relation between combat exposure and alienation. Our analyses suggested that any combat exposure was associated with higher levels of alienation in late life.

This parallels similar findings by Schnurr, Rosenberg, and Friedman (1993), who found that men with moderate combat levels were more likely to improve on the Minnesota Multiphasic Personality Inventory (MMPI) from early to midlife than those with either no or high levels of combat exposure. Furthermore, earlier work in the same sample confirmed a strong and fairly linear relationship between combat exposure and PTSD symptoms nearly 50 years later.

Perceiving positive effects of military service in 1990 was associated with higher wisdom scores 10 years later. Furthermore, these effects were only partially mediated through coping strategies. Thus, how one interprets an experience may be more important than the existence of trauma for positive experience in later life. This suggests that SRG stems more from appraisal and coping processes than from exposure per se. Furthermore, it raises questions about the common assumption that SRG is more likely to occur with major trauma than everyday stress (Tedeschi and Calhoun 2004) and sup-

ports arguments by Aldwin and Levenson (2004) that moderate stressors may also result in posttraumatic growth.

One possible interpretation is that SRG is not a one-dimensional phenomenon. Examination of the literature reveals more of a multidimensional structure, with SRG including transformations in self-identity, increases in competence, changes in values, closer relationships with significant others, and sometimes spiritual transformations (Tedeschi and Calhoun 2004). Thus, it would make sense that moderate stressor levels might help with increases in competence, changes in values, and closer relationships, whereas very high stress levels may be necessary for transformational change. However, our current measures do not adequately assess these different dimensions. It appears that combat exposure increases the risk for alienation in later life, and thus it might be more difficult to develop the sort of perspective that is captured by our wisdom measure. However, it is encouraging that the perceiving benefits of military service earlier in life does seem to promote wisdom in later life.

However, a number of caveats are in order. First, the sample was composed primarily of older European American men, and thus it is not clear whether the results found here will generalize to other, more diverse samples, including women and ethnic minorities. Given that some level of resources may be necessary for the occurrence of SRG (Crosnoe and Elder 2004), these findings may not generalize to very low socioeconomic status groups as well. Furthermore, even within the NAS men, our sample was younger and healthier than the norm, which is to be expected when examining participation at multiple points in time but may further limit its generalization.

Second, we did not explore whether personality might be a third force driving both perceived benefits and wisdom. It is entirely possible that both simply reflect something like optimism (see Davis, Nolen-Hoeksema, and Larson 1998). Adding additional surveys that had personality data would have further decreased the sample size. However, earlier work with the MMPI suggested that the relationship between combat exposure and perceived benefits was relatively robust and withstood covarying out personality factors (Schnurr et al. 1993). Nonetheless, future research should explore the intersection between personality characteristics, perceived benefits of stress, and wisdom.

Another difficulty is that the ASTI asks participants to report whether their views of life are different today than they were 10 years ago. Thus, the scores reflect the participants' perceptions of their changes in self-transcendence rather than absolute levels of self-transcendence. This poses a risk that changes in self-transcendence may have occurred long ago. Note that the perceived benefits scale also examines self-perceived change. Nonetheless,

the temporal distance between the two measures hopefully softens any problems with correlated errors.

Finally, this study was only partially longitudinal in that the primary predictor variables were assessed 10 years before the outcome variables. However, a stronger design would be to have baseline measures of various forms of adaptation, including wisdom, then follow individuals until they experienced trauma, assess SRG after that occurrence, and then at some point after that change in wisdom. However, such a prospective design would be extremely expensive and time-consuming, and preliminary studies such as these are necessary to support even planning such a study.

On the whole, then, this study suggests that combat exposure can have both positive and negative effects in later life. Although combat exposure does increase the risk for alienation in later life, it also affords the opportunity for SRG, which in turn may be related to positive adaptation in later life. However, much more research, preferably longitudinal, is needed to understand how and why some individuals can perceive benefits in even highly traumatic circumstances and how SRG can promote the development of wisdom in later life.

References

- Aldwin, Carolyn M. 1994. *Stress, Coping, and Development: An Integrative Perspective*. New York: Guilford.
- Aldwin, Carolyn M. and Michael R. Levenson. 2004. "Post-Traumatic Growth: A Developmental Perspective." *Psychological Inquiry* 15:19-21.
- . 2005. "Military Service and Emotional Maturation: The Chelsea Pensioners." In *Historical Influences on Lives and Aging*, edited by K. W. Schaie and G. Elder, Jr. San Diego, CA: Academic Press.
- Aldwin, Carolyn M., Michael R. Levenson, and Avron Spiro III. 1994. "Vulnerability and Resilience to Combat Exposure: Can Stress Have Lifelong Effects?" *Psychology & Aging* 9:34-44.
- Aldwin, Carolyn M. and Daniel Stokols. 1988. "The Effects of Environmental Change on Individuals and Groups: Some Neglected Issues in Stress Research." *Journal of Environmental Psychology* 8:57-75.
- Aldwin, Carolyn M. and Karen J. Sutton. 1998. "A Developmental Perspective on Posttraumatic Growth." Pp. 43-63 in *Posttraumatic Growth: Positive Changes in the Aftermath of Crisis*, edited by R. G. Tedeschi, C. L. Park, and L. G. Calhoun. Mahwah, NJ: Lawrence Erlbaum.
- Aldwin, Carolyn M., Karen J. Sutton, and Margie Lachman. 1996. "The Development of Coping Resources in Adulthood." *Journal of Personality* 64:837-71.
- Ardelt, Monika. 1997. "Wisdom and Life Satisfaction in Old Age." *Journal of Gerontology: Psychological Sciences* 52B:P15-P27.
- . 1998. "Social Crisis and Individual Growth: The Long-Term Effects of the Great Depression." *Journal of Aging Studies* 12:291-314.
- . 2000. "Antecedents and Effects of Wisdom in Old Age." *Research on Aging* 22:360-94.

- Assmann, A. 1994. "Wholesome Knowledge: Concepts of Wisdom in a Historical and Cross-Cultural Perspective." Pp. 188-224 in *Life-Span Development and Behavior: Volume 12*, edited by D. L. Featherman, R. M. Lerner, and M. Perlmutter. Hillsdale, NJ: Lawrence Erlbaum.
- Baltes, Paul B. & Ursula M. Staudinger. 2000. "Wisdom: A Metaheuristic (Pragmatic) to Orchestrate Mind and Virtue Toward Excellence." *American Psychologist* 55:122-36.
- Beebe, G. W. and A. H. Simon. 1969. "Ascertainment of Mortality in the U.S. Veteran Population." *American Journal of Epidemiology* 89:636-43.
- Birren, James E. and L. M. Fisher. 1990. "The Elements of Wisdom: Overview and Integration." Pp. 317-32 in *Wisdom: Its Nature, Origins, and Development*, edited by R. J. Sternberg. New York: Cambridge University Press.
- Bluck, Susan and Judith Glück. 2004. "Making Things Better and Learning a Lesson: Experiencing Wisdom Across the Lifespan." *Journal of Personality* 72:543-72.
- Bonanno, George A. 2004. "Loss, Trauma, and Human Resilience: Have We Underestimated the Human Capacity to Thrive After Extremely Aversive Events?" *American Psychologist* 59:20-28.
- Bossé, Raymond, David J. Ekerdt, and J. E. Silbert. 1984. "The Veterans Administration Normative Aging Study." Pp. 273-83 in *Handbook of Longitudinal Research, Vol. 2: Teenage and Adult Cohorts*, edited by S. A. Mednick, M. Harway, and K. M. Finello. New York: Praeger.
- Centers for Disease Control and Prevention. 1988. "Health Status of Vietnam Veterans: I. Psychosocial Characteristics." *JAMA* 259:2701-7.
- Clipp, Elizabeth C. and Glen H. Elder Jr. 1996. "The Aging Veteran of World War II: Psychiatric and Life Course Insights." Pp. 19-51 in *Aging and Posttraumatic Stress Disorder*, edited by P. E. Ruskin and J. A. Talbott. Washington, DC: American Psychiatric Press.
- Cloninger, C. Robert, Dragan M. Svrakic, and Thomas R. Przybeck. 1993. "A Psychobiological Model of Temperament and Character." *Archives of General Psychiatry American Medical Association* 50:975-90.
- Crosnoe, Robert and Glen H. Elder Jr. 2004. "From Childhood to the Later Years: Pathways of Human Development." *Research on Aging* 26:623-54.
- Csikszentmihalyi, Mihaly and Kevin Rathunde. 1990. "The Psychology of Wisdom: An Evolutionary Interpretation." Pp. 25-51 in *Wisdom: Its Nature, Origins, and Development*, edited by R. J. Sternberg. Cambridge, UK: Cambridge University Press.
- Cumming, Elaine and W. E. Henry. 1961. *Growing Old*. New York: Basic Books.
- Curnow, Trevor. 1999. *Wisdom, Intuition, and Ethics*. Aldershot, UK: Ashgate.
- Davis, Christopher G., Susan Nolen-Hoeksema, and Judith Larson. 1998. "Making Sense of Loss and Benefiting From the Experience; Two Construals of Meaning." *Journal of Personality and Social Psychology* 75:561-74.
- Dohrenwend, Bruce P., Yuval Neria, J. Blake Turner, Nicholas Turse, Randal Marshall, Roberto Lewis-Fernandez, and Karestan C. Koenen. 2004. "Positive Tertiary Appraisals and Posttraumatic Stress Disorder in U.S. Male Veterans of the War in Vietnam: The Roles of Positive Affirmation, Positive Reformulation, and Defensive Denial." *Journal of Consulting and Clinical Psychology* 72:417-33.
- Elder, Glen H. Jr. 1974. *Children of the Great Depression*. Chicago: University of Chicago Press.
- Elder, Glen H. Jr. and Elizabeth C. Clipp. 1989. "Combat Experience and Emotional Health: Impairment and Resilience in Later Life." *Journal of Personality* 57:311-41.
- Epstein, Seymour. 1991. "The Self-Concept, the Traumatic Neurosis, and the Structure of Personality." Pp. 63-98 in *Perspectives in Personality, Vol. 3*, edited by D. J. Ozer, J. M. Healy, and A. J. Stewart. London, UK: Jessica Kingsley.
- Falk, Bunny, Michel Hersen, and Vincent B. Van Hasselt. 1994. "Assessment of PTSD in Older Adults: A Critical Review." *Clinical Psychological Review* 14:383-415.

- Haggerty, Robert J., Lonnie R. Sherrod, Norman Garmezy, and Michael Rutter. 1994. *Stress, Risk, and Resilience in Children and Adolescents: Process, Mechanisms, and Interventions*. New York: Cambridge University Press.
- Helson, Ravena and Srivastava, Sanjay. 2002. "Creative and Wise People: Similarities, Differences, and How They Develop." *Personality and Social Psychology Bulletin* 28:1430-40.
- Helson, Ravena and Paul Wink. 1992. "Personality Change in Women From the Early 40s to the Early 50s." *Journal of Personality and Social Psychology* 65:597-605.
- Holliday, Stephen G. and Michael J. Chandler. 1986. *Wisdom: Explorations in Adult Competence, Vol. 17*. Basel, Switzerland: Karger.
- Ickovics, Jeannette R. and Crystal L. Park. 1998. Paradigm Shift: Why a Focus on Health Is Important. *Journal of Social Issues* 54:237.
- Janoff-Bulman, Ronnie. 1992. *Shattered Assumptions: Toward a New Psychology of Trauma*. New York: Free Press.
- Janoff-Bulman, Ronnie and Michael Berg. 1998. "Disillusionment and the Creation of Value: From Traumatic Losses to Existential Gains." Pp. 35-47 in *Perspectives on Loss: A Sourcebook*, edited by J. H. Harvey. Philadelphia: Brunner/Mazel.
- Jennings, Patricia A., Michael R. Levenson, Carolyn M. Aldwin, Ray W. Shiraishi, Avron Spiro III, and Daniel K. Mroczek. 2003. "Self-Transcendence, Personality, and Health in Later Life." *The Gerontologist* 43:208-9.
- Keane, Terance M., John A. Fairbank, Juesta M. Caddell, and Rose T. Zimering. 1989. "Clinical Evaluation of a Measure to Assess Combat Exposure." *Psychological Assessment* 1:53-55.
- Kulka, Richard A., William E. Schlenger, John A. Fairbank, Richard L. Hough, B. Kathleen Jordan, Charles R. Marmar, and Daniel S. Weiss. 1990. *Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study*. Philadelphia: Brunner/Mazel.
- Labouvie-Vief, Gisela. 1990. "Wisdom as Integrated Thought: Historical and Developmental Perspectives." Pp. 52-83 in *Wisdom: Its Nature, Origins, and Development*, edited by R. J. Sternberg. Cambridge, UK: Cambridge University Press.
- Lazarus, Richard S. and Susan Folkman. 1984. *Stress, Appraisal, and Coping*. New York: Springer.
- Levenson, Michael R., Patricia A. Jennings, Carolyn M. Aldwin, and Ray W. Shiraishi. 2005. "Self-Transcendence: Conceptualization and Measurement." *International Journal of Aging and Human Development* 60:127-43.
- Levenson, Michael R., Patricia A. Jennings, Thao Le, and Carolyn M. Aldwin. Forthcoming. "Contemplative Psychologies as Theories of Self-Transcendence in Adulthood." In *The Handbook of the Psychology of Religion*, edited by D. M. Wulff. New York: Oxford University Press.
- Linley, P. Alex. 2003. "Positive Adaptation to Trauma: Wisdom as Both Process and Outcome." *Journal of Traumatic Stress* 16:601-10.
- Linley, P. Alex and Stephen Joseph. 2004. "Positive Change Following Trauma and Adversity: A Review." *Journal of Traumatic Stress* 17:11-21.
- Lyons, Judith A. 1991. "Strategies for Assessing the Potential for Positive Adjustment Following Trauma." *Journal of Traumatic Stress* 4:93-111.
- Maas, Ineke and Richard A. Settersten, Jr. 1999. "Military Service During Wartime: Effects on Men's Occupational Trajectories and Later Economic Well-Being." *European Sociological Review* 15:213-32.
- Marshall, Samuel L. A. 1947. *Men Against Fire: The Problem of Battle Command*. New York: William Morrow.

- Maruyama, Magoroh. 1963. "The Second Cybernetics: Deviation-Amplifying Mutual Casual Processes." *American Scientist* 51:164-79.
- McKee, Patrick and Clifton Barber. 1999. "On Defining Wisdom." *International Journal of Aging and Human Development* 49:149-64.
- Miller, William R. 2004. "The Phenomenon of Quantum Change." *Journal of Clinical Psychology* 60:453-60.
- Monks, John P. 1957. *College Men at War*. Boston: American Academy of Arts and Sciences.
- Orwoll, Lucinda and Marion Perlmutter. 1990. "The Study of Wise Persons: Integrating a Personality Perspective." Pp. 160-77 in *Wisdom: Its Nature, Origins, and Development*, edited by R. J. Sternberg. Cambridge, UK: Cambridge University Press.
- Pascual-Leone, Juan. 1990. "An Essay on Wisdom: Toward Organismic Processes That Make It Possible." Pp. 244-278 in *Wisdom: Its Nature, Origins, and Development*, edited by R. J. Sternberg. Cambridge, UK: Cambridge University Press.
- Piedmont, Ralph L. 1999. "Does Spirituality Represent the Sixth Factor of Personality? Spiritual Transcendence and the Five-Factor Model." *Journal of Personality* 67:985-1013.
- Reed, Pamela G. 1986. "Developmental Resources and Depression in the Elderly." *Nursing Research* 35:368-74.
- . 1991. "Self-Transcendence and Mental Health in Oldest-Old Adults." *Nursing Research* 40:1-7.
- Schnurr, Paula P., Stanley D. Rosenberg, and Matthew J. Friedman. 1993. Change in MMPI Scores From College to Adulthood as a Function of Military Service. *Journal of Abnormal Psychology* 102:288-96.
- Spiro III, Avron, Paula P. Schnurr, and Carolyn M. Aldwin. 1994. "Combat-Related Post-traumatic Stress Disorder Symptoms in Older Men." *Psychology and Aging* 9:17-26.
- . 1997. "A Life-Span Perspective on the Effects of Military Service." *Journal of Geriatric Psychiatry* 30:91-128.
- Stanton, Annette L., Julienne E. Bower, and Carissa A. Low. Forthcoming. "Posttraumatic Growth After Cancer." In *Handbook of Posttraumatic Growth: Research and Practice*, edited by L. G. Calhoun & R. G. Tedeschi. Mahwah, NJ: Lawrence Erlbaum.
- Sternberg, Robert J. 1998. "A Balance Theory of Wisdom." *Review of General Psychology* 2:347-65.
- Taranto, M. A. 1989. "Facets of Wisdom: A Theoretical Synthesis." *International Journal of Aging and Human Development* 29:1-21.
- Tedeschi, Richard G. and Lawrence G. Calhoun. 2004. "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence." *Psychological Inquiry* 15:1-18.
- Tedeschi, Richard G., Crystal L. Park, and Lawrence G. Calhoun. 1998a. "Posttraumatic Growth: Conceptual Issues." Pp. 1-22 in *Posttraumatic Growth: Positive Changes in the Aftermath of Crisis*, edited by R. G. Tedeschi, C. L. Park, and L. G. Calhoun. Mahwah, NJ: Lawrence Erlbaum.
- . 1998b. *Posttraumatic Growth: Positive Changes in the Aftermath of Crisis*. Mahwah, NJ: Lawrence Erlbaum.
- Tornstam, Lars. 1994. "Gero-Transcendence: A Theoretical and Empirical Exploration." Pp. 203-26 in *Aging and the Religious Dimension*, edited by L. E. Thomas and S. A. Eisenhandler. London: Auburn House.
- . 1997. "Gerotranscendence: The Contemplative Dimension of Aging." *Journal of Aging Studies* 11:143-54.
- . 1999. "Late-Life Transcendence: A New Developmental Perspective on Aging." Pp. 178-202 in *Religion, Belief, and Spirituality in Late Life*, edited by L. E. Thomas and S. A. Eisenhandler. New York: Springer.

Wink, Paul and Ravenna Helson. 1997. "Practical and Transcendent Wisdom: Their Nature and Some Longitudinal Findings." *Journal of Adult Development* 4:1-14.

Wolfe, Jessica, Pamela J. Brown, Joan Furey, and Karen B. Levin. 1993. "Patterns of Positive Readjustment in Vietnam Combat Veterans." *Journal of Traumatic Stress* 6:179-93.

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