

Military Service and (Dis)Continuity in the Life Course

Evidence on Disadvantage and Mortality From the Health and Retirement Study and the Study of Assets and Health Dynamics Among the Oldest-Old

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This study uses a life-course framework and data from the Health and Retirement Study and the Study of Assets and Health Dynamics Among the Oldest-Old to examine three hypotheses related to (dis)continuity in the effects of early-life disadvantage (African American race and low paternal education) and military service on later-life mortality. Specifically, the authors consider whether military service (and age at enlistment) mediates or moderates the effects of early-life disadvantage on later-life mortality and whether mid- to late-life marital status, socioeconomic status, health status, and health behaviors mediate the effects of military service on mortality. The authors find very little evidence to support the notion that any mortality benefits accrue to men as a consequence of military service overall or enlistment at any particular age. Most of the evidence is consistent with life-course disruption and continuity of disadvantage interpretations.

Keywords: *military service; mortality; life course; cumulative disadvantage*

The question of how military service shapes men's life-course trajectories has received limited but sustained attention in the literature for more than 25 years (Elder 1974, 1986, 1987; Elder, Shanahan, and Clipp 1994; Hogan 1978a; 1978b; 1981; Laub and Sampson 2003; Parker et al. 2001; Pavalko and Elder 1990; Sampson and Laub 1996; Xie 1992). Through comparisons of veterans and nonveterans, as well as analyses of age-at-

mobilization effects on educational, occupational, marital, and health outcomes, these authors have sought to examine continuities and discontinuities in men's life-course trajectories as a function of whether they served in the military and at what point in the life course they entered military service.

To date, research on the impact of military service on mortality outcomes in later life has been limited. The more extensive studies that have examined the experiences of World War II veterans have not systematically considered mortality as an outcome. Two studies of Vietnam War veterans, one based on U.S. data (Hearst, Newman, and Hulley 1986) and one based on Australian data (Adena et al. 1985), came to differing conclusions about the effect of military service during the Vietnam War on mortality; the U.S. investigators concluded that veterans had a higher death rate, primarily because of suicide and motor vehicle accidents, whereas the Australian investigators reported no significant differences in the death rates of veterans and nonveterans. However, both of these analyses considered mortality only over the short term, and neither considered whether the effect of military service on mortality varied by race or earlier life circumstances.

In this study, we adopted a life-course approach to studying later-life mortality in relation to early-life disadvantage and military service. Specifically, we used nationally representative data from the Health and Retirement Study (HRS) and the Study of Assets and Health Dynamics Among the Oldest-Old (AHEAD) to investigate the effects of disadvantage emanating from being African American and having a father with low educational attainment on mortality; whether military service or age at enlistment mediates or moderates the effects of African American race and low paternal education on later-life mortality; and whether mid- to late-life-course marital, socioeconomic, and health status or health behaviors mediate the effects of early-life-course disadvantages or military service on later-life civilian mortality over a 9- to 10-year period.

Theoretical Considerations

There are a number of reasons to hypothesize that the experiences of veterans may be different from those of nonveterans in ways that would affect subsequent life-course trajectories and experiences and, ultimately, mortal-

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ity. On one hand, the experience of being in the military could help men establish more disciplined health lifestyles, such as regular exercise regimes, which could carry health benefits over the life course. Additionally, access to health care through the U.S. Department of Veterans Affairs hospital system and educational benefits available through the G.I. Bill may, over the life course, contribute to a later-life mortality advantage for veterans relative to nonveterans. For example, Xie (1992) showed that after they exit the military, veterans gradually come to have higher educational attainments and earnings than nonveterans. On the other hand, active-duty military service with combat exposure may subject veterans to circumstances that lead them to be physically or psychologically impaired in ways that may contribute to a later-life health and mortality disadvantage. In addition, it can put them at risk for life events that are negatively associated with health outcomes. For example, it is well established that there are health benefits to marriage, particularly for men (Lillard and Waite 1995; Rogers 1995; Simon 2002). However, recent research suggests a complex relationship between marriage, marital transitions, and health over the life course (Williams and Umberson 2004). Because World War II veterans are more likely to divorce than nonveterans (Pavalko and Elder 1990), this could place them at an increased risk for mortality in later life.

The literature on military service and the life course generally extends beyond straightforward comparisons of veterans and nonveterans to take into account the timing of military service in men's lives and how that intersects with earlier circumstances and later trajectories. By focusing on early versus late entry into the military, this literature on the effects of age at mobilization on later-life outcomes interrogates two corollary hypotheses grounded in the concepts and theories of the life course: the military as positive turning point and as a life-course disruption. Both of these hypotheses emphasize the potential of military service to produce discontinuity in the life course.

The military as positive turning point hypothesis focuses on young age at entry into the military because it maximizes the chances for redirection of the life course and minimizes disruption to established life-course trajectories. Elder (1987) argued that early entry into the military represents a social and psychological moratorium, which both delays the transition to adulthood and allows for the maximal use of service benefits. Early entry may reflect a selection of the most disadvantaged, who see military service as a route out of difficult life circumstances; however, these are precisely the persons who may benefit most from the health and educational benefits available to veterans.

There is considerable evidence in the literature that early entry into the military can produce beneficial discontinuity in the life-course trajectories of

initially disadvantaged men. For example, Elder (1986) reported that early entrants had more disadvantaged family backgrounds, poorer grades, and lower feelings of self-adequacy, but in part through later transitions to adult roles and responsibilities, they were able to equal the occupational achievements of nonveterans, to have more stable marriages than nonveterans, and to experience larger gains in psychological strength through midlife than nonveterans. This is consistent with the beliefs of the majority of early entrants, who were much more likely than later entrants to report retrospectively that their lives had followed different and more rewarding courses as a result of their military service (Elder 1987). Other studies have also provided evidence in support of the military as positive turning point hypothesis. For example, Sampson and Laub (1996) concluded, "Military service in the World War II era provided American men from economically disadvantaged backgrounds with an unprecedented opportunity to better their lives through on-the-job training and further education" (p. 364; see also Laub and Sampson 2003). If this is the case, those who served in the military (particularly those who enlisted at relatively young ages) should have lower mortality in later life than those who did not serve. In addition, early-life disadvantage associated with being African American or having a father with low educational attainment should be ameliorated to some extent by serving in the military.

The life-course disruption hypothesis is a corollary to that of the military as positive turning point hypothesis. According to this hypothesis, relatively late entry into the military has the potential to disrupt established marital, parenting, and occupational trajectories, which may have consequences for the subsequent patterning of the life course and later-life outcomes. Later entrants often come from more advantaged backgrounds than earlier entrants. Because later entrants are more likely to have completed their educations and will have less time at the completion of their service to take advantage of educational benefits for veterans, the gains that accrue to more disadvantaged, earlier entrants may not materialize to the same degree or with the same effects in the lives of later entrants. In addition to the corollary evidence regarding late entry that is reported in the studies that focus on early entrants, military service as a turning point, and life-course discontinuity, Elder et al. (1994) provided direct evidence in support of this life-course disruption hypothesis. They reported that each year entrance into military service was delayed reduced the economic and job benefits associated with military service and increased the risk for life disruption and related costs. Moreover, partly as a result of the work and family life disadvantages they experienced, late-mobilized men were at greater risk for negative physical health trajectories over the life course. Consequently, according to the life-

course disruption hypothesis, late entrants into the military should have higher mortality in later life than those who entered the military at a younger age. These effects should be exacerbated for relatively advantaged men, including Whites and those whose fathers had higher educational attainments.

The military as positive turning point and life-course disruption hypotheses focus on discontinuities in the life course produced by military service. In the first instance, early-life disadvantage yields to some extent to the opportunities and benefits emanating from attachment to the military. In the second instance, relatively more advantaged early beginnings, which partly contribute to a successful transition to adult occupational, marital, and parenting roles, are disrupted by military service.

Although models of discontinuity have been the primary focus of analyses aiming to understand how military service shapes the life courses of men, an alternative cumulative-(dis)advantage hypothesis can also be derived from the life-course perspective (Dannefer 1987; O'Rand 1996; Settersten 2003). If a social institution is not organized to ameliorate the effects of, or otherwise reproduces, existing systems of social stratification, then participation in that social institution is unlikely to enable individuals to overcome early-life disadvantage, which creates continuity in the life course and may serve to reinforce processes of cumulating (dis)advantage. Therefore, the cumulative-(dis)advantage perspective reminds us that for military service to generate life-course discontinuity, the military as a social institution must enable individuals to overcome early-life disadvantage by providing opportunities that alter life chances and choices. But if social hierarchies of (dis)advantage are reproduced within the military or in the implementation of benefits, then it is possible that earlier (dis)advantages will be propelled forward through the life course in a more or less continuous manner. In this case, military service would have no effect on mortality in later life and would not mediate or moderate the effects of early-life (dis)advantage on later-life mortality.

Data and Methods

This analysis is based on two nationally representative longitudinal data sets: the HRS and AHEAD. The HRS contains an initial sample of over 12,600 preretirement adults between the ages of 51 and 61 years. The baseline data were collected in 1992, with biennial follow-ups in 1994 and 1996. The AHEAD sample consists of 7,447 older adults aged 70 years and above. Baseline data were collected in 1993, with a follow-up in 1995. In 1998, the HRS and AHEAD were combined into a single data collection effort that

contains a steady-state design, with additional waves of data gathered in 2000 and 2002. The present study includes the baseline male respondents who were either White or African American (HRS $n = 5,639$, AHEAD $n = 2,899$). We did not include women in this analysis because military service was rare among women in these cohorts.

It is important to note that only those who survived to the ages of eligibility for the respective studies could be observed in our analyses. This is more of a concern with respect to African Americans, who have higher death rates at younger ages than Whites, and for those in the AHEAD, because it includes older individuals than the HRS. This is more of a concern with respect to African Americans (and those whose fathers had lower educational attainments), and reduces the observed race (paternal education) difference in later-life mortality, because only the healthiest members of these cohorts were observed in these studies. Our findings must be interpreted with this caveat in mind.

Dependent Variable

For each sample, information was gathered from proxy respondents at subsequent waves regarding the occurrence of respondent deaths. The dependent variable for this analysis measured whether a respondent died between the baseline interview and the 2002 interview (0 = no, 1 = yes). As shown in Table 1, almost 14% of the HRS sample and over 51% of the AHEAD sample died during this period.

Independent Variables

There are three primary independent variables in this analysis: race, father's education, and military service. Race and father's education, which were considered family background characteristics, served as indicators of relative (dis)advantage in early life. As previously mentioned, the analysis focused on the experience of White and African American men. Men in other racial and ethnic groups were not included in this study because there was an insufficient number to reliably detect differences in mortality between those with and without military service. As shown in Table 1, less than 10% of the HRS and AHEAD samples was African American. The second family background measure was father's education (less than eight years, eight years or more, missing). Mother's education is also available in the data sets but was not used in this analysis because it is so highly correlated with father's education. Table 1 indicates that the majority of HRS respondents' fathers had eight years or more of education (66%), whereas the fathers of the AHEAD

Table 1
Weighted Descriptive Statistics by Study Membership

Variable	HRS 1992			AHEAD 1993		
	%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>
Dependent variable						
Died 1992 to 2002	13.93			51.43		
Independent variables						
Early-life background characteristics						
Race (White)	90.12			92.18		
Father's education						
< 8 years (reference)	23.07			44.63		
≥ 8 years	65.97			44.09		
Missing cases	10.96			11.28		
Military Service						
% yes	56.93			56.82		
Age at enlistment						
No military service	43.07			43.18		
< 20 years	27.79			7.00		
20 to 23 years	24.16			27.69		
≥ 24 years	4.66			22.11		
Control variables						
Demographic/socioeconomic status						
Age (years)		55.87	3.20		76.90	5.50
Education (years)		12.53	3.19		11.11	3.76
Household income		\$58,592	\$60,163		\$29,685	\$33,741
Employment						
Not working (reference)	20.83			86.53		
Working	60.68			6.04		
Self-employed	18.49			7.43		
Health status/behaviors						
Self-rated health (1 to 5)		3.51	1.19		2.97	1.19
Health conditions (0 to 8)		1.17	1.15		1.61	1.24
Body mass index		27.22	4.26		25.51	3.73
Normal weight (reference)	30.35			43.42		
Underweight	0.49			2.31		
Overweight	48.65			43.73		
Obese	20.51			10.54		
Smoking						
Never smoked (reference)	25.65			23.87		
Former smoker	46.09			64.02		
Current smoker	28.26			12.11		
Alcohol consumption (0 to 4 drinks/day)		1.07	0.97		0.77	0.84
Unweighted <i>n</i>	5,639			2,899		

Note: HRS = Health and Retirement Study; AHEAD = Study of Assets and Health Dynamics Among the Oldest-Old.

respondents were split evenly between those with less than eight years of education (45%) and those with eight years or more of education (44%).

There are two measures of military service in this analysis. The first is a measure of whether a respondent reported that he had served in the military, where military service was defined as “active military service” not including service in the military reserves. Nearly 57% of both the HRS and AHEAD respondents reported that they had served in the military, consistent with what would be expected. The HRS sample includes persons born from 1931 to 1941, and the AHEAD sample includes persons born before 1924. According to Hogan (1981), the percentage of men represented in the HRS birth cohorts who served on active duty in the armed forces for six months or longer declined steadily from 67.2% for those born in 1931 to 40.3% for those born in 1941. The percentage of men represented in the AHEAD birth cohorts who had six months or more of active duty service declined steadily from 76.6% for those born in 1924 to 24.3% for those born in 1907; however, it is important to note that there are relatively few respondents from the oldest cohorts in the AHEAD. It is also important to note that the six birth cohorts that fall outside of both the HRS and AHEAD sampling frames (i.e., those born from 1925 to 1930) had substantially higher percentages with six months of active duty service, ranging from a low of 67.7% to a high of 79.5%.

The second measure takes into account the timing of military service during the life course. Previous research (e.g., Elder 1986; 1987; Elder et al. 1994; Sampson and Laub 1996; Xie 1992) suggests that early enlistment in the military is less disruptive to men’s lives and is associated with greater accumulated advantage over the life course than later enrollment. Given this, we constructed an age of enlistment variable with the following categories: no military service, enlisted before the age of 20 years, enlisted between the ages of 20 and 23 years, and enlisted at age 24 years or older. Table 1 indicates that there are substantial differences between the HRS and AHEAD samples in the age at enlistment. Although approximately 43% of each sample did not serve in the military, the HRS respondents tended to enlist at younger ages than the AHEAD respondents: over one quarter of the HRS sample enlisted prior to age 20 years, whereas only 7% of the AHEAD sample enlisted prior to age 20 years.

Control Variables

With the exception of some preliminary descriptive tabulations, all analyses controlled for age. In supplemental analyses, we tested a Race \times Age interaction to account for possible nonlinearity in the effect of race on mor-

tality over the age range represented in this stage of the life course; however, it was not significant at the .05 level in either the HRS or AHEAD model. Thus, we did not include it in the models reported in this article. Some analyses also controlled for variables that represented mid- to late-life-course characteristics that were acquired after any military service and were measured in the baseline HRS and AHEAD interviews prior to the measurement of the dependent variable. These included several demographic and socioeconomic characteristics, such as marital status (married = 1), education (years), annual household income (dollars), and current employment status (not working, working for an employer, self-employed), and various measures of respondents' health status and behaviors, such as self-rated health (1 = *poor*, 5 = *excellent*), number of health conditions, body mass index (BMI; normal weight: $18.5 \leq \text{BMI} < 24.9$; underweight: $\text{BMI} < 18.5$; overweight $25.0 \leq \text{BMI} \leq 29.9$; obese: $\text{BMI} \geq 30.0$), smoking behavior (never, past smoker, current smoker), and alcohol consumption (number of drinks per day).

Analysis Plan

The analysis focused on the overall effect and the timing of military service on mortality in later life and whether the effects of military service on mortality differed for Whites and African Americans and those with fathers who had less than eight or eight or more years of education. We conducted separate analyses on the HRS and AHEAD samples because the period from baseline to 2002 during which the dependent variable was observed differed by one year across the two studies and because of age differences between the samples that influenced their eligibility to serve in particular wars and military conflicts. The younger HRS sample was more likely to serve in the Vietnam War, whereas the older AHEAD sample was more likely to serve in World War II. The age differences of these samples also influenced the relative opportunity for social mobility available to White and African American men, and men of different social classes, who grew up in the particular historical circumstances that contextualized their early life courses.

After presenting descriptive statistics on the percentage of respondents who died during each study by race, father's education, and military service, we present a series of hierarchical logistic regression models predicting the likelihood of death. As these models are elaborated, death is predicted as a function of early-life background characteristics (i.e., race and father's education), age, and military service (age at enlistment); these variables plus interactions between the background characteristics and military service (age at enlistment); and these variables plus the mid- to late-life marital sta-

tus, socioeconomic status, health status, and health behavior control variables. The overall effect of military service and the effects of enlistment age were tested in separate models. The descriptive and multivariate analyses took into account the effects of the survey design by using the SVY options in Stata, which enabled us to use the weights, adjust the estimates for clustering in the sample, and calculate robust standard errors (StataCorp 2001).

Our analyses were designed specifically to address the hypotheses outlined above. Specifically, support for the positive turning point hypothesis will be found if military service in general, and early age at enlistment, are negatively related to the likelihood of death. Additional evidence in support of this hypothesis would be indicated by a lower likelihood of dying among African Americans who served in the military relative to African Americans who did not serve, or men whose fathers had low educational attainment who served in the military relative to men whose fathers had low educational attainment and did not serve, respectively. Support for the life-course disruption hypothesis will be found if Whites, and those whose fathers had higher educational attainment, who served in the military, are more likely to die than Whites, and those whose fathers had lower educational attainment, who did not serve. Evidence in support of the cumulative-(dis)advantage hypothesis would be found if the effects of race or father's education persisted after controlling for military service.

Results

Being African American and having a less well-educated father are, on average, associated with relative disadvantage that emerges early in the life course. Such early-life disadvantage is expected to increase the likelihood of mortality over the life course through processes of cumulating disadvantage, unless some intervening events or processes redirect the life course in ways that circumvent early-life disadvantages in favor of health and longevity.

We began our examination of whether military service produced discontinuity in the life courses of men in the HRS and AHEAD cohorts by examining the bivariate relationship between race, paternal education, and military service and mortality later in life. In both the HRS and the AHEAD, African Americans and those whose fathers had less than eight years of education were significantly more likely to have died between 1992-1993 and 2002 than Whites and those whose fathers had higher educational attainments, respectively. In the HRS, 23.3% of African Americans had died, compared with 12.9% of Whites, whereas in the AHEAD, 60.0% of African Americans and 51% of Whites had died. With respect to father's education, in the HRS,

17.6% of those whose fathers had less than eight years of education had died (compared with 12.1% of those whose fathers had eight or more years of education), and in the AHEAD, the parallel estimates were 53.9% and 47.8%. In the HRS, there was no significant difference in the likelihood of dying between 1992 and 2002 between those who had and had not served (14.9% vs. 12.7%). In the AHEAD, men who served in the military were significantly less likely to have died between 1993 and 2002 than men who had not served in the military (46.4% vs. 59.7%).

Table 2 presents results of a multivariate logistic regression analysis of the effect of military service on the likelihood of death in the period from 1992-1993 to 2002. The top panel of Table 2 presents the results for the HRS, and the bottom panel presents the results for the AHEAD. Model 1 included race, father's education, and age. To evaluate the effect of military service on mortality and the extent to which it mediates or counteracts the effects of early-life racial and socioeconomic disadvantage on mortality, we added a dichotomous variable for military service to model 2. Models 3 and 4 added interactions between race and military service and father's education and military service, respectively, to examine whether military service moderates the effects of early-life disadvantage on later-life mortality. If the interaction is significant and negative, this would provide evidence in support of the military as positive turning point hypothesis, whereas a significant and positive interaction would support the cumulative-(dis)advantage hypothesis. If the interaction term were not significant, we would conclude that military service does not moderate the effect of early-life disadvantage on mortality.

As seen in model 1 in the top panel of Table 2, in the HRS, race, father's education, and age each had significant independent effects on later-life mortality in the expected directions. Military service had no significant effect on later-life mortality (model 2), and the addition of this variable to the model did little to change the effects of the other variables. Model 3 revealed marginally significant evidence that military service moderates the effect of race on mortality. Relative to Whites who had not served in the military (the reference group), Whites who had served in the military were marginally more likely to have died (log likelihood = .2282, $p = .053$). African Americans were significantly more likely than Whites to have died; however, there was a marginally significant interaction between race and military service ($p = .059$) such that relative to Whites who had not served in the military, African Americans with no military service were more likely to have died (log likelihood = .8616) than African Americans with military service (log likelihood = .2282 + .8616 - .4115 = .6783). There was no evidence that military service moderated the effect of low paternal education on later-life mortality (model 4).

Table 2
Survey Logistic Regression Analysis of the Effect of Military Service on the
Likelihood of Death Between 1992-1993 and 2002 in the Health and Retirement Study (HRS)
and the Study of Assets and Health Dynamics Among the Oldest-Old (AHEAD)

Variable	Model 1	Model 2	Model 3	Model 4
	HRS			
Military service	—	.1645 (.10)	.2282+ (.12)	.2235 (.14)
Race (1 = African American)	.6467*** (.08)	.6720*** (.08)	.8616*** (.14)	.6734*** (.08)
Father's education < 8 years (reference: ≥ 8 years)	.3389*** (.09)	.3518*** (.09)	.3531*** (.09)	.4779*** (.15)
Father's education missing	.2734+ (.14)	.2861+ (.15)	.2752+ (.15)	.2668 (.18)
Age (years)	.0976*** (.02)	.0931*** (.02)	.0929*** (.02)	.0935*** (.02)
Military Service × Race	—	—	-.4115+ (.21)	—
Military Service × Father's Education < 8 Years	—	—	—	-.2228 (.22)
Military Service × Father's Education Missing	—	—	—	.0435 (.27)
Constant	-7.5103*** (1.08)	-7.3589*** (1.04)	-7.3874*** (1.04)	-7.4227*** (1.13)
Number of observations	5,639	5,639	5,639	5,639
F	38.96***	31.82***	26.25***	21.80***

AHEAD

Military service (yes = 1)	—	.1052 (.08)	.1206 (.09)	.1036 (.12)
Race (1 = African American)	.2720* (.12)	.2837* (.12)	.3767+ (.19)	.2788* (.12)
Father's education < 8 years (reference: ≥8 years)	.1130 (.07)	.1200 (.07)	.1207 (.07)	.1622 (.12)
Father's education missing	.4864** (.17)	.4898** (.16)	.4937** (.16)	.2900 (.23)
Age (years)	.1423*** (.01)	.1466*** (.01)	.1468*** (.01)	.1468*** (.01)
Military Service × Race	—	—	-.1909 (.26)	—
Father's education missing	—	—	—	-.0784 (.17)
Military Service × Father's Education < 8 Years	—	—	—	.3425 (.29)
Constant	-10.9487*** (0.66)	-11.3436*** (0.78)	-11.3650*** (0.78)	-11.3532*** (0.78)
Number of observations	2,899	2,899	2,899	2,899
F	82.85***	65.13***	54.66***	46.85***

Note: Standard errors are shown in parentheses.

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (chi-square test).

As seen in model 1 in the bottom panel of Table 2, in the AHEAD, the likelihood of dying in the period from 1993 to 2002 was higher for African Americans and older persons; however, in contrast to the results for the HRS, low paternal education was not associated with a higher likelihood of dying once race and age were taken into account. In contrast to the significant, negative association between military service and mortality evident in the bivariate results, the effect of military service in model 2 was positive and nonsignificant. Supplemental analyses (not shown) indicated that controlling for age alone reduced the military service coefficient to nonsignificance. In fact, respondents in the AHEAD who served in the military were, on average, five years younger than those who reported no military service. Therefore, the lower likelihood of dying among the AHEAD respondents with military service that was apparent at the bivariate level was due to their younger average age rather than military service per se. Models 3 and 4 provided no evidence that military service moderates the effects of African American race and low paternal education, respectively, on later-life mortality.

Taken together, the results presented in Table 2 suggest that military service did not substantially improve the life chances of men in the HRS or AHEAD cohorts in ways that influenced later-life mortality. Analysis of the HRS data provides limited evidence that military service mitigated to some extent the effects of racial inequality on later-life mortality. Overall, the results are more suggestive of life-course continuity and cumulative disadvantage than of discontinuity resulting from the positive influence of military service on later-life mortality.

The analyses presented thus far have focused on an overall measure of military service that did not take into account the age at which men entered military service. Life-course theory and prior empirical research suggest that the benefits of military service are most likely to accrue to those who enter military service at younger ages, whereas those who enter at older ages are subject to more life-course disruption as a result of their military service. Thus, it is possible that the nonsignificant findings for the dichotomous military service variable reflect countervailing positive and negative influences that can be teased apart by focusing on age at enlistment. To investigate this possibility, we examined the effects of age at enlistment on later-life mortality.

Table 3 replicates the analyses presented in Table 2, with the exception that age at enlistment (< 20, 20 to 23, and \geq 24 years old at enlistment vs. no military service) was substituted for the dichotomous military service variable. There was no need to replicate model 1 from Table 2, because it would be identical in this analysis to what was already presented; thus, model 1 in this table presents the main effects of age at enlistment controlling for race, father's educational attainment, and age. Models 2 and 3 analyzed whether

age at enlistment moderates the effects of race and paternal education on later-life mortality. The interpretations of these interactions are parallel to those presented in Table 2. The top panel of Table 3 presents the results for the HRS; the bottom panel presents the results for the AHEAD.

The results of model 1 for the HRS respondents were partially consistent with theoretical expectations emerging from the life-course disruption hypothesis; however, they are not consistent with the military as positive turning point hypothesis. Both those who enlisted early (before age 20) and those who enlisted late (at age 24 or older) were significantly more likely to have died in the period between 1992 and 2002 than those who had never served in the military. The results of models 2 and 3 provide no evidence that age at enlistment moderated the effects of being African American or having a father with low educational attainment on mortality.

The results of model 1 for the AHEAD respondents revealed no significant differences by age at enrollment. As was the case with the HRS respondents, models 2 and 3 revealed no evidence that age at enlistment interacted with race or paternal education to influence later-life mortality for better or worse.

Taken together, these results provide no evidence that age at enlistment, particularly early enlistment as suggested by prior research, differentially benefited the men in either the HRS or AHEAD cohorts or contributed to a disruption of the mortality disadvantage emanating from being African American and having a father with low educational attainment. The results from the HRS provide some evidence that is consistent with the life-course disruption hypothesis.

A final set of analyses examined whether the effects of military service or age at enlistment on later-life mortality are mediated by mid- to late-life-course marital, socioeconomic, and health statuses or health behaviors. We focus in the text on the HRS sample because we observed no significant effects of military service or age at enlistment on mortality in the AHEAD; however, we report parallel results for the AHEAD in Table 4 and discuss a few findings that emerged unexpectedly. For each analysis, model 1 in Table 4 replicates the preferred model from prior analyses, although some coefficients presented in the earlier tables are not shown here (i.e., age and father's education missing). In model 2, respondents' marital and socioeconomic status (education, household income, employment) measured at the baseline were added. In model 3, we controlled for respondents' baseline health status and health behaviors (but not their marital and socioeconomic statuses), and in model 4, we controlled for respondents' marital, socioeconomic, and health statuses, as well as their health behaviors.

Table 3
Survey Logistic Regression Analysis of the Effect of the Age of Entry
Into Military Service on the Likelihood of Death Between 1992-1993
and 2002 in the Health and Retirement Study (HRS) and the Study
of Assets and Health Dynamics Among the Oldest-Old (AHEAD)

Variable	Model 1	Model 2	Model 3
	HRS		
Age at enlistment (reference: no service)			
< 20 years	.3753** (.11)	.4402*** (.12)	.4413** (.14)
20 to 23 years	-.2161 (.14)	-.1537 (.16)	-.1535 (.19)
≥ 24 years	.5084* (.25)	.5603* (.25)	.5880+ (.30)
Race (1 = African American)	.6806*** (.08)	.8670*** (.14)	.6772*** (.08)
Father's education < 8 years (reference: ≥ 8 years)	.3477*** (.09)	.3484*** (.09)	.4759** (.15)
Father's education missing	.2529+ (.14)	.2424+ (.14)	.2622 (.17)
Age (years)	.1010*** (.02)	.1007*** (.02)	.1009*** (.02)
Enlisted < 20 Years × Race	—	-.4240 (.26)	—
Enlisted 20 to 23 Years × Race	—	-.3929 (.33)	—
Enlisted ≥ 24 Years × Race	—	-.3485 (.61)	—
Enlisted < 20 Years × Father's Education < 8 Years	—	—	-.3144 (.28)
Enlisted 20 to 23 Years × Father's Education < 8 Years	—	—	-.0919 (.25)
Enlisted ≥ 24 Years × Father's Education < 8 Years	—	—	-.1575 (.48)
Enlisted < 20 Years × Father's Education Missing	—	—	.1550 (.29)
Enlisted 20 to 23 Years × Father's Education Missing	—	—	-.3597 (.41)
Enlisted ≥ 24 Years × Father's Education Missing	—	—	-.4791 (.74)
Constant	-7.7948*** (1.08)	-7.8208*** (1.08)	-7.8318*** (1.07)
Number of observations	5,639	5,639	5,639
F 23.13***	15.09***	12.28***	
	AHEAD		
Age at enlistment (reference: no service)			
< 20 years	.2117 (.17)	.1819 (.17)	.1535 (.26)
20 to 23 years	.1259 (.13)	.1328 (.14)	.1459 (.17)
≥ 24 years	.0757 (.12)	.1205 (.13)	.0667 (.17)
Race (1 = African American)	.2879* (.12)	.3808* (.19)	.2964* (.12)
Father's education < 8 years (reference: ≥ 8 years)	.1171 (.07)	.1196+ (.07)	.1590 (.12)

(continued)

Table 3 (continued)

Variable	Model 1	Model 2		Model 3
		AHEAD		
Father's education missing	.4857** (.17)	.4911** (.16)		.2867 (.23)
Age (years)	.1494*** (.01)	.1501*** (.01)		.1498*** (.01)
Enlisted < 20 Years × Race	—	.7456 (.75)		—
Enlisted 20 to 23 Years × Race	—	.0075 (.27)		—
Enlisted ≥ 24 Years × Race	—	-.6115 (.39)		—
Enlisted < 20 Years × Father's Education < 8 Years	—	—		-.0334 (.30)
Enlisted 20 to 23 Years × Father's Education < 8 Years	—	—		-.0592 (.22)
Enlisted ≥ 24 Years × Father's Education < 8 Years	—	—		-.1126 (.22)
Enlisted < 20 Years × Father's Education Missing	—	—		.5349 (.60)
Enlisted 20 to 23 Years × Father's Education Missing	—	—		-.0747 (.34)
Enlisted ≥ 24 Years × Father's Education Missing	—	—		.5472 (.38)
Constant	-11.5622*** (0.91)	-11.6246*** (0.90)		—
11.5895*** (0.92)				
Number of observations	2,899	2,899	2,899	
F44.07***	33.96***	22.11***		

Note: Standard errors are shown in parentheses.

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (chi-square test).

Although there was some shifting in statistical significance with respect to the military service and Military Service × Race coefficients depending on whether marital and socioeconomic statuses or health status and behaviors were controlled, the results presented in model 4 in the top left-hand panel indicate that adding the full set of control variables did not change the pattern of results observed earlier. The effects of military service on later-life mortality were not mediated by later-life marital, socioeconomic, and health statuses or health behaviors. However, it is noteworthy that these characteristics measured later in life, but prior to the measurement of the mortality outcome, added considerably to the predictive power of the model and explained a substantial portion of the effect of race on mortality, although that effect remained large and statistically significant. These factors reduced to non-significance the effect of low paternal education on later-life mortality.

As seen in the bottom left-hand panel in Table 4, the results for age at enlistment yielded a similar conclusion; these marital status, socioeconomic

Table 4
Survey Logistic Regression Analysis of Whether the Effects of Military Service (age at enlistment)
on the Likelihood of Death Between 1992-1993 and 2002 Were Mediated by Socioeconomic
and Health Status and Health Behavior Characteristics Measured in 1992-1993

Variable	HRS: Military Service				AHEAD: Military Service			
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^d	Model 1	Model 2	Model 3	Model 4
Military service (1 = yes)	.2282+ (.12)	.2920* (.12)	.2828* (.12)	.2490* (.12)	.1052 (.08)	.1734+ (.09)	.1708+ (.10)	.1720 (.11)
Military Service × Race	-.4115+ (.21)	-.3330 (.21)	-.4161+ (.22)	-.4435+ (.23)	—	—	—	—
Race (1 = African American)	.8616*** (.14)	.5422*** (.16)	.6307*** (.13)	.5489*** (.15)	.2837* (.12)	.1188 (.13)	.0894 (.14)	.0454 (.14)
Father's Education < 8 Years	.3531*** (.09)	.1875+ (.10)	.0681 (.08)	.0979 (.09)	.1200 (.07)	-.0006 (.08)	-.0047 (.08)	-.0426 (.09)
Constant	-7.3874*** (1.04)	-4.7332*** (1.09)	-6.3628*** (1.22)	-6.1398*** (1.24)	-11.3436*** (0.78)	-10.0792*** (0.77)	-10.5486*** (0.89)	-9.9913*** (0.86)
Number of observations	5,639	5,639	5,639	5,639	2,899	2,899	2,899	2,899
F	38.96***	45.04***	27.85***	41.93***	65.13***	39.72***	35.24***	36.39***
	HRS: Age at Enlistment				AHEAD: Age at Enlistment			
Age at enlistment (reference: no service)								
< 20 years	.3753*** (.11)	.3957*** (.11)	.3238** (.12)	.2863* (.12)	.2117 (.17)	.2491 (.18)	.3692* (.16)	.3435* (.17)
20 to 23 years	-.2161 (.14)	-.1021 (.15)	-.0506 (.15)	-.0833 (.16)	.1259 (.13)	.2206 (.13)	.2444 (.15)	.2653+ (.16)
≥ 24 years	.5084* (.25)	.7090** (.25)	.7276* (.28)	.7027* (.28)	.0757 (.12)	.1322 (.13)	.0943 (.13)	.0864 (.13)

Race (1 = African American)	.6806*** (.08)	.3988*** (.11)	.4480*** (.08)	.3559*** (.10)	.2879* (.12)	.1230 (.13)	.0982 (.14)	.0548 (.14)
Father's education < 8 years	.3477*** (.09)	.1916+ (.10)	.0766 (.08)	.1022 (.09)	.1171 (.07)	-.0022 (.08)	-.0113 (.08)	-.0490 (.09)
Constant	-7.7948*** (1.08)	-5.1987*** (1.14)	-6.6712*** (1.26)	-6.4247*** (1.28)	-11.5622*** (0.91)	-10.3763*** (0.90)	-11.0778*** (1.00)	-10.5768*** (0.96)
Number of observations	5,639	5,639	5,639	5,639	2,899	2,899	2,899	2,899
F	23.13***	38.90***	24.46***	37.44***	44.07***	32.01***	29.95***	31.94***

Note: Standard errors are shown in parentheses.

a. Model 1 controlled for age and father's education missing.

b. Model 2 controlled for age, father's education missing, marital status, and socioeconomic characteristics (education, household income, and employment status) measured in 1992.

c. Model 3 controlled for age, father's education missing, health status, and health behavior characteristics (self-rated health, health conditions, body mass index, smoking, and drinking) measured in 1992.

d. Model 4 controlled for age, father's education missing, marital status, socioeconomic status, health status, and health behavior characteristics measured in 1992.

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (chi-square test).

status, health status, and health behavior variables did not mediate the effects of early or late age at entry into the military on later-life mortality. For the men in the HRS cohorts, some other set of variables must link military service, and early and late entry, to increased risk for mortality.

Turning now to the parallel analysis of age at enlistment in the AHEAD data, we focus on the bottom right-hand panel of Table 4 and note that adding controls for later-life health status and health behavior variables increased substantially the effect of early age at entry into the military on the likelihood of mortality. Model 3 indicated that those who entered prior to age 20 years were significantly more likely than those who had not served to have died between 1993 and 2002. In model 4, that coefficient remained statistically significant, and the coefficient for age at enlistment between 20 and 23 years increased to marginal significance.

The Effects of Mid- to Late-Life Characteristics

Although we do not present in Table 4 the coefficients for the control variables, we note that most variables had statistically significant effects on mortality in the expected directions. Here, we summarize these results briefly, focusing on the coefficients from model 4 for the HRS and AHEAD; we do not repeat the discussion of the control variables for the models in the bottom panel of Table 4, because the findings did not change substantively when age at enlistment was substituted for the military service dummy variable. Full models are available from the authors on request.

Among the marital and socioeconomic status control variables, employment status had the most consistent results; those who were employed or self-employed at baseline were significantly less likely to die in the subsequent 9- to 10-year period than those who were not employed in both the HRS and AHEAD models. In the HRS model, the likelihood of dying decreased as household income increased. In the AHEAD model, those who were married were significantly less likely to die than those who were not married. The baseline health status and health behavior variables were all significantly associated with the likelihood of dying in one of the models, and in most cases the results were consistent across the analyses of the HRS and AHEAD models. In both the HRS and AHEAD, those with better self-rated health and fewer health conditions at baseline were less likely to die than those with worse self-rated health and more health conditions, respectively, while the likelihood of dying was higher among current and past smokers compared with those who had never smoked. In the HRS model, those who were underweight were more likely and those who were overweight were less likely to die than those who were normal weight, while in

the AHEAD analysis, the likelihood of dying was lower among the overweight and obese relative to those who were normal weight. Finally, in the AHEAD model, the likelihood of dying decreased as the number of drinks per day increased.

Discussion

At the outset of this article, we drew on the extant literature and the life-course framework to posit three plausible hypotheses: the military as positive turning point and life-course disruption hypothesis, which focus on the role of the military in producing discontinuity in the life-course trajectories of men, and the cumulative-(dis)advantage hypothesis, which focuses on life-course continuity emanating from social structural (dis)advantages that military service is unable to overcome.

Our analyses of later-life mortality as a function of early-life racial and socioeconomic disadvantage and military service using the HRS and AHEAD data provides some evidence in support of both hypotheses that predict discontinuity in men's life-course trajectories as a consequence of military service. We also found evidence in support of life-course continuity in that race and low paternal education continued to exert an influence on later-life mortality in almost all of the analyses.

In the HRS, we found that the effect of military service varied by race. Controlling for age and father's education, among Whites, military service increased the likelihood of dying between 1992 and 2002 relative to Whites who had not served in the military. African Americans had a higher likelihood of dying than Whites regardless of military service; however, African Americans who served in the military had a marginally lower likelihood of dying than African Americans who had not served in the military. In the HRS, the higher likelihood of dying for Whites who had served in the military is consistent with the life-course disruption hypothesis; the amelioration of racial disadvantage that military service afforded African American men is consistent with the military as positive turning point hypothesis.

In the AHEAD, we find no evidence that military service per se influenced later-life mortality or moderated the effects of early-life disadvantage on later-life mortality. The apparent bivariate association, which suggested that military service substantially and significantly reduced mortality, was fully accounted for by the five-year age difference, on average, between those who had and had not served.

Our analyses of the effects of age at enlistment on later-life mortality provided some additional evidence that is consistent with the life-course disruption-

tion hypothesis; however, it also revealed evidence that directly counters theoretical expectations and prior evidence regarding the military as positive turning point hypothesis as developed on the basis of early age at entry to the military. In the HRS, we found that both those who had entered the military early (at ages less than 20 years) and those who had entered the military late (at ages 24 years or greater) were significantly more likely than those who had not served in the military to have died between 1992 and 2002. In the AHEAD, those who entered the military early (at ages less than 20 years) were more likely to have died between 1993 and 2002 than those with no military service once later-life health status and behaviors were controlled. We found no evidence in either the HRS or the AHEAD that age at enlistment moderated the effects of racial and father's educational attainment on later-life mortality. Although the higher likelihood of dying among those who entered the military late is consistent with the life-course disruption hypothesis, none of the hypotheses predicted that early entrants would be more likely to die than those who did not serve. If, as is suggested by the literature, early entry is associated with greater disadvantage, then this effect is consistent with an interpretation of life-course continuity and cumulating disadvantage that does not yield as a consequence of military service (and is not explained by race and father's educational attainment or, as we demonstrate, mid- to late-life socioeconomic and health statuses or a range of health behaviors).

Taken together, we find selected evidence that supports each of the three hypotheses. However, we find very little evidence to support the notion that there are any benefits that accrue to men and materialize in their lives as a lower likelihood of dying as a consequence of military service overall or at any particular age at enlistment. Most of the evidence is consistent with life-course disruption and continuity of disadvantage interpretations, which is evidenced by the continuing influence of African American race and low paternal education on later-life mortality and the nonsignificance of military service in the analyses of the AHEAD data.

Our attempt to elucidate the mechanisms by which military service exerted its influence on later-life mortality was not particularly successful but was nonetheless instructive. All of the findings regarding military service and age at enlistment remained essentially unchanged when we controlled for mid- and late-life marital, socioeconomic, and health statuses and health behaviors. The one exception was the unexpected finding of a suppression effect in the AHEAD data, in which early age at enlistment emerged as a significant, positive predictor of later-life mortality and enlistment at age 20 to 23 years emerged as a marginally significant positive predictor of later-life mortality once the mid- and later-life marital, socioeconomic, and health statuses and health behavior variables were controlled. Overall, the findings

suggest that the mechanisms by which military service influences later-life mortality for better (in the case of African Americans in the HRS) or worse (for Whites in the HRS and early and late entrants in the HRS) operates through some pathway or pathways that are not indexed by this set of control variables.

In conclusion, we note that the extant literature is compelling for its theoretical articulation of life-course models and innovative analyses of longitudinal data. However, the results we present in this article suggest that more research is needed to ascertain the extent to which findings reported for specific cohorts or subgroups are generalizable to broader populations and to articulate how life-course processes play out in terms of later-life outcomes and mortality.

We believe that this study has several strengths and some limitations that are important to note. First, we frame our analyses and draw on theories that are anchored in the perspectives of the life course to guide our empirical analyses. Second, this study uses two nationally representative data sets that together allow for an examination of mortality from midlife to late life. Third, most other studies focus on veterans of one war (e.g., World War II veterans, Vietnam veterans) or a particular historical cohort. However, the HRS and AHEAD data allowed us to examine the experiences of two cohorts born in different historical periods and participating in different military conflicts. Fourth, our study examines racial differences in the effects of military service on mortality and asks whether military service and the timing of military service matter in the same ways and to the same degree for men whose military and life experiences during the 20th century were markedly different as a consequence of the color of their skin.

A potential limitation of this study, which is related to the fourth point above, concerns our ability to detect statistically significant differences in mortality between Whites and African Americans (Ferraro and Wilmoth 2000). It is noteworthy, however, that despite concerns about statistical power, statistically significant main effects in the HRS and AHEAD analyses, and a Military \times Race interaction effect in the HRS analysis, were documented consistently. An additional limitation of this study is that we were unable to consider many potentially relevant variables because they were not available in the HRS and AHEAD. For example, we would ideally liked to have had additional measures of early-life circumstances (e.g., childhood health, father's occupational prestige, mother's employment status), military service (e.g., combat exposure, career service), and more detailed mid- to late-life characteristics (e.g., work and family trajectories). A final limitation is that we do not take into account the dynamic nature of late-life health and mortality by estimating hazard models with time-varying covariates. Such an

approach could provide additional insights into these processes and should be pursued in future studies.

Given that this is the first study, to our knowledge, to examine the effect of military service on later-life mortality using the HRS and AHEAD data, our goal was to explore the overall effects of military service and age of enlistment. Future studies should consider the historical context during which men served, for how long they served, and whether the historical timing or duration of service differentially affected mortality. Future studies will also need to consider whether aspects of military service have differential effects on mid- and later-life health and disability trajectories, causes of death, and outcomes for women. This study represents an important starting point for understanding whether military service creates discontinuity or perpetuates continuity across the life course in ways that affect later-life health, disability, and mortality.

References

- Adena, Michael A., Deirdre M. Cobbin, Michael J. Fett, Lina Forcier, H. Malcolm Hudson, Airdrie A. Long, Jean R. Nairn, and Brian I. O'Toole. 1985. "Mortality Among Vietnam Veterans Compared With Non-Veterans and the Australian Population." *The Medical Journal of Australia* 143:541-44.
- Dannefer, Dale. 1987. "Aging and Intracohort Differentiation: Accentuation, the Matthew Effect, and the Life Course." *Sociological Forum* 2:211-36.
- Elder, Glen H. 1974. *Children of the Great Depression: Social Change in Life Experience*. Chicago: University of Chicago Press.
- . 1986. "Military Times and Turning Points in Men's Lives." *Developmental Psychology* 22:233-45.
- . 1987. "War Mobilization and the Life Course: A Cohort of World War II Veterans." *Sociological Forum* 2:449-72.
- Elder, Glen H., Michael J. Shanahan, and Elizabeth Colerick Clipp. 1994. "When War Comes to Men's Lives: Life-Course Patterns in Family, Work, and Health." *Psychology and Aging* 9:5-16.
- Ferraro, Kenneth and Janet Wilmoth. 2000. "Measuring Morbidity in Health Surveys: Disease Counts, Binary Variables, and Statistical Power." *Journal of Gerontology: Social Sciences* 55:S173-98.
- Hearst, Norman, Thomas B. Newman, and Stephen B. Hulley. 1986. "Delayed Effects of the Military Draft: A Randomized Natural Experiment." *New England Journal of Medicine* 314:620-24.
- Hogan, Dennis P. 1978a. "The Effects of Demographic Factors, Family Background, and Early Job Achievement on Age at Marriage." *Demography* 15:161-75.
- . 1978b. "The Variable Order of Events in the Life Course." *American Sociological Review* 43:573-86.
- . 1981. *Transitions and Social Change: The Early Lives of American Men*. New York: Academic Press.

- Laub, John H. and Robert J. Sampson. 2003. *Shared Beginnings, Divergent Lives: Delinquent Boys to Age 70*. Cambridge, MA: Harvard University Press.
- Lillard, Lee A., and Linda J. Waite. 1995. "Till Death Do Us Part: Marital Disruption and Mortality." *American Journal of Sociology* 100:1131-56.
- O'Rand, A. M. 1996. "The Precious and Precocious: Understanding Cumulative Disadvantage and Cumulative Advantage Over the Life Course." *The Gerontologist* 36:230-38.
- Parker, Michael W., George F. Fuller, Harold G. Koenig, Jeffrey M. Bellis, Mark A. Vaitkus, William F. Barko, and Joan Eitzen. 2001. "Soldier and Family Wellness Across the Life Course: A Developmental Model of Successful Aging, Spirituality, and Health Promotion, Part II." *Military Medicine* 166:561-70.
- Pavalko, Eliza K., and Glen H. Elder. 1990. "World War II and Divorce: A Life-Course Perspective." *American Journal of Sociology* 95:1213-34.
- Rogers, Richard G. 1995. "Marriage, Sex, and Mortality." *Journal of Marriage and the Family* 57:515-26.
- Sampson, Robert J. and John H. Laub. 1996. "Socioeconomic Achievement in the Life Course of Disadvantaged Men: Military Service as a Turning Point, Circa 1940-1965." *American Sociological Review* 61:347-67.
- Settersten, Richard. 2003. *An Invitation to the Life Course: Toward New Understandings of Later Life*. Amityville, NY: Baywood.
- Simon, Robin W. 2002. "Revisiting the Relationship Among Gender, Marital Status, and Mental Health." *American Journal of Sociology* 107:1065-96.
- StataCorp. 2001. *Stata Statistical Software: Release 7.0*. College Station, TX: StataCorp.
- Williams, Kristi, and Debra Umberson. 2004. "Marital Status, Marital Transitions, and Health: A Gendered Life Course Perspective." *Journal of Health and Social Behavior* 45:81-98.
- Xie, Yu. 1992. "The Socioeconomic Status of Young Male Veterans, 1964-1984." *Social Science Quarterly* 73:379-96.

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