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Conscientiousness, Career Success, and Longevity: A Lifespan Analysis

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Journal

Annals of Behavioral Medicine, 37(2)

ISSN

1532-4796

Authors

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Publication Date

2009-04-01

DOI

10.1007/s12160-009-9095-6

Peer reviewed

ORIGINAL ARTICLE

Conscientiousness, Career Success, and Longevity: A Lifespan Analysis

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Published online: 20 May 2009 © The Author(s) 2009. This article is published with open access at Springerlink.com

Abstract

Background Markers of executive functioning, such as prudent planning for the future and impulse control, are related to conscientiousness and may be central to both occupational success and health outcomes.

Purpose The aim of the study was to examine relations among conscientiousness, career success, and mortality risk across a 65-year period.

Methods Using data derived from 693 male participants in the Terman Life Cycle Study, we examined associations among childhood personality, midlife objective career success, and lifelong mortality risk through 2006.

Results Conscientiousness and career success each predicted lower mortality risk (N=693, relative hazard (rh)= 0.82 [95% confidence interval=0.74, 0.91] and rh=0.80 [0.71, 0.91], respectively), with both shared and unique variance. Importantly, childhood personality moderated the success–longevity link; conscientiousness was most relevant for least successful individuals.

Conclusion Conscientiousness and career success predicted longevity, but not in a straightforward manner. Findings highlight the importance of lifespan processes.

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Introduction

Careers, partially rooted in developmental patterns, may have long-lasting social and health consequences. Aside from the obvious function of providing income, careers relate to social roles, self-concept, ambition, and well-being. Success in work may foster a sense of competence and lead to enhanced well-being, especially if viewed as the result of motivated and productive effort. Executive functioning-those mental processes essential to planning for the future, organizing priorities, and inhibiting impulsive actions-appears central both to career success and to avoiding threats to one's long-term health. Relatedly, personality traits such as conscientiousness and achievement motivation may represent behavioral correlates of the mental processes that partially underlie both career success and longevity. For example, conscientiousness is a key element of both job performance and longevity [1, 2]. Yet predictors of work success and of health and longevity are typically studied as separate domains. Thus, the question of whether individual differences in behavioral manifestations of executive functioning (especially impulse control) partially underlie both career success and longevity is intriguing. The present study uses a lifespan perspective to examine the relations between aspects of childhood personality, midlife career success, and lifelong mortality risk.

Career Success

Career success is typically conceptualized along two dimensions: extrinsic (objective) and intrinsic (subjective). Extrinsic success refers to concrete, verifiable measures such as salary, promotion history, job knowledge and performance, and quality of work, whereas intrinsic success refers to an individual's personal evaluation of and satisfaction with his or her career [3–5]. Although subjective (intrinsic) career satisfaction has been linked to better psychological outcomes, more fulfilling relationships, and better work performance [6–9], a focus on subjective elements inadvertently captures a host of correlated attributes and may obscure our understanding of risks and benefits specifically associated with more objective aspects of work achievement. Thus, in the present study, we focus on objective (extrinsic) career success, while recognizing that this is generally associated with some aspects of subjective success.

Personality, Executive Functioning, and Success Outcomes

A successful career often relies heavily upon traits related to executive functioning, behaviorally manifested as the ability to get things done. Markers of executive functioning may include aspects of planfulness, impulse control, organization, and reasoning [10–12]; these traits overlap with facets of the personality trait conscientiousness, as measured by the NEO-PI-R [13]. Further, there is evidence that effortful control correlates with and aids the development of impulse control, self-regulation, and conscientiousness [14–18], and executive functioning has been shown to correlate with intelligence [19] and, in certain cases, motivation [20].

In turn, facets of personality and executive functioning may impact objective outcomes, such as career success and longevity, and subjective outcomes, such as perceived wellbeing [21–23]. For example, both the dependability and the achievement orientation aspects of conscientiousness have been shown to affect supervisory ratings of job performance [24]. Conscientiousness, intelligence, and achievement motivation have each been associated with better work performance [21, 25-32], and conscientiousness has been linked to better self-rated health [33], healthpromoting behaviors [34, 35], and lower mortality risk [1, 36]. Other studies link socioeconomic status to health, but the causal links are murky and it is unknown whether high motivation and competence play a significant role [37]. Thus, focusing on individual characteristics may be informative in understanding links between cognitive control and success outcomes. To begin to untangle the causal connections, studies are needed with very long-term, objective outcomes like longevity, with examination of factors that may moderate these associations.

The Terman Sample

To examine these matters across the lifespan, we derived data from the Terman Life Cycle Study [38]. Starting in 1922, over 1,500 children were assessed and then followed

throughout their lives, completing various assessments approximately every 5 to 10 years. In 1940, Terman and his colleagues rated male participants on vocational success. The 150 most successful and 150 least successful men were classified based on "the extent to which the subject made use of his superior intellectual ability" (39, p. 497). Terman compared the two groups on a large range of child and young adult variables [39]. In childhood, few variables distinguished the two groups, but by young adulthood, different pathways were evident. Family background, parental marital stability, personality (including drive to achieve), and marriage separated the successful from the unsuccessful.

In a follow-up study, Robert Sears [40] examined whether these success groupings were related to perceived satisfaction with occupation in late life and found that objective occupational success had little bearing on career satisfaction. In another study with the Terman participants, Pavalko, Elder, and Clipp [41] examined occupational stability patterns in relation to mortality risk through 1990; those who moved through a series of unrelated jobs were at increased mortality risk compared to those who maintained a steady career pattern. That study did not look at objective success; rather, the focus was on occupational stability. However, it did suggest that careers are relevant to long-term health outcomes.

Longevity, the ultimate endpoint in a temporal chain of life events, is often used as the single best measure of health. In our prior studies with the Terman sample, childhood conscientiousness has been shown to predict lower mortality risk [42], an effect that holds after controlling for adult conscientiousness [43]. Conscientiousness as a predictor of longevity has now been replicated in other studies, using very diverse samples (for a review, see [1]). Nevertheless, it remains unclear how conscientiousness, career success, and health are related to each other across many years.

The Present Study

Longitudinal studies spanning multiple decades are invaluable in addressing causal hypotheses and moderating effects [44]. Archival data are an underused resource—one that can highlight processes and be useful in testing lifespan models. Archival data are not without limitations, but by exercising care (e.g., understanding the data in detail, establishing scale validities, and recasting portions of the archive to target specific questions), we can address lifespan issues in a way that is impossible with cross-sectional and shorterterm studies [45–47].

In the present study, we extend prior investigations of the Terman participants by specifically examining the relation between childhood personality (especially conscientiousness), objective adult career success, and mortality risk through 2006. We predict that (a) conscientiousness (which contains some of the vital elements of executive functioning) will relate to midlife career success and longevity; (b) career success will predict longer life; and (c) the career success–longevity link will be moderated by childhood personality, suggesting the importance of individual differences in linking career and health outcomes across the entire lifespan.

Methods

Participants

Participants were drawn from the ongoing Terman Life Cycle Study (see [48] for a complete description). In 1922, teachers across California identified both the youngest and most intelligent children in their classes; the children were tested using the Stanford–Binet intelligence test and were included in the study if they had an IQ of 135 or more. Some children were added through 1928, yielding a total sample of 1,528 participants (856 males, 672 females). Participants were assessed throughout their lives, and our research team has supplemented this information by collecting death certificates and constructing and validating new psychosocial indexes (e.g., [47]).

As noted, Terman and his colleagues rated the male participants on how successful they became in their careers. Women in this cohort were limited in career opportunities and choices due to the sociocultural context of their lives; therefore, Terman only included males in these ratings [39]. Following Terman's work, the present study was limited to male participants who received a vocational success rating in 1940 (N=795). To be consistent with previous studies and to have a relatively cohort-homogenous sample, participants born prior to 1904 or after 1915 were excluded (N=78). In addition, participants missing all childhood personality data were excluded (N=24), leaving a final sample of 693 male participants.

Measures

Measures throughout the lifespan were included to inform the questions of interest, including the initial 1922 assessment, adulthood assessments (1940, 1950, and 1960), and mortality information through 2006. To increase reliability, single item responses were combined to create composite variables, as specified below.

Objective Career Success

Ratings of vocational success by Terman's team in 1940 were used to indicate objective success. Terman's criteria included occupational classification (according to the thencurrent census), job prestige, job performance, roles of leadership in the workplace, honors and recognitions received, and annual income [39, 49]. Less weight was given to earned income, except for businessmen, who were expected to earn a higher salary. Through consensual agreement, 150 men were classified as most successful, 150 were classified as least successful, and all others were classified as moderately successful. In the present sample, there were 139 in the most successful group, 412 in the moderately success group, and 142 in the least successful group.

Intelligence

At the baseline assessment (1922), participants completed the Stanford–Binet intelligence exam. Additional tests were administered to determine the reliability of these IQ scores. From these different tests, Terman and his colleagues determined an overall best-estimated childhood IQ level. The participants were selected for their intelligence and thus had the ability to succeed, yet there remained some range in intelligence levels (ranging from 135 to 194) and a much greater range on psychosocial variables [35, 50]. We have used the Pearson–Lawley correction for multivariate cases to examine potential selection effects on correlations (that is, examining the potential impact of IQ selection on relations among traits correlated with IQ) and have found minimal to no effects of selection on health- and personality-related variables.

Childhood Personality

In the 1922 assessment, parents and teachers rated the children on 25 different personality traits. Through factor analysis, six different personality dimensions have previously been identified [42]. The present study included the conscientiousness (four items, α =0.76) and motivation (five items; α =0.71) dimensions. In this sample, conscientiousness most clearly reflects the facet of self-discipline and is most relevant to executive functioning [47]. The motivation dimension reflects drive to succeed and originality and was included as a potential covariate of conscientiousness and career success.

In addition, we examined retrospective reports of ambition by both participants and their parents. Fewer ratings were available and the reports were given retrospectively, so these variables are included to supplement the other variables. In 1940, parents reported the degree to which their son was characterized by "ambition, drive, and willingness to work towards success" (N=350). In 1960, participants reflected on how ambitious they believed they had been between ages 30 and 40 (around the time that the objective career success ratings were made; N=495).

Physical Health and Adjustment

In 1950 and 1960, participants self-reported their general physical health in recent years; most of the participants were in good or very good health at both time periods. Participants specified whether they had experienced any nervousness, worry, or special difficulties in recent years, and the nature of these difficulties. Based on these responses, case histories, and personal correspondence, Terman and his colleagues categorized the participants' overall mental adjustment. Further, participants disclosed their alcohol use, which may serve as a proxy for mental maladjustment. Ratings and reports from the 1950 and 1960 reports on health, mental adjustment, and alcohol use were averaged, and participants were then categorized on a fourpoint physical health scale (1 = poor/very poor health, 4 =very good health), a three-point mental adjustment scale (1 = serious maladjustment, 2 = some maladjustment, 3 =well-adjusted), and a four-point alcohol scale (1 = no)alcohol, 4 = alcohol is a serious problem). Physical health and alcohol data were available for 638 participants, and mental adjustment data were available for 637 participants.

Mortality

We have collected death certificates (from county and state agencies around the country) through 2006 to ascertain and verify the year and age of death. For some participants (N= 67), death certificates could not be located, but relatives confirmed mortality status. Death information has been collected for 632 participants (91.2% of those in the present study; the remaining 8.8% are assumed to be alive or were lost to follow-up and are censored in the analyses).

Data Analysis

The primary analyses relied on Cox proportional hazards regression methods to predict all-cause mortality from 1940 through 2006. First, we tested whether career success alone relates to mortality risk. Second, we tested whether intelligence and childhood personality (conscientiousness and motivation) relate individually to mortality risk. Third, we tested the unique contribution of career success and personality, by simultaneously including both in the model. Fourth, we tested the possible moderating effect of personality on career success by adding interaction terms to the model. Finally, we included midlife physical health, mental adjustment, and alcohol use to control for midlife health status. Age was controlled in all analyses.

Analyses were performed using the SAS[®] software, version 9.1. Because the personality scales lack a natural metric, the beta coefficients were rescaled so that a one-point change equals the interquartile range of that scale.

This scaling makes the coefficients in the proportional regression equation estimate the difference in the log hazard ratio between a person at the 25th and 75th percentiles of the personality scales, holding the other variables in the equation constant. For the other variables, the *b* parameters refer to the expected change in the hazard function with a one-point change on the scale, holding the other variables in the equation constant.

Results

Descriptive and Bivariate Relations

Descriptive statistics are given in Table 1. In addition, the last column indicates the Pearson *r* correlations between each variable and career success. Childhood factors, including intelligence, childhood conscientiousness, motivation, and ambition, were related to more successful careers. Specifically, success was positively correlated with: (1) childhood conscientiousness, r(691)=0.09, p=0.02; (2) childhood motivation, as rated by parents and teachers, r(691)=0.12, p=0.001; (3) ambition, rated retrospectively by parents in 1940, r(348)=0.17, p=0.002; and (4) ambition, rated retrospectively by the participants in 1960, r(493)=0.15, p=0.0006. In addition, objective career success was related to better midlife mental adjustment (r(635)=0.13, p=0.002) and to an older age at death (r(630)=0.13, p=0.001).

Mortality Risk

We next examined the relation of midlife career success to mortality risk, with the potential moderating effects of personality, through a series of Cox proportional regression survival analyses. In each case, we present the relative hazards (rh) and 95% confidence intervals (CI).

First, as predicted, career success was related to lower mortality risk (rh(691)=0.80 [CI=0.71, 0.91]). Men who were independently rated by Terman as most successful in 1940 were less likely to die at any given age than those who were rated as least successful. Figure 1 illustrates the relation between career success and mortality risk by plotting a cumulative hazard function for each group.

Second, we examined whether intelligence and personality were related to longer life. As previously found with this sample, childhood conscientiousness was significantly related to lower mortality risk (rh(691)=0.82 [CI=0.74, 0.91]). Motivation and intelligence were not significant predictors of mortality risk ($rh_{motivation}=1.01$ [CI=0.91, 1.12]; $rh_{ig}=1.00$ [CI=1.00, 1.01]).

Third, we examined the degree of overlapping variance predicted by career success and conscientiousness by simultaneously including the two. This model estimates

Variable	Ν	Mean	SD	Min	Max	Correlation (<i>r</i>) with success ^a
Year of birth	693	1910	2.92	1904	1915	-0.00
Objective career success	693	2.00	0.64	1	3	_
Childhood characteristics						
Intelligence (IQ)	693	149	10.31	135	194	0.10**
Conscientiousness	693	20.63	4.99	4.00	31.00	0.09*
Motivation	693	20.82	5.34	6.00	35.00	0.12**
Parent-rated ambition	350	2.44	0.58	1	3	0.17**
Retrospective ambition	495	3.97	0.79	1	5	0.15***
Midlife characteristics						
Self-rated health	638	3.29	0.68	1	4	0.06
Mental adjustment	637	2.59	0.64	1	3	0.13**
Alcohol use	638	2.21	0.89	1	4	0.00
Age at death	632	79.47 ^b	14.30	30.54	100.82	0.13**

 Table 1 Descriptive r correlations with objective career success

Different sample sizes indicate missing data. Age is given in years. Higher scores indicate a larger amount or higher level.

p*<0.05; *p*<0.01; ****p*<0.001

^a Pearson r correlations with objective career success (measured on a three-point scale)

^b Median age of death, using the Kaplan-Meier estimate

the unique effect of career success on longevity after controlling for conscientiousness and the unique effect of conscientiousness after controlling for career success. As demonstrated in the top section of Table 2, both variables remained strong, significant predictors of mortality risk (rh_{career success}=0.80 [CI=0.71, 0.90]; rh_{conscientiousness}=0.82 [CI=0.74, 0.91]), indicating that although the two are related, conscientiousness and career success are independently relevant to longevity. Childhood motivation and intelligence remained non-significant predictors and did not alter the success–longevity relation.

Fourth, we examined whether personality moderated the career-longevity link by including interaction terms be-







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Table 2 Cox proportional hazard analyses, including	Model	b	Relative hazard	р	95% confidence interval				
interaction effects	Main effects, simultaneous entry (N=693)								
All analysis control for are	Objective career success	-0.23	0.80	0.0004	0.71, 0.90				
	Conscientiousness	-0.20	0.82	0.0002	0.74, 0.91				
	Objective career success	-0.23	0.80	0.0004	0.71, 0.90				
	Motivation	0.02	1.02	0.72	0.92, 1.13				
	Objective career success	-0.23	0.80	0.0003	0.70, 0.90				
	Intelligence (IQ)	0.004	1.00	0.28	1.00, 1.01				
	Interaction effects (N=693)								
	Objective career success	-0.23	0.79	0.0002	0.70, 0.90				
	Conscientiousness	-0.19	0.83	0.0006	0.75, 0.93				
	Career-conscientiousness interaction	0.03	1.03	0.02	1.00, 1.05				
	Objective career success	-0.24	0.79	0.0002	0.70, 0.90				
	Motivation	0.04	1.04	0.53	0.93, 1.15				
	Career-motivation interaction	0.03	1.03	0.04	1.00, 1.05				
	Objective career success	-0.22	0.80	0.0004	0.71, 0.90				
	Intelligence	0.004	1.00	0.31	1.00, 1.01				
	Career-IQ interaction	0.005	1.00	0.42	0.99, 1.02				
	Controlling for midlife health and adjustment ($N=637$)								
	Objective career success	-0.19	0.83	0.005	0.73, 0.95				
	Conscientiousness	-0.16	0.85	0.007	0.76, 0.96				
	Career-conscientiousness interaction	0.02	1.02	0.05	1.00, 1.05				
	Physical health	-0.10	0.90	0.13	0.79, 1.03				
	Mental adjustment	-0.03	0.97	0.69	0.83, 1.12				
	Alcohol use	0.17	1.19	0.0009	1.07, 1.32				
	Objective career success	-0.20	0.82	0.004	0.72, 0.94				
	Motivation	0.05	1.06	0.36	0.94, 1.18				
	Career-motivation interaction	0.03	1.03	0.04	1.00, 1.05				
	Physical health	-0.10	0.90	0.13	0.79, 1.03				
Conscientiousness and motiva-	Mental adjustment	-0.04	0.96	0.60	0.84, 1.11				
tion estimates are interquartile relative hazards	Alcohol use	0.21	1.24	< 0.0001	1.12, 1.37				

mortality risk, this risk was moderated by their level of conscientiousness, with high conscientiousness attenuating the risk associated with low success. Further analyses (scatterplots not shown) suggest that those who were both unconscientious and unsuccessful were especially likely to die before age 60. Similarly, for individuals with low childhood motivation, unsuccessful individuals were at a much greater mortality risk than very and moderately successful individuals.

It is possible that the relations between career success and longevity, and the moderating effects of personality, simply

extend from health and adjustment (i.e., the healthy are more successful and live longer). To examine this possibility, we examined the relation of midlife physical health, mental adjustment, and alcohol use on mortality risk, and then included these with the other significant variables (career success, conscientiousness, motivation, and the interaction terms). Individually, self-reported physical health and mental adjustment were marginally related to decreased mortality risk (N=637; rh_{health}=0.91 [CI=0.80, 1.03]; rh_{adjustment}=0.94 [CI=0.82, 1.08]). Alcohol use was related to increased mortality risk (rh_{alcohol}=1.23 [CI=1.11, 1.36]). As shown in Fig. 2 Expected mortality risk of individuals at the first, second, and third quartiles (on the personality variables) for the most successful, moderately successful, and least successful career groups for childhood conscientiousness (*top graph*) and motivation (*bottom graph*)



the bottom section of Table 2, career success, conscientiousness, and the interactions remained significant after controlling for these health-related factors.

Prior studies with the Terman sample found that unstable marital history, alcohol use, smoking, and poor mental health predicted increased mortality risk [35, 51, 52]. In a supplemental analysis, we examined these variables as potential mediators that might explain the main effects and interactions. Confirming results from our prior studies, now predicting mortality risk through 2006, experiencing divorce, alcohol use, or being a smoker predicted increased mortality risk (rh(620)_{divorce}=1.30, [CI=1.07, 1.58]; rh(638)_{al-} cohol=1.24 [CI=1.12, 1.37]; rh(356)smoking=1.31 [CI=1.11, 1.55]). Higher conscientiousness or more success was related to more stable marriages and less smoking and drinking. Including these predictors in the model with conscientiousness, career success, and the interactions slightly reduced the effect of career success on mortality, but did not alter the effects of conscientiousness or the interactions.

Discussion

The present study used a rich, longitudinal, archival dataset to explore the associations among childhood personality, adult career success, and longevity across the lifespan. Whereas prior research has linked career success with better psychosocial and short-term health outcomes, previous studies have not examined very long-term health sequelae of career success. Furthermore, studies focusing on socioeconomic status have typically ignored the broader range of psychosocial factors. Our findings indicate that career success is indeed relevant to longer life across six decades, but this appears moderated by childhood variables likely relevant to executive functioning.

As previously found in this sample [42], this study confirmed that childhood conscientiousness was related to longevity. Although conscientiousness and career success were also related (i.e., individuals rated higher on conscientiousness are more likely to go on to successful careers than individuals rated lower on conscientiousness), the two factors independently predicted mortality risk. Thus, it is not simply the case that some men are more dependable and in control of their impulses and therefore go on to more successful careers and longer lives. Rather, more complex processes are leading to higher or lower mortality risk, likely involving psychosocial factors across the lifespan.

We uncovered some indication of the complex ways in which the individual characteristics of conscientiousness and motivation are important in the success-longevity link. For successful individuals, conscientiousness made little difference-both career success and conscientiousness were related to decreased mortality risk. For unsuccessful individuals, however, conscientiousness attenuated the negative effects of low success. Similarly, for unsuccessful individuals, motivation played a moderating role; low success combined with low motivation was associated with the greatest risk. whereas low success coupled with higher motivation was less hazardous. These latter individuals may have been motivated in areas that were not captured in the ratings of success, and this motivation may have produced success in other areas of life. Indeed, career success does play an important role in long-term outcomes, but the larger psychosocial context of the individual's life needs to be considered [7, 21, 23, 53, 54].

We examined several potential mechanisms for explaining the observed linkages, including midlife health and mental adjustment, but failed to uncover definitive answers. Nevertheless, stress regulation may play an important role [55]; the methods used for collecting the data used here may have been unable to identify this mechanism. Future research should examine potential mechanisms linking these processes, focusing more explicitly on physiological and cognitive processes.

Limitations and Future Directions

The criteria used to determine objective success may be open to refinement, but the ratings created by Terman and his colleagues in 1940 were advanced for the time, reflecting modern notions of objective success [3, 22]. Our use of these ratings precludes retrospective biases. Also, the focus in the present study was on objective success; although subjective success may be relevant, it is intrinsically interesting to examine the effects of objective success itself [56].

Childhood conscientiousness is relevant to executive control processes [15], but is not a direct measure. Aspects of conscientiousness overlap with the markers of executive functioning, including aspects of impulse control, planfulness, drive, and ambition [10–12, 20]. When using archival data, the exact questions of interest are rarely directly testable, as is the case here; however, such data are invaluable in highlighting lifelong processes. Further, previous findings uncovered in this sample concerning personality and longevity have proven replicable in a

nationally representative sample [57] and in research in other cohorts [1]. This demonstrates that, when carefully refined and thoughtfully constructed, archival measures can be reliable, valid, and yield replicable results.

With a longitudinal study of a single cohort, care should be taken in generalizing to different times and places. Our study only included male participants; at the time that the success ratings were done, many women were not in the workforce or had minimal opportunities, regardless of ability. Further, the sample is highly intelligent, and most were Anglo-American and came from an upper middle class background. While this homogeneity does limit the generalizability of the results, there are also some important benefits. Comparisons can be made within the sample without being confounded by other variables such as access to and understanding of basic health care and other needs. Prior studies with this sample have found an important set of psychosocial characteristics, pathways, and outcomes (e.g., [35, 50, 58]). The sample is not representative of the general US population, but the findings do support other shorter-term studies linking career success to beneficial outcomes. Future research should examine other populations including women, more long-term outcomes associated with success, and the moderating and mediating factors linking occupation and health.

In sum, in this archival prospective cohort study of intelligent men, conscientiousness and objective career success predicted mortality risk across subsequent decades, but not in a straightforward manner. The link between success and mortality risk depended in part on early childhood personality traits, assessed decades prior, and suggests that aspects of executive functioning early in life may be quite important moderators of the relationships between life experiences and health outcomes in later life. Precise prediction will require a more nuanced understanding of the correlates and consequences of specific life pathways; these findings offer intriguing suggestions for further study.

Acknowledgments This project was funded by National Institute of Aging grants AG08825 (H. S. Friedman, PI) and AG027001 (C. A. Reynolds, PI). The data are derived from the Terman Life Cycle Study, begun by Lewis M. Terman. This paper is one of a series developed from a large-scale, multiyear, multidisciplinary project on lifespan predictors of health and longevity. Reviews or meta-analyses using these findings should consult our related papers, dating from 1993.

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