

The Big Five Personality Traits and the Life Course: A 45-Year Longitudinal Study

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One hundred sixty-three men who have been followed prospectively for over 45 years were rated on a set of 25 personality traits at the end of their college careers and took the NEO-PI at approximately ages 67–68. The college traits were transformed, via a rating procedure, to scales assessing each of the Big Five dimensions and related to the NEO-PI. Three traits—Neuroticism, Extraversion, and Openness—exhibited significant correlations across the 45-year interval. Furthermore, the trait profiles remained relatively stable over that interval. Both sets of personality traits were related to a wide variety of life course variables representing the domains of global adult adjustment, career functioning/success, creativity, social relations, mental health, substance abuse, childhood characteristics, familial history of pathology, maturity of defenses, and political attitudes. Conscientiousness in college was the best predictor of what happened to the men in the future, whereas Neuroticism in late midlife was the best correlate of life course functioning across a variety of domains. © 1999 Academic Press

For over 45 years, researchers have been following a group of men from the Harvard classes of 1939–1944 using repeated interviews and questionnaires to document their functioning in a variety of domains, including global adult adjustment, career functioning/success, creativity, social relations, mental health, substance abuse, childhood characteristics, familial history of psychopathology, maturity of defenses, and political attitudes (Vaillant, 1974, 1976, 1977; Vaillant, Meyer, Mukamal, & Soldz, 1998). Previous work has found that global mental health and maturity of defenses are potent predictors of functioning in a variety of domains over the life course (Vaillant, 1974, 1976, 1977; Vaillant & Vaillant, 1990a, 1993). In this study we extend previous work on this sample by relating these life course outcomes to the Big Five personality traits as assessed by observer ratings at the end of college and self-reports at age 67. We further examine the stability of the Big Five traits over this long interval.

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In recent years, a broad, though by no means universal, consensus has developed that the structure of the personality trait domain can be encompassed by the five superordinate Big Five dimensions of Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness (John, 1990; McCrae & Costa, 1990; McCrae & John, 1992; but cf., Block, 1995). The first finding driving this consensus was that the same basic factor structure has emerged from a broad range of personality judgments derived via a variety of instruments and methodologies (e.g., Goldberg, 1990; Norman, 1963; Soldz, Budman, Demby, & Merry, 1993a,b; Tupes & Christal, 1961). The second finding contributing to the consensus was the considerable convergence between the self-reported trait ratings and ratings of others who well know the individual. In addition, there is convergence between observer ratings, whether the observers are spouses or peers (Funder & West, 1993; John & Robbins, 1993; Kenny, 1994; McCrae & Costa, 1987). Somewhat conflicting results, however, were obtained by Soldz, Budman, Demby, and Merry (1996) with a clinical population of personality-disordered patients in group psychotherapy.¹ In general, the evidence indicates that, at least for nonclinical populations, the Big Five traits have a replicable factor analytic structure and exhibit considerable consensual validity.

Once a broad consensus on the structure of the trait domain developed, work on traits moved on to examining stability and change in the traits over time and to explicating the meaning of these traits for individual functioning over the life course. Among the questions asked are: To what degree do these traits change over time? Are any apparent changes noted meaningful or are they merely random noise? What are the relationships between these traits and other aspects of individual functioning over the life course? Do the relationships between traits and life course functioning change over time? The present study seeks to illuminate these questions using data from a cohort of men who have been followed from 1942 to 1995.

STABILITY OF PERSONALITY

The typical longitudinal study administers the same personality instrument to the same individuals at least twice. With such data, one can investigate five different types of personality stability that have been identified by Caspi and Bem (1980). Three of these—differential stability, ipsative stability, and

¹ They found that, while there was strong convergence on all five traits between the other group members viewing a given target patient and between therapists and these other group members, only for Extraversion was there convergence with the ratings of the patient him-/herself. Budman, Demby, Soldz and Merry (1996), in examining the outcomes of the patients in these same groups, also found that the trait of Neuroticism exhibited a significant decline over the 18 months of the treatment, providing the first data relevant to the possibility raised by McCrae and Costa (1990) that these traits may change over the course of longer-term psychotherapy.

coherence—are of interest for our purposes in that they can be assessed by the current data, which uses different personality measures at ages 22 and 67.

Differential Stability [also referred to as rank order stability by McCrae and Costa (1990)] refers to stability in the relative placement of individuals *within a given group* on a given trait over time. Ipsative Stability refers to stability, *within a given individual*, of the relative importance or salience of a given trait, relative to other traits, over time. Finally, Coherence refers to consistency over time of a presumed genotype that underlies (possibly different) phenotypic behaviors at different points in the life course.

Of these three types of trait stability, most attention in adult developmental research has focused on Differential Stability. With the notable exception of Block's (1971) classic study of adolescent development, Ipsative Stability has been largely ignored. Coherence has largely been studied in the context of continuity from childhood to adulthood (e.g., Caspi, Bem, & Elder, 1989; Ryder, 1967) rather than across long stretches in adulthood.

With regard to Differential Stability, Costa and McCrae (1988, 1994) have made a strong case that, in terms of rank order, personality traits are largely unchanged after the age of 30. They have found that, over a 6-year interval, test–retest correlations for the three Big Five traits for which they had data are almost as high as those between ratings 2 weeks apart. When disattenuated for reliability, these correlations were .90 or above. Costa and McCrae (1994) summarize the available stability coefficients in adult samples for each of the five factors and find a median retest correlation for four of the five factors of .64 and for one factor of .67.

Other major longitudinal studies of Differential Stability have essentially supported the Costa and McCrae position. Finn (1986), for example, found evidence that 30-year MMPI stability was greater for men originally ages 43 to 53 than for men originally ages 17 to 25, although in both cohorts stability was high. A few studies have, however, found some evidence of trait change during adulthood (Haan, Millsap, & Hartka, 1986; Jones & Meredith, 1996; Wink & Helson, 1993)

The present study contributes to the literature on trait stability by investigating the Differential and Ipsative Stability and Coherence of the Big Five traits over a 45-year interval. In the 1940s, when our sample was first assessed, contemporary personality instruments assessing the Big Five traits were not in existence. Our sample of 163 men was, however, extensively studied during college, including interviews with the men several times a year and interviews with their mothers. At the end of their college careers, each man was rated for the presence of 25 personality traits that were defined for this study. When viewed in retrospect, these traits were rather idiosyncratic in nature and definition. For example, one trait labeled “Just So” was defined as “As group of men who are strongly systematic, neat, meticulous,

and who depend on orderly routine and regularity. They are rigid and apt to be upset if their established habits and ways of living are interrupted.” (Heath, 1945, p. 25). The idiosyncratic nature of these traits posed a challenge to our ability to explore their stability. The existence of the Big Five trait taxonomy presented a solution to the difficulty. The men had been assessed at approximately ages 67–68 on the NEO-Personality Inventory (NEO-PI; Costa & McCrae, 1985). By reducing the idiosyncratic College Ratings to the Big Five taxonomy, we would be able to compare traits across the 4+ decades for which we had data. The present article reports our findings regarding the Differential and Ipsative stability of the Big Five traits over a 45 year interval. To our knowledge, this interval constitutes the longest period of time over which stability of the Big Five have been examined.

There are, however, four factors that should make the magnitude of the stability coefficients in this study smaller than those reported in many other longitudinal studies. First, the time interval is considerably longer than that examined in most previous such studies and the expected magnitude of correlations should decrease with time. Second, the College traits were assessed at the end of these men’s college careers, when they were approximately 21 years old. This age is considerably before the age 30 point at which, in the opinion of Costa and McCrae (1994), personality traits are “set like plaster” (p. 21). Thus, these men’s traits may still be somewhat fluid before they gel into a stable state, as will be reflected in their NEO-PI ratings. For example, Siegler, Zonderman, Barefoot, Williams, Costa, and McCrae (1990) found that correlations between the MMPI administered during college and the NEO-PI administered during adulthood were approximately half the concurrent correlations between the two instruments at middle adulthood. These findings were interpreted to mean that “about half the variance in basic dimensions of personality is stable from college age into middle adulthood” (p. 644).

Additionally, the two sets of trait measures are derived from different methods. The NEO-PI is a traditional self-report questionnaire. The College Traits are derived from ratings of the men which are then transformed into Big Five ratings. These ratings were made on a dichotomous basis (presence/absence) that also reduces the power to find relationships with other variables (Cohen, 1990) and, presumably, reliability. Due to the nature of the original college ratings, we do not have any reliability data for them (Heath, 1945; Wells & Woods, 1946). However, previous interpretable findings with various numbers of these traits in other work based on the Grant Study (e.g., Vaillant & Vaillant, 1990) argues that these traits have validity and hence must be reliable, if to an unknown degree. If these traits are correlated with the NEO-PI and with other life course variables, these correlations will provide further support for the meaningfulness of these ratings.

Finally, the two sets of trait judgments reflect not only distinct methods,

but also distinct perspectives. While the NEO-PI reflects the perspective of the self on one's traits, the College Trait ratings reflect the opinions of an outside observer, a senior member of the research team who was familiar with the voluminous information obtained on each participant over the 4 years of college. While convergence of perspectives on traits has frequently been demonstrated (John & Robins, 1993; Costa & McCrae, 1988), there is considerable disagreement as to the magnitude of the relationships to be expected (Kenny, 1994; Mount, Barrick, & Strauss, 1994; cf. Soldz et al., 1996). Furthermore, there is evidence that Self and Observer perspectives have differential validity (Mount, Barrick & Strauss, 1994) and that divergence between perspectives may have a substantive interpretation (Soldz et al., 1996). Presumably, all four of these factors are at play in the present study.

THE BIG FIVE AND LIFE COURSE FUNCTIONING

In addition to the issues of Differential and Ipsative trait stability, the question also arises as to the relationships between an individual's standing on these traits and that person's functioning in other life domains and whether these relationships are stable over time.² There are differing perspectives regarding how to conceptualize relationships between traits and other areas of functioning. Costa and McCrae (1994) proposed a model in which traits are regarded as basic tendencies, which, together with external influences, determine an individual's characteristic adaptations, which in turn influence the person's objective biography and self concept. Similarly, McAdams (1995, 1996) divides personality into three levels with the Big Five traits constituting the first level. Unlike Costa and McCrae, however, McAdams argues that no level is primary, that relationships between levels are purely empirical in nature and that an individual's functioning in the other two levels—personal concerns and identity—are not derivatives of their traits.

Both the Costa and McCrae and McAdams conceptualizations raise to the forefront the relationship between traits and other aspects of personality and functioning over the life course. In the same sense that researchers use California Q-Sort (Block, 1961) correlations to explicate the meaning of a construct, so the meanings of traits can be understood in terms of the real world behaviors with which those traits are related. Thus, examination of the relationships between the Big Five traits and other domains of life functioning will help elucidate the meanings of the Big Five.

Much of the existing work in this area involves the correlation of self-report Big Five measures with other self-report instruments. McCrae and Costa, for example, have undertaken an extensive series of studies indicating

² Note that this issue is related to Caspi and Bem's (1990) Coherence form of trait stability.

that many of the standard personality instruments—including the Myers-Briggs type Indicator (McCrae & Costa, 1989a), the Jackson Personality Research Form (Costa & McCrae, 1988b), and the Interpersonal Adjective Scales-Revised (McCrae & Costa; 1989b)—have strong correlations with the Big Five traits. Clinical researchers have found considerable correlation between the Big Five traits and personality disorder diagnoses (Costa & Widiger, 1994; Soldz, Budman, Demby, & Merry, 1993a; Wiggins & Pincus, 1989). Similarly, both Costa, Zonderman, and McCrae (1991) and Soldz, Budman, Demby, and Merry (1996b) have found significant correlation between the Big Five and certain self-report measures of coping and/or defenses.

Research on the correlates of the Big Five has progressed in recent years beyond the exclusive use of self-report inventories. Much of this research suggests that Self and Other Big Five ratings have differential predictive qualities. Mount, Barrick, and Strauss (1994), for example, found that both Self- and Other (supervisor, coworker, and customer)-ratings of Big Five traits predicted work functioning for salesmen. Of equal interest, they found that the Other-ratings for four of the Big Five traits exhibited equal or greater validity than did Self-ratings. In addition, the Other-ratings made unique contributions to explaining work performance. Similarly, Soldz, Budman, Demby, and Merry (1993b), in their clinical sample, found a relationship between personality disorder diagnoses from a structured clinical interview and the Big Five, while Soldz et al. (1996) found that, for group therapy patients, there was a positive relationship between overall degree of personality pathology (number of DSM-III-R symptoms met) and the extent of agreement between the Self and Others (therapists and other group members) regarding an individual's trait ratings. Again, these suggest that Self and Other trait ratings may have distinct meanings. Soldz et al. (1995) found that significant relationships between the Defense Style Questionnaire (DSQ; Bond, Gardner, Christian, & Sigal, 1983) and personality disorder symptomatology remained after the Big Five were partialled out of the DSQ. They speculated that these findings were partly due to differences between Self and Others in judging an individual's personality traits, as the personality disorder judgments were made by clinician interviewers. These studies provide evidence that, although Self and Other Big Five ratings are often highly correlated, they may not be equivalent in terms of their ability to predict an individual's functioning over the life course.

Each of the above-mentioned studies of the correlates of the Big Five, and most others to date, are additionally limited to assessing either contemporaneous relationships in which both the personality traits and functional measures are measured at the same point in time or at least relationships in which both traits and other characteristics are measured within a few years of each other at essentially the same stage in the life course. In short, available studies

fail to address whether correlations between the Big Five traits and other life domains are constant over the life course.

The present study seeks to extend previous work on the meaning for the life course of the Big Five traits by examining the relationships between the Big Five traits assessed at early adulthood and again at late midlife and a range of life course variables assessing a number of domains of functioning. These life course variables, in turn, take into account these men's functioning and behavior over many years rather than at one point in time.

METHODS

Participants

Participants were 163 men from the 268 participants in Grant Study (Vaillant, 1977) of normal male development in adulthood. Originally, 268 male sophomores were selected from the Harvard classes of 1939–1944 for the absence of any serious physical or emotional problems. Of these men, 252 were rated on the College Traits at the end of their college careers. Of these, 163 remained alive and were willing to return the NEO-PI in 1988. These men had been followed continuously since enrollment in the study with a combination of interviews at ages 31 and 50 and biannual questionnaires.

Big Five Measures

NEO Personality Inventory

The NEO Personality Inventory (NEO—PI; Costa & McCrae, 1985) is a 181-item inventory assessing the Big Five traits. In addition, it generates facet scores for six facets for each of three of the five factors: Neuroticism, Extraversion, and Openness to Experience. It is perhaps the most widely used measure of the Big Five traits. (The newer Revised NEO-PI, with facet scores for the other two factors, was not available at the time these data were collected.)

College Trait Ratings

At the conclusion of each Grant Study man's college career, a study psychiatrist aware of all the data obtained on the participant, with the collaboration of the study psychologist, rated each participant on 25 personality traits using a yes/no format (College Traits). These trait definitions were created especially for the project and have not been used in other research projects. In order to compare these trait ratings to latter personality, as assessed by the NEO-PI, we transformed these college ratings to the Big Five personality factors. We had a group of seven raters rate each of the 25 traits using a 7-point bipolar scale (–3 to +3) on each of the Big Five factors of Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience.³ As definitions of the Big Five traits, raters were given copies of a table from McCrae and John (1992, pp. 178–179) which contained Adjective Check List adjectives, California Q-Sort items, and scales from the Revised NEO-PI for each of the five factors.

³ Raters consisted of one psychiatrist, four psychologists, one social worker, and one research assistant, each familiar with the Big Five model.

TABLE 1
Intraclass Correlations for College Traits Big Five Composite Ratings

Big Five Trait	ICC	Number of traits with non-zero ratings (out of 25 total)	Sample College Traits (Direction of loading)
Neuroticism	.90	20	Mood swings (+); Well-integrated (-); Self-conscious, introspective (+)
Extraversion	.96	20	Vital affect (+); Shy (-); Self-conscious, introspective (+)
Openness	.93	21	Ideational (+); Pragmatic (-); Creative and intuitive (+)
Agreeableness	.83	12	Sociable, friendly (+); Humanistic (-); Asocial (-)
Conscientiousness	.96	15	Practical, organizing (+); Overintegrated, just so (+); Incompletely integrated (-)

Table 1 contains sample College Trait items and the number of nonzero ratings out of a maximum 25 for each Big Five factor; these ranged from a low of 12 for Agreeableness, through 15 for Conscientiousness, to a high of 21 for Openness. In order to assess the reliability of these ratings, we calculated the intraclass correlation for the mean of each Big Five factor across all 25 College Traits. The resultant ICCs for the mean ratings are also in Table 1; all reliabilities were above .90, except that for Agreeableness, which was .83.

In order to allow for the different saliences of the College Traits on the Big Five factors, the mean rating of each College Trait on each Big Five factor was used as a weight. For each Big Five factor, we created a composite College rating by multiplying each participant's trait score by the mean rating of that trait on the Big Five factor, resulting in five College Big Five trait scores.

For example, 21 of the 25 traits had nonzero weights for Openness and 9 of the traits received a mean rating with an absolute value ≥ 1.0 on the Openness factor. The three highest Openness weights were for traits labeled "Motivations toward the creative and intuitive," "Motivations toward the ideational," and "Sensitive affect," while the largest negative Openness weights were for traits labeled "Motivations toward practical organizing" and "Pragmatic."⁴

The resulting trait scores exhibited substantial intercorrelations, ranging as high as .79 between Extraversion and Agreeableness. In order to remove these intercorrelations, which could interfere with the interpretation of the relationships of these variables to others, we subjected the College Big Five Trait scores to principal components analysis, rotated all five components using varimax rotation, and then matched the resultant factors with the Big Five dimensions

⁴ The definition of this trait included the phrase "They are subtle in their thinking and inclined to be aesthetic and to place greater emphasis on cultural values, which makes difficult their acceptance of the usual values and adjustment to the realities of life" (Heath, 1945).

(cf. Jackson, 1975). The resultant components, while orthogonal, correlated highly with the original scales with which they were identified; these correlations ranged from .82 for Agreeableness to .95 for Openness. It is the component scores from these rotated principal components that we use in subsequent analyses.

Life Functioning Measures

In order to assess the life course correlates of the Big Five traits, we needed to choose a small set of variables out of the hundreds collected over the 50 years these men have been studied. One of the authors (SS) selected several domains of interest, either because of the likelihood of their being related to Big Five traits or because of their general importance for life functioning. The other author (GEV), who was not directly involved in these data analyses, then nominated variables from each domain that, based on his extensive previous research on these men, had proven to have the greatest construct and predictive validity. The domains from which variables were selected by this procedure were: Global Adult Adjustment, Career Functioning/Success, Creativity, Social Relations, Mental Health, Substance Abuse, Familial History of Psychopathology, Maturity of Defenses, and Political Attitudes. We also included the domain of Childhood Characteristics in order to examine the degree to which the personality traits were predicted by childhood functioning. The first author then examined the definitions of the variables and made predictions of their expected relationships to the Big Five traits; these predictions are contained in Table 2. These predictions were broadly based on the assumptions that Neuroticism would be related to Mental Health and Substance Abuse, Extraversion and Conscientiousness to Career Functioning/Success, Conscientiousness to Substance Abuse, Openness to Creativity and Political Attitudes, and Agreeableness to Social Relations (Costa & McCrae, 1992).

Global Adult Adjustment

Early adulthood adjustment. A global score for adult adjustment before age 47 was calculated by summing variables assessing three work areas (whether 1967 income was above \$20,000, career advancement leaving college, and enjoyment of work), whether participant takes vacation, days of sick leave, marital satisfaction, and engagement in regular social activities with others. The data for these ratings were obtained from biennial questionnaires completed over a 20-year interval. While interrater reliability for this variable was not assessed, it correlated .69 with an independently rated Global Adjustment Scale (GAS; Endicott, Spitzer, Fliess, & Cohen, 1976) rating of global adjustment over the same interval.

Late midlife adjustment. A global score for adjustment between ages 47 and 62 was calculated by summing variables assessing three work variables (whether working full time at age 62, career advancement since age 47, and enjoyment of work), enjoyment of at least 3 weeks of vacation, days of sick leave, marital satisfaction, and engagement in regular social activities with others. The data for these ratings were obtained from questionnaires over this interval, from interviews with approximately half the men between the ages of 54 and 59, and by phone when information was missing. Interrater reliability ($N = 223$) was .80.

Adult life stage. The highest (modified) Eriksonian developmental level achieved was rated using all available information on the men from ages 18 to 50 (Vaillant & Milofsky, 1980). The Erikson (1963) stages were retained, with two changes: parts of stage 5 (Identity vs Identity Diffusion) were split off as stage 6a (Career Consolidation vs Self-absorption) and parts of stage 7 (Generativity vs Stagnation) were split off as stage 7a (Keepers of the Meaning vs Rigidity). The scale was rated on a 5-point scale from 1 (less than stage 5) to 5 (stage 7). Interrater reliability ($N = 93$) was .61.

TABLE 2
Predictions of Relationships between Big Five Traits and Life Course Variables

Life Course Variable	Trait				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Early Adult Adjustment	-				
Late Midlife Adjustment	-				
Adult Life Stage	-				
Maturity of Defenses, 15-47	-				+
Psychiatric Usage	+				+
Mood-Altering Drug Use	+				-
Depression	+				+
Who's Who		+			+
Maximum Income		+			+
Social Support	-			+	
Marital Quality	-			+	
Pack-years Smoking	+				-
Alcohol Abuse	+				-
Creativity					
Childhood Environmental Strengths	-			+	
Childhood Character	-				
Familial Alcohol Abuse	-			+	
Familial History of Depression	-				
Conservative Political Attitudes					-

Note. Predictions of positive correlations are signified by +, those of negative correlations by -.

Career Functioning/Success

Who's who. For each man, this dichotomous variable assesses whether they were listed in *Who's Who in America* for either 1969 or 1979. A score of 1 indicates that the man was not listed either time and a 2 that he was listed at least once.

Maximum income. From the data obtained on the biannual questionnaires, the individual's 1970–1980 maximum income was estimated in 1977 dollars.

Average sick days. The average number of days of work missed per year was obtained by averaging data from the 1944, 1946, 1966, and 1967 questionnaires (Phillips, Vaillant, & Schurr, 1987).

Creativity

Creativity. Based on Case Summary Workbooks that had been prepared on each man, supplemented with the 25th College Reunion Report (for patents and publications) and the biannual questionnaires, each man was assessed on a 4-point scale of creativity. One point was assigned to a man for each of the following: Artistic Achievement (e.g., having received a national prize in arts or science; having had a one-man show), Creative Product (e.g., two or more published articles; obtained two or more patents), Sustained Artistic Hobby (e.g., plays musical instrument publicly), and Artistic in Public Interest (e.g., art or literary critic). The final scale ranged from 1 = Creativity clear: 3 or 4 points to 4 = Not Creative: 0 points. More information on this scale and its validity can be obtained in Vaillant and Vaillant (1990b).

Social Relations

Social support. The quality of the men's relations with others between ages 50 and 70 were rated from material abstracted from the interviews and biennial questionnaires by a research assistant. Eight scales assessing such dimensions as quality of relationships with children, with wife, with friends, and involvement with others in such domains as games with nonfamily members and church were combined into one global score. Median interrater reliability for pairs of three raters was .80 (Vaillant, Meyer, Mukamal, & Soldz, 1998).

Marital quality. This was a global score for the overall quality of the participant's marriage, based on data obtained from both the husbands and their wives. The scale combines both husbands' and wives' Locke-Wallace (1959) Marital Adjustment Scale-Modified scores (husbands' scores obtained in 1981, wives' scores in 1987) and a 3-point scale of marital adjustment by husbands obtained from five questionnaires between 1954 and 1989 and from wives in three questionnaires between 1967 and 1987. These data were combined to yield a 4-point score of Marital Quality ranging from 1 = Best Marriage to 4 = Divorced without 20 years of remarriage. More information on this scale can be found in Vaillant and Vaillant (1993).

Mental Health

Psychiatric usage. This variable records the lifetime number of psychiatric visits before age 60 as recorded on questionnaires. It was coded as 1 = 0 visits, 2 = 1–2 visits, 3–99 = actual number of visits, 99 = 99 + visits (Phillips, Vaillant & Schurr, 1987).

Mood-altering drug use. Use of mood-altering drugs (primarily sedatives, tranquilizers, antidepressants, and stimulants) before ages 50–52 was recorded on several questionnaires. This variable was coded using the scale: 1 = no reported use, 2 = occasional use of mood altering drugs, 3 = regular use (30+ days during the year of maximum use), 4 = hospitalization or clear damage to socioeconomic status caused by use of mood altering drugs (Vaillant et al., 1996).

Depression. This variable assesses the number of signs of depression present in an individual prior to age 51. The scale ranges from 0 (no signs of depression) to 8.

Substance Abuse

Pack-years smoking. The participants' smoking histories were obtained from biennial questionnaires from age 20 to age 50. Smoking was categorized as 1 = never smoked, 2 = 1–10 pack-years, 3 = 11–24 pack-years, 4 = 25–40 pack-years, 5 = 41–50 pack-years, and 6 = 51–60 pack-years (Vaillant, Schnurr, Baron, & Gerber, 1991).

Alcohol abuse (DSM-III). This scale assessed the presence of DSM-III (American Psychiatric Association, 1980) alcohol abuse or dependence by age 47 using a three-value scale: 1 = no alcohol abuse, 2 = alcohol abuse, and 3 = alcohol dependence. Diagnosis was made by consensus of two clinicians based on interviews at approximately age 47 combined with recent psychiatric and medical records years (Vaillant, Schnurr, Baron, & Gerber, 1991).

Childhood Contributions

Childhood environmental strengths. Two research assistants blind to all data on the men after age 19 reviewed the 10–20 h of social history on each man and rated him on five subscales assessing home atmosphere; childhood relationships with mother, father and siblings; and a global impression of home environment (Vaillant, 1974).

Childhood character. This was a 5-point rating of character between birth and age 10. Scores range from 1 = dissocial to 5 = good-natured, normally social (Vaillant, 1974).

Familial History of Psychopathology

Familial alcohol abuse and familial history of depression. During the participants' time in college, a social investigator visited the men's homes and took extensive social histories from the men's parents. Included in these histories were age at death and cause of death of uncles, aunts, and grandparents and whether any such ancestor or other close relative had a mental illness, had abused alcohol, or had committed suicide. Over the next 45 years, alcohol abuse and depression in siblings were recorded and the men in midlife were questioned about depressed and alcoholic relatives (Vaillant et al., 1996).

Maturity of Defenses

Maturity of defenses, 15–47. Defense maturity was assessed using a 9-point scale (1 = mature, 9 = immature). Vignettes containing examples of adaptive behavior at times of crisis and conflict were excerpted from the men's records. On the basis of a code book, each vignette was labeled as featuring 1 of 15 defenses. These defense ratings were grouped into three groups (immature, intermediate, and mature) and then combined into one score using the methods described in Vaillant (1977, 1992, 1994; Vaillant, Bond, & Vaillant, 1986). Evidence for the validity of these defense ratings in a separate sample can also be found in Vaillant (1992) and Soldz and Vaillant (1998).

Political Attitudes

Conservative political attitudes. All information from interviews and biennial questionnaires relevant to the men's political attitudes between approximately ages 40 (1960) and 75 (1994) was abstracted. Material available included the men's contemporaneous attitudes toward the Civil Rights movement, the Vietnam war, the Nuclear Freeze movement, the Reagan presidency, and Newt Gingrich, as well as preferred candidates for president during each election over those years. This material was then rated by the two authors of this article on a 9-point

scale. One rater was blind to all other information about the men, whereas the other rater was familiar with the broad outlines of most of the men's lives. Interrater reliability ($N = 201$) was .88.

RESULTS

Stability of Traits

Differential stability. The first question to be examined is the ordinal stability of the Big Five personality traits over the 40+ years between the College ratings and the administration of the NEO. Table 3 reports the Pearson correlations between the College Big Five Ratings and the NEO domain scores and the facet scores for Neuroticism, Extraversion, and Openness. Three Big Five factors, Neuroticism, Extraversion and Openness, exhibit significant correlations. At .38, the stability correlation for Openness is a particularly notable evidence of cross-time, cross-method convergence for this dimension. While this correlation might be influenced by stability of IQ over time, such an explanation seems unlikely given the restricted range one would expect for IQ in a Harvard class. It should also be kept in mind that the two factors which did not exhibit ordinal stability were those measured by brief 18-item scales by the NEO-PI.

Ipsative Stability

In addition to the stability of individual traits, a related issue in personality stability is the stability of an individual's profile over time, which is related to Caspi and Bem's (1990) ipsative stability. In order to examine ipsative stability, we formed indices of agreement between the College Big Five scores and the NEO for each individual. The two indices we used were the Pearson correlation between the profiles and McCrae's Index of Profile Agreement (I_{pa} ; McCrae, 1993b).⁵ The correlation assesses whether an individual's profile for the five traits rises and falls similarly, ignoring the absolute level of the profile (the mean of the five trait scores). That is, the correlation assesses agreement in profile shape, ignoring differences in elevation (Cattell, 1949). The McCrae index is designed to measure the degree of similarity between profiles, while giving lesser weight to disagreements between and a greater weight to agreements between extreme scores—those which deviate further from the mean—since, for extreme scores, an equivalent difference between scores represents a smaller difference in percentile standing. It is designed to avoid limitations of the Pearson correlation and the Euclidean distance as measures of profile agreement. McCrae (1993b) demonstrated empirically that the I_{pa} was a superior index of profile similarity across

⁵ This use of the correlation to compare profiles is similar to its use in Soldz et al. (1996) to compare Big Five self ratings of group therapy patients with those by other group members and therapists.

TABLE 3
Correlations between College Big Five Ratings and the NEO

	College rating				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
NEO at 65					
Neuroticism	.20*	-.09	.02	.03	-.09
Anxiety	.17*	-.14	.01	.08	-.04
Hostile	.08	-.02	.00	-.06	-.06
Depression	.22**	.00	.06	.09	-.07
Self-Consciousness	.20*	-.06	-.03	-.04	-.10
Impulsivity	.06	-.02	.05	.09	-.07
Vulnerability	.14	-.16*	-.03	-.03	-.07
Extraversion	-.05	.19*	-.04	.12	.04
Warmth	.04	.15	-.03	.09	.00
Gregariousness	.00	.11	-.19	.10	.06
Assertiveness	-.09	.08	-.02	-.02	.06
Activity	-.08	.15	.03	.00	.03
Excitement Seeking	-.05	.15	-.05	.18*	-.08
Positive Emotionality	.00	.10	.13	.11	.06
Openness	.03	-.13	.38***	-.02	.03
Fantasy	.13	-.12	.28***	-.02	-.03
Aesthetics	.05	-.06	.40***	.02	-.01
Feelings	.03	.00	.21**	-.01	.00
Actions	-.02	-.09	.09	.03	.03
Ideas	-.04	-.10	.18*	-.06	.11
Values	-.09	-.17*	.29***	-.01	.04
Agreeableness	-.06	-.01	.01	.07	.11
Conscientiousness	-.16*	.12	.11	-.11	.12

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

raters than was the r_p index created by Cattell (1949). The profile correlation (expressed as a z-score through the Fisher transformation) and the I_{pa} correlated .70, indicating substantial agreement between these two ways of measuring profile similarity.

In order to assess average profile similarity between the College scores and the NEO, we calculated the mean of each of these two indices across all subjects. We then tested whether this mean was significantly different from 0. For the I_{pa} , the mean was .41 [$SD = .94$, $t(161) = 5.57$, $p < .0001$], while for the profile correlation, the z-transformed mean was .29 [$SD = .61$, $t(161) = 6.08$, $p < .0001$]. Thus both analyses provide strong support for ipsative stability over the 43 year interval.

Coherence: Correlates of Big Five Ratings with Life Course Variables

College. In order to explore the relationship between the trait ratings obtained at the end of these men's college careers and the measures of life course functioning, we correlated these two sets of measures (Table 4). Conscientiousness bore the strongest relationship to life course variables, being positively related to Early Adult Adjustment, Adult Life Stage, HSRS, and Maturity of Defenses and negatively with Depression, Pack-years Smoking, Alcohol Abuse, and Familial Alcohol Abuse. Each of the remaining Big Five traits was significantly correlated with two or three life course variables. Extraversion was positively significantly correlated with Maximum Income and Conservative Political Attitudes. Neuroticism was positively related to Pack-years Smoking and negatively to Childhood Character and Early Adult Adjustment. Openness was positively related to both Psychiatric Usage and to Creativity and negatively to Conservative Political Attitudes. Agreeableness was negatively related to Creativity and positively to Social Support and both childhood variables.

NEO-PI. Table 5 contains the correlations of the NEO-PI domain scores with the same life course variables that were related to the College Traits. Of the Big Five traits, Neuroticism and Extraversion were the most strongly related to the life course variables. Neuroticism was significantly correlated with 11 variables, including being negatively related to both Early Adult and Late Midlife Adjustment, Adult Life Stage, HSRS, Maturity of Defenses, and Maximum Income and positively related to all five mental health and substance abuse variables as well as Familial History of Depression. Extraversion was positively related to both adult adjustment variables, Adult Life Stage, Who's Who, Maximum Income, Social Support, and Childhood Character. Openness was positively related to Psychiatric Usage, Depression, and Creativity and negatively to Conservative Political Attitudes. Agreeableness was positively related to Late Midlife Adjustment and Social Support and negatively to Alcohol Abuse. In contrast to the

TABLE 4
Correlations between College Big Five Ratings and Life Course Variables

Life Course Variable	College rating				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Early Adult Adjustment	-.20*	.09	-.05	.09	.23**
Late Midlife Adjustment	-.11	.14	-.01	.09	.09
Adult Life Stage	-.14	.02	.06	.11	.33***
Maturity of Defenses, 15-47	-.17	.04	.01	.15	.26**
Psychiatric Usage	.13	.15	.21**	-.08	-.22**
Mood-Altering Drug Use	-.03	.06	.04	-.01	-.06
Depression	.10	.11	.16	-.07	-.18*
Who's Who	-.08	-.06	.12	.05	-.01
Maximum Income	-.03	.22**	-.01	.01	.09
Social Support	-.03	.04	-.02	.17*	.02
Marital Quality	-.15	-.04	.02	.11	.07
Pack-years Smoking	.21**	.04	.01	-.09	-.16*
Alcohol Abuse	.03	.12	-.04	.06	-.19*
Creativity	-.03	-.10	.40***	-.27**	-.12
Childhood Environmental Strengths	-.15	.03	.11	.21**	.02
Childhood Character	-.20*	.14	-.02	.20*	.10
Familial Alcohol Abuse	.07	.01	.05	-.04	-.17*
Familial History of Depression	.04	.03	.10	.04	-.06
Conservative Political Attitudes	-.14	.22***	-.39***	.09	.02

Note. Directions of some correlations reversed so that higher numbers always represent higher levels of the construct. Sample size is 163 except Late Midlife Adjustment ($N = 162$), Adult Life Stage ($N = 131$), HSRS ($N = 71$), Maturity of Defenses, 15-47 ($N = 132$), Who's Who ($N = 162$), Marital Quality ($N = 158$), Creativity ($N = 132$), and Conservative Political Attitudes ($N = 152$).

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

TABLE 5
Correlations between NEO-PI and Life Course Variables

Life Course Variable	NEO-PI				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Early Adult Adjustment	-.30***	.27***	.02	.06	.12
Late Midlife Adjustment	-.24**	.25***	-.01	.19*	.12
Adult Life Stage	-.23**	.25**	.14	.10	.01
Maturity of Defenses, 15-47	-.33***	.10	-.08	.14	.21*
Psychiatric Usage	.35***	-.04	.19*	.04	-.06
Mood-Altering Drug Use	.29***	-.10	.09	.03	-.03
Depression	.36***	-.04	.17*	.01	-.01
Who's Who	.10	-.19*	.04	.01	-.05
Maximum Income	-.15*	.18*	-.09	-.14	.15
Social Support	-.15	.29***	-.02	.20**	.09
Marital Quality	-.09	.08	-.05	.10	.04
Pack-years Smoking	.27***	-.15	-.06	-.14	-.14
Alcohol Abuse	.29***	-.07	-.14	-.18*	-.15
Creativity	.03	.00	.27**	-.04	.09
Childhood Environmental Strengths	-.13	.15	.01	.06	.07
Childhood Character	-.08	.23**	.01	.06	-.02
Familial Alcohol Abuse	.05	-.03	.04	-.13	.01
Familial History of Depression	.29***	.00	.15	.03	-.08
Conservative Political Attitudes	-.09	.00	-.42***	-.17	.09

Note. Directions of some correlations reversed so that higher numbers always represent higher levels of a construct. Sample size is 163 except Late Midlife Adjustment ($N = 162$), Adult Life Stage ($N = 131$), HSRS ($N = 71$), Maturity of Defenses, 15-47 ($N = 132$), Who's Who ($N = 162$), Marital Quality ($N = 158$), Creativity ($N = 132$), and Conservative Political Attitudes ($N = 152$).
* $p < .05$; ** $p < .01$; *** $p < .001$.

College Traits, NEO-PI Conscientiousness was only related to Maturity of Defenses, 15–47.

It should also be noted that eight of the Big Five life course correlations were significant with both Big Five measures and that seven of these relationships were hypothesized (Table 2). In both samples, Neuroticism was related to Early Adult Adjustment and Pack-years Smoking; Extraversion to Maximum Income; Openness to Psychiatric Usage, Creativity, and Conservative Political Attitudes; Agreeableness to Social Support; and Conscientiousness to Maturity of Defenses. Further, 20 of the 27 hypothesized relationships were confirmed with at least one Big Five measure (NEO-PI: 17, College Traits: 11).

Discussion

Trait Stability

The issues of Big Five trait stability and of the relationship of these traits to life course functioning were examined in a sample of men who had been followed for 45 years. Measures of each of the Big Five traits were obtained for each of the men at the end of their college career in the mid-1940s. The same men were administered the NEO-PI at approximately ages 67–68. It was found that three of the five traits—Neuroticism, Extraversion, and Openness—were significantly correlated across that time interval.

While a few other studies have examined personality stability across comparably long time intervals, ours is the longest using the Big Five as its conceptual base, which is not surprising given that the Big Five are of relatively recent vintage (Norman, 1963; Tupes & Cristal; Wiggins, 1973). We were able to accomplish this comparison because each of the men had been rated in the 1940s on a wide variety of personality traits. Notwithstanding the idiosyncratic character of these traits, the comprehensiveness of the five-factor structure allowed us to translate these trait ratings into Big Five terms, thus facilitating examination of Differential and Ipsative Stability. We found that three of the five traits were significantly correlated across this time interval, and for one of those traits, Openness, the magnitude of the correlation was sizable.

Nonetheless, our correlations are considerably lower than those reported by others for shorter time intervals. The four factors limiting the magnitude of these correlations discussed above—the long time interval between measurements, the youth of the men when the first assessments were obtained, the difference in methods used to obtain the two measurements, and the distinct perspectives reflected in these personality measurements—need to be kept in mind as the magnitude of these correlations is interpreted. Given these four issues and the fact that the version of the NEO-PI we used contained relatively brief scales for Agreeableness and Conscientiousness, these

correlations are relatively impressive and results lend further evidence to the Costa and McCrae (1994) position that personality traits are fairly stable over adulthood.

An additional aspect of our examination of trait stability is that we examined Ipsative Stability by investigating the relationships within an individual of trait profiles, demonstrating that the relative salience of the traits within an individual exhibited a degree of stability over the 45-year interval. This result was consistent between two different measures of profile similarity, the Pearson correlation and McCrae's (1993a) I_{PA} , lending further support to the finding. This result is especially impressive as each intra-individual measure of profile similarity is between two sets of only five numbers, likely leading to low reliability to the similarity measure. Nonetheless, the mean similarity measure was clearly and significantly different from the null hypothesis value of 0.

Coherence: Personality and the Life Course

A second major goal of this study was to investigate personality coherence by examining the life course correlates of the Big Five traits assessed at two widely separated points during adulthood. We found that there were numerous life course correlates of the Big Five at each time point. Eight of the trait–life course correlations were significant at both time points. Thus, Neuroticism was related to Early Adult Adjustment and Pack-years Smoking; Extraversion to Maximum Income; Openness to Psychiatric Usage, Creativity, and Conservative Political Attitudes; Agreeableness to Social Support; and Conscientiousness to Maturity of Defenses, 15–47. With the exception of the relationship between Openness and Psychiatric Usage, all of these relationships were predicted (Table 2). In fact, 74% (20 of 27) predicted personality–life course relationships were confirmed with at least one of the personality measures.

One strength of our study is that we are able to examine the relation between personality traits and life course functioning at two widely disparate points in the life course. The correlations between the life course variables and College Traits are largely predictive in nature, while those with the NEO-PI are postdictions. Thus, correlations that are significant with both measures can be considered replications and taken as evidence that these relationships are due to enduring personality dispositions with relatively stable meanings over long time intervals (coherence). Thus, these relationships between the personality traits and these life course variables can be considered robust and stable over a 40-year period.

These findings, including the confirmed hypothesized relationships and the unpredicted but still largely unsurprising relationships, provide an interesting explication of the meanings of the Big Five traits for life course functioning. Extraversion, for example, may provide the energy and drive for career suc-

cess in the form of income. Neuroticism is related to adjustment, at least early in adulthood, and also may interfere with smoking cessation, despite knowledge of the risks.⁶

Openness is strongly related to creativity in the real world, which provides a strong validation of this construct; this finding replicates that of Helson, Roberts, and Agronick (1995), who found occupational creativity at midlife to be predictable from such college personality traits as creative temperament, originality, or independence of judgment that are most likely related to the Openness Big Five factor. Openness was negatively related to Conservative Political Attitudes, confirming the Costa and McCrae [1992; see also McCrae (1996)] position that “closed individuals tend to accept authority and honor tradition and as a consequence are generally conservative” (p. 17).

Openness is also positively related to Psychiatric Usage. This result has two possible, nonexclusive interpretations. First, Open individuals may be more willing than others to explore their inner life. Second, Openness appears to be connected with psychiatric distress, as is seen from the significant correlation between NEO-PI Openness and Depression and the nonsignificant correlation of similar magnitude (.16 vs .17) with College Openness. A similar relationship between Openness and Depression was found by Wolfenstein and Trull (1997). This relationship could have interesting implications for health services research (cf. Vaillant, 1972).

While most of the observed correlations are easily interpretable, a couple are rather surprising. For example, College Extraversion was positively correlated with Conservative Political Attitudes. Costa and McCrae (1992) report a positive correlation of .40 between NEO-PI-R Extraversion and Openness (the corresponding correlation in the present sample was .26), which would suggest that Extraversion should be correlated negatively with Conservative Political Attitudes, if at all. However, in the present sample, College Extraversion was correlated $-.17$ with the NEO-PI Openness to Values facet, which is consistent with the observed relationship with Conservative Political Attitudes and suggests that the Extraversion ratings may have been influenced by conventionality. Perhaps those most observably active and energetic in college in the early 1940s were active in conventional activities such as class leadership, sports participation, and so on. Similarly, the negative relationship between College Agreeableness and Creativity was unexpected. It is possible that Agreeableness in college was connected with a

⁶ We explored whether this neuroticism—smoking relationship could be a byproduct of smoking’s association with alcohol abuse and mental illness. We therefore regressed Smoking on Neuroticism after entering Alcohol Abuse and Depressive Diagnosis. The effect of Neuroticism remained strong [$F(1, 159) = 10.01, p = .002$] even after controlling for these other variables.

lack of the competitive drive that could contribute to the public creative success measured by our Creativity variable. In any case, these unexpected relationships may deserve attention in future predictive studies.

Despite the similar personality–life course relationships for many variables, there appear to be some differences between the life course correlates of the College Big Five and the NEO-PI in late midlife. The College personality trait with the strongest relationship to later life course functioning is Conscientiousness, which is significantly correlated with eight life course variables at that point and with only one life course variable in late midlife. College Conscientiousness was related to Early Adult Adjustment; Adult Life Stage; Maturity of Defenses, 15–47; Psychiatric Usage; Depression; Pack-years Smoking; Alcohol Abuse; and Familial Alcohol Abuse. Thus, College Conscientiousness appears to be a strong predictor of what will happen to these men later in life in a variety of domains.

In contrast, the strongest relationships between the NEO-PI at approximately age 65 and the life course variables are with Neuroticism, related to 11 life course variables, and Extraversion, related to 7 life course variables. Neuroticism was related to both Early Adult and Late Midlife Adjustment; Adult Life Stage; Maturity of Defenses, 15–47; Psychiatric Usage; Mood-Altering Drug Use; Maximum Income; Pack-years Smoking; Alcohol Abuse; and Familial History of Depression. Thus, like College Conscientiousness, Late Midlife Neuroticism is strongly related to life course functioning in a variety of domains.

The interpretation of our results is complicated by the fact that the Big Five measures at the two times are methodologically distinct in the several ways discussed above. While the Late Midlife Big Five scores are derived from a standard self-report inventory, the College Big Five scores are derived from ratings made by the researchers. Thus, the College ratings are ratings from the perspective of the Other. As noted above, Self and Other personality ratings generally converge, but can also have differential validity. Part of the differences in life course correlates of the two sets of personality ratings may therefore be due not to the different measurement times but to the different perspectives from which the traits are assessed. In this interpretation, Self-assessed Neuroticism and Other-assessed Conscientiousness may be the best predictors of life course functioning. If the different sets of correlations between personality and the life course are primarily due to the differences between self-report and other-report, then examination of personality and life functioning relationships should take into account the manner in which personality is assessed and not assume that results using self-report can be easily aggregated with results using ratings by others. In the absence of long-term longitudinal data, this possibility could be evaluated by administering a self-report personality inventory to older adults, while simultaneously obtaining other ratings of personality traits (from either people close to the

participants or from life history data) and examining the life course correlates of these different measures.

Our results can also be interpreted as suggesting that stage of life is important when considering the relationship between personality and other areas of functioning. Thus, Conscientiousness in college may be the best predictor of how an individual will function later in life because it reflects both planfulness and the presence of self-control that helps the individual avoid such perils as smoking and alcohol abuse. Neuroticism in late midlife may be the best correlate of life course functioning at that stage because it is, at least in part, a consequence of penetration of genetic vulnerability to depression and alcoholism, the two adult life onset variables contributing most negatively to late life outcome. If personality–life course correlates change over the life course, then it will be essential to consider stage of life when examining the relations of personality to life course functioning. If stage of life is ignored, the field may end up hopelessly trying to reconcile divergent results due to life stage. Thus, these issues require elaboration before the exact relations between personality and the life course can be clarified. Whatever the methodological issues obscuring the exact interpretation of our findings, these results can be taken as further evidence that personality matters. One's personality is strongly related to one's functioning in a wide variety of life domains.

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