



Still Stable after All These Years? Personality Stability Theory Revisited

Monika Ardelt

Social Psychology Quarterly, Vol. 63, No. 4, Special Millenium Issue on the State of Sociological Social Psychology (Dec., 2000), 392-405.

Stable URL:

<http://links.jstor.org/sici?sici=0190-2725%28200012%2963%3A4%3C392%3ASSAATY%3E2.0.CO%3B2-E>

Social Psychology Quarterly is currently published by American Sociological Association.

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/asa.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is an independent not-for-profit organization dedicated to creating and preserving a digital archive of scholarly journals. For more information regarding JSTOR, please contact support@jstor.org.

Still Stable After All These Years? Personality Stability Theory Revisited*

MONIKA ARDELT
University of Florida

Costa and McCrae maintain that personality is basically stable after age 30. Other researchers, however, find that personality tends to change over time and that personality stability depends on the stability of the social environment and the instruments used to test personality stability and change. A meta-analysis of 206 personality stability coefficients reported in the literature fails to support personality stability theory. Personality tends to be less stable if the retest interval is large, if age at first measurement is low or over 50, and if a change in individual aspects of personality rather than overall personality is measured. Moreover, studies assessing any of the "big five NEO" personality traits and studies by Costa, McCrae, and colleagues tend to find higher personality stability coefficients. It is suggested that personality stability and change cannot be studied meaningfully without simultaneously examining stability and change in the social environment.

McCrae and Costa (1982) suggest that an individual's personality at age 30 is a good predictor of his or her personality at age 80. Indeed, many studies, particularly those by Costa, McCrae, and colleagues, have shown that personality characteristics are surprisingly stable over the life span (e.g., Costa and McCrae 1997; Moss and Susman 1980). Most studies, however, follow their subjects only for a relatively short period. Studies with retest intervals of 20 years or more tend to find less personality stability (Haan 1981). In their review of the literature on personality development, Moss and Susman (1980:591) conclude that "as the time interval between measurement increases, the evidence of stability decreases."

The purpose of this review is to examine the claim of personality stability theory that personality remains basically stable after age 30. In a meta-analysis of 206 rank-order personality stability coefficients reported in the

literature on personality stability and change, I analyzed the relative effects of retest interval, age at first measurement, measurement instrument, and gender on retest stability. The meta-analysis was not concerned with mean-level changes in personality in a population over time, but with a change in the rank order of individuals on personality measures.

Can individuals' personalities truly change with time beyond the change that is experienced by the average person? Overall, the results show that the length of the retest interval has a negative effect on personality stability; the age at first measurement initially has a positive effect and after age 50 has a negative effect. The analyses also indicate that the "big five NEO" personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) and composite personality instruments are likely to produce higher stability coefficients. Even after controlling for all these effects, however, Costa and McCrae still tend to find higher stability coefficients than other researchers in personality development.

FACTORS AFFECTING PERSONALITY STABILITY AND CHANGE

Definition of Personality

Whether personality remains stable or changes across the life span depends largely

*I would like to express my gratitude to Anthony J. LaGreca for helpful comments on an earlier draft, and to Sari B. Venokur for her extensive help with the literature search. The paper was presented at the 2000 annual meetings of the American Sociological Association, held in Washington, DC. All correspondence concerning this article should be addressed to Monika Ardel, Department of Sociology, University of Florida, PO Box 117330, Gainesville, FL 32611-7330; email: ardel@soc.ufl.edu.

on the definition of personality (Weinberger 1994). Costa and McCrae (1997) define personality as consisting of five broad personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness); they tend to find less change than researchers who define personality "as a relatively enduring structure of motivations and resources" (Helson and Stewart 1994:204). Hence an overrestrictive definition of personality may prevent the discovery of personality change (Helson and Stewart 1994).

Genetics

Many personality researchers share the view that an individual's personality is determined in part by genetic factors (Caspi 1993; Helson and Stewart 1994; McGue, Bacon, and Lykken 1993). Few, however, would go as far as Costa and McCrae, who believe that personality traits are solely the product of genetic predisposition and thus cannot be changed over the course of a person's life (McCrae et al. 2000). In their views, even the personality changes that can be observed before age 30 are due to genetic influences.

Yet it is unlikely that these genetic changes are solely biologically based. It is more likely that genetic changes are a response to the individual's social environment: that nature adapts to nurture. Reiss et al. (2000), for example, found a reciprocal relationship between children's genetic personality dispositions and adults' parenting behavior. Parents often react to their children's personality traits so as to reinforce those traits (e.g., by protecting an introverted, shy child); such reaction causes genetic changes that lead to further manifestation of the children's personality dispositions.

To what extent is personality affected by nature as opposed to nurture? Pogue-Geile and Rose (1985) suggest that genetic effects may vary across the life span. McGue et al. (1993) and Pogue-Geile and Rose (1985) found that identical twins remain more similar in personality during early adulthood than do fraternal twins. With advancing age, however, genes tend to affect personality change to a lesser degree than does an idiosyncratic environment. McCartney, Harris, and Bernieri (1990:226), who performed a

meta-analysis of 103 twin studies, concluded that the effects of genetics and the shared environment on personality tend to decrease with age: "In other words, as twins grow up, they grow apart."

Using a five-wave community sample and a structural equation modeling approach, Ormel and Rijdsdijk (2000) compared three models to test whether changes in neuroticism over a period of 16 years were due primarily to measurement error (trait model), the environment (state model), or both. The trait model, which posits that neuroticism is a genetically based unchangeable trait, was rejected by the data, whereas both the state and the trait and state model fit the data well. Ormel and Rijdsdijk concluded that there is at least some evidence for true personality change. Usually, however, change occurs at small, cumulative rates over long periods rather than suddenly and dramatically.

Research to date does not support the assumption that personality consists of genetically based, immutable traits. Instead it appears that both nature and nurture determine an individual's personality.

Environment

The term environment, as used here, refers primarily to a person's social environment. It can be defined as an individual's social networks, roles, relationships, opportunities, and constraints (Alwin 1995).

According to Costa and McCrae (1997:283), "personality is not a product of the life course . . . but a robust and resilient set of dispositions within the individual that themselves help shape the life course. People are not mere pawns of the environment, but active agents who steadfastly pursue their own style of being throughout life." The second part of this statement is largely supported by theoretical and empirical research (e.g., Caspi 1993); the first part, however, is often rejected.

Individuals actively select, shape, and transform the environment to fit their personalities (Mortimer, Finch, and Kumka 1982). Hence personality may be relatively stable across time because of a stable social environment, not necessarily because it con-

sists of unchangeable biologically based traits (Hertzog and Nesselroade 1987).

Caspi, Bem, and Elder (1989) distinguish between cumulative and interactional continuity of personality. Cumulative continuity refers to individuals' self-selection into social environments, which reinforce their personality. Interactional continuity, by contrast, means that persons tend to exhibit characteristic behavior patterns consistent with their personality; these patterns, in turn, tend to evoke complementary responses from others. Individuals are likely to interpret these responses so as to confirm their personality, and thereby to reinforce their personality further. Caspi et al. (1989), for example, found that ill-tempered boys became ill-tempered men who were more likely than others in their cohort to experience divorce, unemployment, and downward occupational mobility. The authors, however (Caspi et al. 1989:401, note 1), also admit "that the strength of the continuities is often quite modest . . . the trajectories of real lives can be dramatically changed by both planned interventions and chance events."

Similarly, Mortimer et al. (1982) show that self-competence at the end of college serves as a self-fulfilling prophecy. Male college seniors with high self-competence scores tended to display higher levels of self-competence and to be more successful in their careers 10 years later than did seniors with lower scores. Objective life events, however, such as work experiences and job satisfaction, also affected their level of self-competence even with controls for self-competence 10 years earlier.

The effect of the work environment on a person's self-concept, problem-solving approach, value system, and intellectual skills has been demonstrated widely in research by Kohn (1977). Kohn and his colleagues found that people with self-directed occupations are more likely than others to strive for autonomy, not only in the workplace but also at home. "The higher men's social-stratification positions, the more likely they are to value self-direction, for themselves and for their children, and the more likely they are to hold self-directed orientations to self, and society" (Kohn and Schoenbach 1983:187). Individuals with limited and constricted job

opportunities, by contrast, often favor conformity over autonomy and teach their children accordingly. Hence individuals' social class position affects not only their own personality but that of their children as well.

A continuous reciprocal relationship apparently exists between personality, the social environment, and life experiences (Moen, Elder, and Lüscher 1995; Mortimer et al. 1982; Stokes, Mumford, and Owens 1989). But what happens in times of transition, when environmental changes are so drastic that the usual behavior patterns are disrupted and the individual has only minimal control over the environment? According to the stress-related growth perspective (Park, Cohen, and Murch 1996), transition periods provide the greatest opportunity for personality change because successful coping with new and unpredictable situations often requires a reorganization of one's priorities and adaptations to the environment.

By contrast, the accentuation principle of the life course paradigm claims that personality characteristics will become even more pronounced and more salient during periods of transition because people tend to rely on their internal traits and old coping styles to deal with a new situation (Elder and O'Rand 1995). Although this behavior may be maladaptive at times and may even lead to psychological decline, people tend to avoid in the short term the disequilibrium and uncertainty that personality change and growth necessarily entail (Bursik 1991).

Yet transition periods can change people's personalities, resulting in either psychological growth or decline. Bursik (1991) showed that marital separation can lead to either an increase or a regression in ego development for women, depending on their level of adjustment. Similarly, Ardelet (1998) found that among men and women who experienced economic hardship during the Great Depression psychological health tended to either increase or decrease between 1930 and 1944. The group whose psychological health increased was judged to possess wise personality characteristics in old age, 40 years later, whereas the group showing a decrease in psychological health registered relatively low wisdom scores. The study found no changes in psychological health

scores between 1930 and 1944 for men and women without experience of Depression hardships.

Stress-related growth and the accentuation principle do not necessarily contradict each other. Elder (1974) observed that middle-class children who experienced economic deprivation during the Depression tended to increase in psychological health from childhood to adulthood over a period of 22 years, whereas nondeprived individuals remained relatively stable during that period. In this instance, stress-related growth was due to family resources and the children's adaptive potential, which accentuated their positive trajectory.

Furthermore, the effect of a transition period often depends on the characteristics of the transition. Changes in the environment are generally most stressful if they are unexpected, undesirable, unpredictable, and "off time" in relation to one's life stage (Elder 1994; Mortimer and Simmons 1978). For example, men who were drafted into the military during World War II after they had established their careers and families suffered the most devastating personal and social consequences. By contrast, men who entered the military early in their lives often benefited from the experience (Elder 1995).

In view of these research findings, it is difficult to support the statement that "personality is not a product of the life course" (Costa and McCrae 1997:283). Individuals actively select, shape, and transform their environment, but the environment also shapes and transforms individuals.

Gender

Women's life course tends to be more diverse and less normative than men's. Traditional roles allow men to "find themselves" early in life, primarily through their occupational choices, whereas women's personalities are affected by both their family and work roles. Depending on their individual pathways, women's personalities may develop quite differently. Helson and Picano (1990) showed that women who joined the labor force in early adulthood became more independent and more assertive between ages 21 and 43, whereas homemakers did not.

Similarly, although most women showed normative developmental changes toward greater autonomy and maturity from age 21 to 43, the personalities of women who remained childless and did not pursue high-level occupational careers changed very little (Helson and Moane 1987).

Many women also may postpone their own self-development until their children are older. Roberts (1997) found no evidence for personality change due to occupational experiences for women from age 21 to 27. Work experiences from age 27 to 43, however, were related to personality change. Increases in workforce participation and occupational success were related to increases in self-efficacy, and occupational success was related to increases in adherence to norms.

Longitudinal studies also suggest that gender differences in personality decrease with age (Helson and Wink 1992). Women tend to become more independent and more assertive, and men are more likely to develop an interest in the family and community. In a society where gender norms become less distinct and more equitable, it is likely that personality differences between men and women may decrease at even earlier ages (e.g., Stevens and Truss 1985) and that personality changes may depend more strongly on men's and women's marital, family, and occupational histories than on gender.

Age at First Measurement

Researchers generally agree that retest correlations tend to be lower for individuals who are under age 30 at the first time of measurement (Alwin 1995; Asendorpf 1992; Costa and McCrae 1997; Weinberger 1994). During the teenage years, an individual's personality is still forming; it may be influenced by parents, friends, and an environment that is given rather than chosen (Caspi 1993; Mortimer and Simmons 1978). In Western societies, early adulthood is considered to be the developmental phase when people can free themselves from their childhood settings and find out what they want to do with their lives (Caspi et al. 1989). By age 30, most major life decisions (e.g., marriage, children, and occupation) often have been made; as a result, people's personality characteristics

may change less after that time (Haan, Millsap, and Hartka 1986). Moreover, life decisions and choices that are made at later ages are likely to confirm rather than explore one's personality (Mortimer and Simmons 1978; Stokes et al. 1989). In this regard, an individual's personality is the product both of choice and of continuity over the life course (Caspi 1993). Finn (1986), for example, found that 30-year stability coefficients generally were higher for men who were tested initially in middle adulthood than for men who were between ages 17 and 25 at their initial assessment.

It is less clear, however, whether personality continues to become more rigid after age 29. Costa, McCrae and Arenberg (1980) found no evidence that personality stability was greater in older than in younger cohorts. Field and Millsap (1991), however, who compared a group of old-old adults (ages 74 to 84) with a group of oldest-old adults (ages 85 to 93) over a period of 14 years, observed that the oldest-old experienced a sharper decline in energetic personality characteristics than did the old-old. The old-old, however, increased in agreeableness over time, while the oldest-old remained stable in this trait.

Length of Retest Interval

The shorter the retest interval, the higher the stability coefficient tends to be, and vice versa (Asendorpf 1992; Costa and McCrae 1994). Personality stability coefficients are usually higher in studies with retest intervals of less than 10 years, particularly if the respondents are age 30 or above at first measurement (Costa and McCrae 1988; Helson and Wink 1992). Even if people's personalities change only a little in the short term, cumulative changes, which often are due to interactions with the environment, occur over a long period (Asendorpf 1992; Helson and Stewart 1994; Ormel and Rijdsdijk 2000). Uncorrected stability coefficients for retest intervals of 20 years or more are rarely greater than .50 (e.g., Finn 1986; Helson and Moane 1987; Jones and Meredith 1996); even coefficients corrected for measurement error tend to decline with the length of the retest interval (Conley 1984).

Measurement Instrument

Instruments that measure relatively enduring personality traits, particularly the big five NEO traits, tend to produce higher stability coefficients than instruments that were designed to measure developmental change (Helson and Stewart 1994; Weinberger 1994). Moreover, it appears that Costa and McCrae, the strongest supporters of personality stability theory, tend to find higher stability coefficients in their studies than do other researchers (Costa and McCrae 1997). In addition, single aspects of a person's personality, such as self-esteem, affect balance, locus of control, and even neuroticism, are more likely to change over time than is an individual's overall personality (e.g., Bachman, O'Malley, and Johnston 1978; Cantoni 1955).

The literature also discusses the possibility that self-reported personality may inflate personality stability. Self-reported personality may depend on one's self-image, which in turn may be more stable than actual personality (Costa and McCrae 1997; Field and Millsap 1991; Finn 1986). To avoid this positive bias, some researchers use trained raters, spouses, or peers to rate a person's personality at different points in time. Trained raters often vary from one measurement point to another and tend to produce lower stability coefficients than do self-reports or spouse ratings (Costa and McCrae 1988; Jones and Meredith 1996).

It is not clear, however, whether this means that trained raters are more able to discover personality change or whether they tend to cause higher measurement errors (Costa and McCrae 1997). Spouses or peers as raters, by contrast, also may inflate stability coefficients if they judge their marital partners or friends on the basis of a relatively unchanging mental image of those individuals (Costa and McCrae 1994; Field and Millsap 1991). Unfortunately, without a valid outside criterion for personality change and stability, it is impossible to judge whether self-ratings, spouses' ratings, peers' ratings, or ratings by trained judges produce the most valid results. Costa and McCrae (1988) and Conley (1985) found no evidence for differences in personality stability coefficients

between self and spouse ratings over periods of six and 18 years.

Measurement Error

Personality instruments are not perfectly reliable; therefore uncorrected stability coefficients tend to underestimate personality stability (Costa and McCrae 1997). Studies that correct for the unreliability of measurement instruments generally find even higher stability coefficients. Costa and McCrae (1988) obtained corrected stability coefficients of .90 or higher for neuroticism, extraversion, and openness to experience for a six-year retest interval; Costa et al. (1980) report corrected 12-year stability coefficients of .80 or higher for the Guilford-Zimmerman Temperament Survey (GZTS) scales, with a median value of .91. On the basis of these results, McCrae (1993) concluded that changes in personality scores are largely the result of measurement error.

Corrected stability coefficients for other personality characteristics, however, such as self-esteem, tend to be lower (Bachman et al. 1978). Furthermore, even corrected stability coefficients decline with time and are affected by the age at first measurement. For example, corrected 30-year stability coefficients for 15 factor scales of the Minnesota Multiphasic Personality Inventory (MMPI) ranged from $-.20$ to $.81$ (median = $.47$) for young adult males, compared with 30-year stability coefficients ranging from $.14$ to $.97$ (median = $.72$) for middle-aged males (Finn 1986).

HYPOTHESES

I test the following eight hypotheses in a meta-analysis of 206 personality stability coefficients reported in the literature on personality stability and change.

1. Studies by Costa and McCrae, the major proponents of personality stability theory, tend to find higher stability coefficients than studies by other researchers.
2. The big five NEO personality traits tend to be more stable over time than other aspects of personality.

3. Single aspects of personality tend to change more than overall personality.
4. Personality stability tends to be higher in studies that use self-report instruments than in those which use outside raters.
5. The longer the retest interval, the smaller the stability coefficient is likely to be.
6. The lower the age at first measurement, the smaller the stability coefficient tends to be.
7. According to McCrae and Costa (1982), the effect of age at first measurement on personality stability should become insignificant for stability coefficients when the initial assessment is made at age 30 or above.
8. Because of relatively strong gender norms and expectations, women's personalities tend to be relatively stable during the early years of life but become less stable later in life, when women have the chance to discover their "true" selves. By contrast, men's personalities are expected to be relatively stable after age 30. This gender difference in personality stability becomes more pronounced with the length of the retest interval. I test this hypothesis by including an interaction effect: gender $\times$ age at first measurement $\times$ length of retest interval.

METHOD

Procedure

An extensive search of the literature on personality stability and change produced 206 uncorrected rank-order stability coefficients of self-reported personality measures or personality ratings by spouses, peers, or trained raters.¹ The goal of the literature search was to obtain studies that varied widely in measurement instrument, retest interval, and age at first measurement. The

¹ Tables listing the range and median of the stability coefficients for each study by length of retest interval, age at first measurement, and respondents' gender are available from the author.

meta-analysis included only studies that reported stability coefficients of personality scales or higher-order personality factors rather than stability coefficients of individual items or personal opinions: personality scales, factors, and higher-order factors tend to be more reliable than individual items.

Measures

Retest stability. The dependent variable consists of the uncorrected personality stability coefficients (i.e., the retest correlation between personality instruments at time 1 and time 2) reported in the literature. I did not take measurement error into account in this meta-analysis because only a small number of studies reported corrected stability coefficients, and because the method of computing the corrected coefficients was not identical across studies. Furthermore, to reduce the effect of outliers, I used only the median stability coefficient for each personality instrument in the analyses.

Retest correlations for the five NEO scales were given sometimes as the retest correlations of the five domains and sometimes as the retest correlations of the individual aspects. To be consistent across studies and to give equal weight to the five domains, I calculated the median correlation of the individual aspects for each domain, if only aspects were available, before determining the median retest correlation of the NEO scales. This approach to measuring change is rather conservative because variability in the stability of individual aspects of personality is ignored. Diener and Larsen (1984), however, recommend the use of aggregated data to average out random and situational effects.

Measurement instrument. I constructed four variables to assess the effect of the measurement instrument: studies by Costa and McCrae (1 = yes; 0 = no), NEO scales (1 = one or more of the big five; 0 = none), self-reported personality² (1 = self-reports; 0 =

external raters), and single personality aspect (1 = yes; 0 = no).

Only very few stability coefficients in the meta-analysis stem from the NEO five-factor inventory developed by Costa and McCrae (1992). Many researchers, however, find parallels to the big five traits in other measurement instruments. Whenever the author or authors of a particular study identified one or more of the NEO traits in their measurement instrument, I divided the instrument into NEO and non-NEO scales, if appropriate, and analyzed the stability coefficients separately for these scales. I also kept this classification consistent across studies. If I encountered different classifications, I gave precedence to classifications made by Costa and McCrae, the authors of the NEO scales, over alternative classifications.

Single personality aspects are defined as single scales that assess only one aspect of personality. Some of these measures, such as locus of control, may be considered multidimensional. Yet if the author or authors reported only one retest correlation per time interval, I treated the measure as a single aspect of personality because it was not possible to calculate the median retest correlation across different dimensions and hence to reduce the influence of outliers.

Retest interval. Only studies with a minimum retest interval of one year were included in the meta-analysis.

Initial age. I set the minimum age at first measurement at 11 years because personality tests of younger age groups may be less reliable (Moss and Susman 1980). When mean or median age was not reported, I used the midpoint of the initial age range in the analyses.

Gender. Gender was coded as 1 (female) and 0 (male). For studies that did not report separate stability coefficients for women and for men, I coded gender as .5.

Analysis

I first performed multiple regression analyses with the complete data. To examine whether the effect of age at first measurement becomes insignificant if the respondent's initial age is 30 or above, I repeated the analyses for studies with an average initial age below 30 and compared the results with

² The number of spouse and peer ratings was too small to be included as a separate independent variable. The analysis results remained virtually the same, however, if self-report, spouse, and peer ratings were combined and compared with ratings by clinicians and trained raters.

those for studies with an average initial age of 30 and above. One must be aware that the stability coefficients are not necessarily independent of each other. Studies employing more than one personality instrument and more than two measurement points produced several stability coefficients, and different studies sometimes used the same samples in their analyses. Yet the inclusion of these stability coefficients in the meta-analysis allows one to test for a change in personality stability over different retest intervals.

RESULTS

Descriptive Statistics

The mean uncorrected stability coefficient is .55. Fourteen percent of the stability coefficients stem from studies by Costa, McCrae, and colleagues, 53 percent represent one or several of the five NEO traits, 28 percent refer to single aspects of personality, almost 80 percent are based on self-ratings, and 51 percent and 32 percent of the stability coefficients derive respectively from male and female (sub)samples. The mean retest interval is 9.6 years; the average age at first measurement is 32.6 years. In view of these statistics, the selected studies and stability coefficients can be considered representative of the literature on personality stability and change.

Multiple Regression Analyses

The first four columns of Table 1 display the unstandardized and standardized multiple OLS regression coefficients of two hierarchical models with all stability coefficients included in the analyses. The results of Model 1 (without the quadratic term) support Hypotheses 1, 2, 3, 5, and 6. Studies by Costa and McCrae tend to find higher stability coefficients than do studies conducted by other researchers (Hypothesis 1). NEO scales tend to produce higher stability coefficients than do other scales (Hypothesis 2); single scales tend to produce lower stability coefficients (Hypothesis 3). The longer the retest interval (Hypothesis 5) and the lower the age at first measurement (Hypothesis 6), the smaller the stability coefficient is likely to be. Hypothesis 4, however, is rejected: self-reports do not result in significantly higher stability coefficients than those based on external raters. The variables included in Model 1 explain half of the variation in the size of the stability coefficient.

Model 2 tests whether the effect of initial age may be curvilinear by including the quadratic term of initial age. As this model shows, the quadratic effect is statistically significant. Because the quadratic term is negative, the relationship between initial age and personality stability takes the form of an inverted U-curve: personality stability first tends to increase with advancing age at first

Table 1. Predictors of Rank-Order Personality Stability for All Stability Coefficients and by Age at First Measurement: OLS Coefficients Estimates

Predictor Variables	All Stability Coefficients <i>n</i> = 206				Initial Age < 30 <i>n</i> = 108		Initial Age ≥ 30 <i>n</i> = 98	
	Model 1		Model 2		Model 3		Model 4	
	<i>b</i>	beta	<i>b</i>	beta	<i>b</i>	beta	<i>b</i>	beta
Costa and McCrae Study	.143***	.36	.150***	.38	—	—	.146***	.49
NEO Scale(s)	.042**	.15	.038**	.14	.039+	.16	.057**	.20
Single Personality Aspect	-.047**	-.15	-.053**	-.17	-.053*	-.20	-.051+	-.17
Self-Reports	.020	.06	.016	.05	-.034	-.12	.060*	.18
Retest Interval	-.007***	-.45	-.008***	-.48	-.008***	-.65	-.007***	-.39
Initial Age	.002***	.19	.007***	.87	.006+	.20	.027***	2.22
Gender (1=Female)	-.007	-.02	-.010	-.03	-.015	-.05	-.003	-.01
<i>Interaction Effect</i>								
(Initial Age) ²			-.00007**	-.70			-.00027***	-2.21
Adjusted <i>R</i> ²	.50		.52		.31		.61	
<i>R</i> ² change ^a			.016**				.063***	

^a *R*² change is due to the inclusion of the interaction effect.

+ *p* < .10; * *p* ≤ .05; ** *p* ≤ .01; *** *p* ≤ .001 (two-tailed tests)

measurement, and then to decline again. The predicted turning point comes at an initial assessment age of about 50 years.

In an additional model (not shown) I examined whether the interaction between gender, age at first measurement, and retest interval is statistically significant (Hypothesis 8). To test this three-way interaction effect, I included all corresponding two-way interaction effects in the analysis. None of the interaction effects are statistically significant, however. Additional analyses reveal that none of the two-way interaction effects reach statistical significance if they are included separately in the model. Hence Hypothesis 8 is rejected.

According to McCrae and Costa (1982), personality at age 30 remains relatively stable until the end of a person's life. Hence Hypothesis 7 states that the effect of age at first measurement should become insignificant if one considers only those stability coefficients which are based on an initial assessment age of 30 or above. To test this hypothesis, I divided all stability coefficients by age at first measurement. Model 3 shows the analysis results of the group with an average initial assessment age below 30. The results basically replicate the findings shown in Model 1, except that none of the studies by Costa and McCrae included participants with an average age below 30 at first measurement. Overall the variables in Model 3 explain 31 percent of the variation in the size of the stability coefficient.

Model 4, which includes only stability coefficients with an average initial assessment age of 30 and above, tests Hypothesis 7. Contrary to this hypothesis, the effect of initial age remains statistically significant. In fact, Model 4 is basically a replication of Model 2. With an increase in age at first measurement, personality stability tends first to increase (up to about age 50) and then to decrease again. In addition, the positive effect of self-reports on personality stability becomes statistically significant. Taken together, the variables included in Model 4 explain 61 percent of the variation in the size of the stability coefficient.

In Model 4, two of the standardized coefficients exceed the permissible value of ± 1 because of the high multicollinearity

between the quadratic term and the corresponding main effect of initial age; this is a common problem in the analysis of interaction effects in relatively small samples. Hence the interpretation of the standardized effects is less meaningful for Model 4 than the interpretation of the unstandardized effects.

DISCUSSION AND CONCLUSIONS

According to Costa and McCrae (1997), personality remains stable across the adult life course. A genetically based personality that cannot be changed, however, justifies the status quo: if people are "born that way" (e.g., shy, neurotic, extraverted), their position in society is less an accomplishment than a birthright. Yet this viewpoint contradicts sociological research on the reciprocal relationship between the person and the environment, and on the influence of childhood and adulthood socialization (Moen et al. 1995; Mortimer and Simmons 1978).

As this meta-analysis has shown, the issue is far from being settled. In fact, the analyses indicate that personality *can* change over the course of a person's life, particularly if age at first measurement is low or over 50, if the retest interval is large, if individual personality aspects rather than the overall personality are considered, and if personality aspects other than the big five NEO traits are assessed. Studies conducted by researchers other than Costa, McCrae, and colleagues also tend to find more evidence for personality change. Costa, McCrae, and colleagues are more likely to measure NEO personality traits, to assess a person's overall personality rather than a single aspect, and to recruit respondents with an average age above 30 at initial assessment; all of these factors tend to increase the size of the retest coefficient. Yet even with controls for these variables, studies by these authors still tend to produce higher stability coefficients than studies performed by other researchers.

The reason for this phenomenon may lie in the nature of the samples. Costa, McCrae, and colleagues tend to use members of the Baltimore Longitudinal Study of Aging (BLSA) for their analyses. The BLSA participants are primarily white, community-dwelling volunteers who agreed to repeated

biomedical and psychological testing and who tend to be relatively high in socioeconomic status (e.g., Costa and McCrae 1988). Although longitudinal studies are rarely representative of the population at large, primarily because of sample attrition and often because of geographical restrictions as well, the fact that BLSA participants were required in advance to commit to the study for a long period may have attracted individuals with more stable personality characteristics than in the general population. By contrast, many of the members of other longitudinal studies in the meta-analysis were contacted at later points and did not commit themselves in advance to the follow-up research. It may be interesting to explore this issue further by comparing the personality profiles of the BLSA participants with those of participants in other longitudinal studies conducted at approximately the same time and with the same age group.

The finding that personality stability first tends to increase with advancing age at first assessment and then to decline when the initial age is over 50 corroborates research by Field and Millsap (1991), who detect evidence for personality changes among old-old (ages 74–84) and oldest-old (ages 85–93) adults. Age 50 often coincides with career consolidation and the “empty nest” phase. In terms of Erikson’s (1982) stage model, it is the phase between generativity versus stagnation and integrity versus despair. In the family sphere, the children often have left the house and may have started their own families; in the occupational sphere, major career goals have been either reached or abandoned. Most individuals are still in good physical and mental health, but they also recognize the first signs of old age. Thus, for some people, moving past age 50 may provide not only the opportunity, due to reduced family obligations, but also the incentive to take a renewed look at priorities and goals in life. This “soul searching” may result in a change in the social environment, which in turn may produce changes in the personality.

To be sure, personality is surprisingly stable for many people, especially if the overall personality is considered rather than individual characteristics or traits. Impressive examples include 30-year uncorrected retest

coefficients between .47 (younger men) and .59 (older men) for NEO scales based on the MMPI (Finn 1986) and 46-year retest coefficients between .22 (women) and .31 (men) for NEO scales based on the California Q-sort (Haan et al. 1986). The latter finding is even more remarkable because the participants were teenagers at the time of initial testing. Certainly, personality at age 30 or even at age 11 may be a good predictor of some people’s personalities at age 80 (McCrae and Costa 1982). Correlations between .59 and .22, however, also mean that 65 percent to 95 percent of the variation in personality remains unexplained for these respondents. We find considerable room for change, which can hardly be explained by measurement error alone (Mortimer et al. 1982).

A limitation of this meta-analysis is that the studies do not provide sufficient information on stability and change in the social environment to permit analysis of its effect on personality development. Therefore I offer the following suggestions for future research.

First, ideally, it would be most promising to study personality before and after unexpected, drastic changes in people’s social environments, particularly those which conflict with their existing personality dispositions (Caspi 1993; Stokes et al. 1989). Unemployment, a terminal illness, incarceration, natural disasters, or sudden political or economic upheaval tend to force individuals to adapt to an environment that they did not select and that may be difficult to shape and transform in accordance with their personality characteristics. Under those circumstances, successful adaptation indeed may require a change in the individual’s personality. Unfortunately it is generally not known when these unexpected changes in the social environment will occur; therefore studies of this kind will require a large budget to follow a diverse segment of society over a long period.

Second, another promising avenue may be to examine personality stability and change before and after planned voluntary or involuntary changes in the social environment, such as relocation, immigration, alcohol and drug rehabilitation, marriage, divorce, and childbearing. Because these

changes are planned, researchers could seek out respondents who have indicated that they are likely to undergo such changes in the near future, and then could follow up later.

Third, cumulative, gradual personality and environmental changes that occur over long periods also need to be studied (Ormel and Rijdsdijk 2000). For short periods, the interaction between person and environment is likely to work in favor of continuity rather than change in personality unless the environment changes drastically (Caspi 1993). This does not imply, however, that traits are unchangeable or that they are due solely to genetic factors (Hertzog and Nesselroade 1987). Gradual but cumulative changes in the social environment are likely to lead to gradual but cumulative changes in the personality, and vice versa. For example, studies by Helson and colleagues (Helson and Moane 1987; Helson and Picano 1990; Helson and Wink 1992) document women's diverse developmental pathways over the life course and the consequences for their personalities. Although we find no evidence for a gender effect or a gender interaction effect in this meta-analysis, it is possible that gender differences do not follow a simple overall pattern. Moreover, the analyses do not take cohort effects into account because the information is incomplete. It is likely, however, that gender and other personality effects vary across cohorts that are exposed to different social environments (Alwin 1995; Elder 1994; Stevens and Truss 1985).

Fourth, to take measurement error into account and to distinguish between a trait and a state model of personality development, we must design longitudinal studies with more than two measurement points and must apply more sophisticated analysis techniques than simple mean-level comparisons or retest correlations (Jones and Meredith 1996; Ormel and Rijdsdijk 2000). Techniques such as latent growth curve analysis or the analysis of stability in personality patterns also can distinguish between average and individual change (Asendorpf 1992; Stokes et al. 1989). Even if continuity of personality is relatively high on average, studies typically find wide variation in the degree of personality stability and change across individuals and over time (Alwin 1995).

Fifth, we know surprisingly little about personality development among nonwhites. Almost all of the longitudinal studies reported in the current meta-analysis contain predominantly white respondents. Future studies must examine whether the same mechanisms for personality stability and change are valid for all ethnic and racial groups.

Past research has indicated that people are capable of personality change and growth, depending on their social environment and their personal motivation. Sociologists in particular understand the reciprocal relationship between the social environment and personality. Yet they rarely seem to challenge the claim by Costa, McCrae, and colleagues that personality is inherited and stable during the adult years. The reason may be twofold: first, sociologists are less interested in personality traits than in self-concepts, social roles, and relationships; and second, sociologists who study the influence of the social environment on personality development over time often do not report stability coefficients. A review of stability coefficients, therefore, may create the impression that personality is more stable than it actually is.

In summary, continuity and change in personality cannot be studied without simultaneously considering the continuities and changes in social environment and the reciprocal effects between an individual's personality, social environment, and experiences (Alwin 1995; Mortimer et al. 1982). Researchers must conduct in-depth analyses that track changes both in the person and in the social environment to examine the circumstances under which personality tends to be stable or to change. The stress-related growth perspective (Park et al. 1996) and the life course paradigm (Elder 1994; Elder and O'Rand 1995), with its mechanisms linking individuals to their social environment, offer promising theoretical frameworks for this endeavor.

REFERENCES

- Alwin, Duane F. 1995. "Taking Time Seriously: Studying Social Change, Social Structure, and Human Lives." Pp. 211-62 in *Examining Lives in Context: Perspectives on the Ecology*

- of *Human Development*, edited by Phyllis Moen, Glen H. Elder Jr., and Kurt Lüscher. Washington, DC: American Psychological Association.
- Ardelt, Monika. 1998. "Social Crisis and Individual Growth: The Long-Term Effects of the Great Depression." *Journal of Aging Studies* 12:291-314.
- Asendorpf, Jens B. 1992. "Beyond Stability: Predicting Inter-Individual Differences in Intra-Individual Change." *European Journal of Personality* 6:103-17.
- Bachman, Jerald G., Patrick M. O'Malley, and Jerome Johnston. 1978. *Youth in Transition*. Vol. 6. Ann Arbor: Institute for Social Research.
- Bursik, Krisanne. 1991. "Adaptation to Divorce and Ego Development in Adult Women." *Journal of Personality and Social Psychology* 60:300-306.
- Cantoni, Louis J. 1955. "A Study in Emotional Adjustment: The Correlation of Student and Adult Forms of the Bell Adjustment Inventory Over a Period of Thirteen Years." *Educational and Psychological Measurement* 15:137-43.
- Caspi, Avshalom. 1993. "Why Maladaptive Behaviors Persist: Sources of Continuity and Change Across the Life Course." Pp. 343-76 in *Studying Lives Through Time: Personality and Development*, edited by David C. Funder and Ross D. Parke. Washington, DC: American Psychological Association.
- Caspi, Avshalom, Daryl J. Bem, and Glen H. Elder Jr. 1989. "Continuities and Consequences of Interactional Styles Across the Life Course." *Journal of Personality* 57:375-406.
- Conley, James J. 1984. "The Hierarchy of Consistency: A Review and Model of Longitudinal Findings on Adult Individual Differences in Intelligence, Personality and Self-Opinion." *Personality and Individual Differences* 5:11-25.
- . 1985. "Longitudinal Stability of Personality Traits: A Multitrait-Multimethod-Multioccasion Analysis." *Journal of Personality and Social Psychology* 49:1266-82.
- Costa, Paul T. and Robert R. McCrae. 1988. "Personality in Adulthood: A Six-Year Longitudinal Study of Self-Reports and Spouse Ratings on the NEO Personality Inventory." *Journal of Personality and Social Psychology* 54:853-63.
- . 1992. *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual*. Odessa, FL: Psychological Assessment Resources.
- . 1994. "Set Like Plaster? Evidence for the Stability of Adult Personality." Pp. 21-40 in *Can Personality Change?*, edited by Todd F. Heatherton and Joel L. Weinberger. Washington, DC: American Psychological Association.
- . 1997. "Longitudinal Stability of Adult Personality." Pp. 269-90 in *Handbook of Personality Psychology*, edited by Robert Hogan, John A. Johnson, and Stephen Briggs. San Diego: Academic Press.
- Costa, Paul T., Robert R. McCrae, and David Arenberg. 1980. "Enduring Dispositions in Adult Males." *Journal of Personality and Social Psychology* 38:793-800.
- Diener, Ed and Randy J. Larsen. 1984. "Temporal Stability and Cross-Situational Consistency of Affective, Behavioral, and Cognitive Responses." *Journal of Personality and Social Psychology* 47:871-83.
- Elder, Glen H., Jr. 1974. *Children of the Great Depression: Social Change in Life Experience*. Chicago: University of Chicago Press.
- . 1994. "Time, Human Agency, and Social Change: Perspectives on the Life Course." *Social Psychology Quarterly* 57:4-15.
- . 1995. "The Life Course Paradigm: Social Change and Individual Development." Pp. 101-39 in *Examining Lives in Context: Perspectives on the Ecology of Human Development*, edited by Phyllis Moen, Glen H. Elder Jr., and Kurt Lüscher. Washington, DC: American Psychological Association.
- Elder, Glen H., Jr. and Angela O'Rand. 1995. "Adult Lives in a Changing Society." Pp. 452-75 in *Sociological Perspectives on Social Psychology*, edited by Karen S. Cook, Gary Alan Fine, and James S. House. Needham Heights, MA: Allyn and Bacon.
- Erikson, Erik H. 1982. *The Life Cycle Completed: A Review*. New York: Norton.
- Field, Dorothy and Roger E. Millsap. 1991. "Personality in Advanced Old Age: Continuity or Change?" *Journals of Gerontology* 46:P299-P308.
- Finn, Stephen E. 1986. "Stability of Personality Self-Ratings Over 30 Years: Evidence for an Age/Cohort Interaction." *Journal of Personality and Social Psychology* 50:813-18.
- Haan, Norma. 1981. "Common Dimensions of Personality Development: Early Adolescence to Middle Years." Pp. 117-51 in *Present and Past in Middle Life*, edited by Dorothy H. Eichorn, John A. Clausen, Norma Haan, Marjorie P. Honzik, and Paul H. Mussen. New York: Academic Press.
- Haan, Norma, Roger Millsap, and Elizabeth Hartka. 1986. "As Time Goes By: Change

- and Stability in Personality Over Fifty Years." *Psychology and Aging* 1:220-32.
- Helson, Ravenna and Geraldine Moane. 1987. "Personality Change in Women From College to Midlife." *Journal of Personality and Social Psychology* 53:176-86.
- Helson, Ravenna and James Picano. 1990. "Is the Traditional Role Bad for Women?" *Journal of Personality and Social Psychology* 59:311-20.
- Helson, Ravenna and Abigail Stewart. 1994. "Personality Change in Adulthood." Pp. 201-25 in *Can Personality Change?*, edited by Todd F. Heatherton and Joel L. Weinberger. Washington, DC: American Psychological Association.
- Helson, Ravenna and Paul Wink. 1992. "Personality Change in Women From the Early 40s to the Early 50s." *Psychology and Aging* 7:46-55.
- Hertzog, Christopher and John R. Nesselroade. 1987. "Beyond Autoregressive Models: Some Implications of the Trait-State Distinction for the Structural Modeling of Developmental Change." *Child Development* 58:93-109.
- Jones, Constance J. and William Meredith. 1996. "Patterns of Personality Change Across the Life Span." *Psychology and Aging* 11:57-65.
- Kohn, Melvin. 1977. *Class and Conformity: A Study in Values*. Homewood, IL: Dorsey.
- Kohn, Melvin and Carrie Schoenbach. 1983. "Class, Stratification, and Psychological Functioning." Pp. 154-89 in *Work and Personality: An Inquiry Into the Impact of Social Stratification*, edited by Melvin Kohn and Carmi Schooler. Norwood, NJ: Ablex.
- McCartney, Kathleen, Monica J. Harris, and Frank Bernieri. 1990. "Growing Up and Growing Apart: A Developmental Meta-Analysis of Twin Studies." *Psychological Bulletin* 107:226-37.
- McCrae, Robert R. 1993. "Moderated Analyses of Longitudinal Personality Stability." *Journal of Personality and Social Psychology* 65:577-85.
- McCrae, Robert R. and Paul T. Costa. 1982. "Self-Concept and the Stability of Personality: Cross-Sectional Comparisons of Self-Reports and Ratings." *Journal of Personality and Social Psychology* 43:1282-92.
- McCrae, Robert R., Paul T. Costa Jr., Fritz Ostendorf, Alois Angleitner, Martina Hřebčková, Maria D. Avia, Jesús Sanz, Maria L. Sánchez-Bernardos, M. Ersin Kusdil, Ruth Woodfield, Peter R. Saunders, and Peter B. Smith. 2000. "Nature over Nurture: Temperament, Personality, and Life Span Development." *Journal of Personality and Social Psychology* 78:173-86.
- McGue, Matt, Steven Bacon, and David T. Lykken. 1993. "Personality Stability and Change in Early Adulthood: A Behavioral Genetic Analysis." *Developmental Psychology* 29:96-109.
- Moen, Phyllis, Glen H. Elder Jr., and Kurt Lüscher, eds. 1995. *Examining Lives in Context: Perspectives on the Ecology of Human Development*. Washington, DC: American Psychological Association.
- Mortimer, Jeylan T., Michael D. Finch, and Donald Kumka. 1982. "Persistence and Change in Development: The Multidimensional Self-Concept." Pp. 263-313 in *Life-Span Development and Behavior*, vol. 4, edited by Paul B. Baltes and Orville G. Brim. New York: Academic Press.
- Mortimer, Jeylan T. and Roberta G. Simmons. 1978. "Adult Socialization." *Annual Review of Sociology* 4:421-54.
- Moss, Howard A. and Elizabeth J. Susman. 1980. "Longitudinal Study of Personality Development." Pp. 530-95 in *Constancy and Change in Human Development*, edited by Orville G. Brim and Jerome Kagan. Cambridge, MA: Harvard University Press.
- Ormel, Johan and Fruehling V. Rijdsdijk. 2000. "Continuing Change in Neuroticism During Adulthood: Structural Modelling of a 16-Year, 5-Wave Community Study." *Personality and Individual Differences* 28:461-78.
- Park, Crystal L., Lawrence H. Cohen, and Renee L. Murch. 1996. "Assessment and Prediction of Stress-Related Growth." *Journal of Personality* 64:71-105.
- Pogue-Geile, Michael F. and Richard J. Rose. 1985. "Developmental Genetic Studies of Adult Personality." *Developmental Psychology* 21:547-57.
- Reiss, David, Jenae M. Neiderhiser, E. Mavis Hetherington, and Robert Plomin. 2000. *The Relationship Code: Deciphering Genetic and Social Influences on Adolescent Development*. Cambridge, MA: Harvard University Press.
- Roberts, Brent W. 1997. "Plaster or Plasticity: Are Adult Work Experiences Associated With Personality Change in Women?" *Journal of Personality* 65:205-32.
- Stevens, David P. and Carroll V. Truss. 1985. "Stability and Change in Adult Personality Over 12 and 20 Years." *Developmental Psychology* 21:568-84.
- Stokes, Garnett S., Michael D. Mumford, and William A. Owens. 1989. "Life History Prototypes in the Study of Human

Individuality." *Journal of Personality* 57:509–45.

Weinberger, Joel L. 1994. "Can Personality Change?" Pp. 333–50 in *Can Personality*

Change?, edited by Todd F. Heatherton and Joel L. Weinberger. Washington, DC: American Psychological Association.

Monika Ardelt is Assistant Professor of Sociology at the University of Florida and a 1999 Brookdale National Fellow. Her research focuses on successful human development throughout the life course and the relationship between wisdom, aging well, and dying well. She has also developed a standardized wisdom scale for use in self-administered surveys of older populations. Recent publications include "Antecedents and Effects of Wisdom in Old Age: A Longitudinal Perspective on Aging Well" (Research on Aging, 2000) and "Intellectual Versus Wisdom-Related Knowledge: The Case for a Different Kind of Learning in the Later Years of Life" (Educational Gerontology, 2000).