

Developmental Paths of Psychological Health From Early Adolescence to Later Adulthood

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Developmental paths of psychological health were examined for 236 participants of the Berkeley Growth Study, the Berkeley Guidance Study, and the Oakland Growth Study. A clinician-reported aggregate index, the Psychological Health Index (PHI), based on California Q-Sort ratings, was created for subsets of participants at 14, 18, 30, 40, 50, and 62 years of age. Latent curve analysis was then used to explicate the life span development of psychological health. Psychological health development could be successfully modeled via 2 piecewise latent growth curves. Psychological health appears to be stable in adolescence and to steadily increase from 30 to 62 years of age. A moderately strong positive correlation between the 2 developmental curves indicates that those with greater psychological health in adolescence show more improvement in adult psychological health tend to also. Results illustrate the value of the PHI and the power of latent curve analysis to explicate longitudinal stability and change.

Clinically oriented researchers suggest there exist periods of the life span when individuals' psychological health may temporarily (or permanently) decline as they reorient (or fail to reorient) themselves to new roles and responsibilities. Adolescence, midlife, and the retirement period are suggested times of lowered psychological health for some individuals (see, e.g., Erikson, 1968; Levinson, Darrow, Klein, Levinson, & McKee, 1978; Levinson & Levinson, 1996; Petersen, Sarigiani, & Kennedy, 1991). Others, however, point to the general stability of many aspects of personality, including characteristics such as neuroticism and self-confidence (see, e.g., Clausen, 1993; Costa & McCrae, 1989, 1994; Siegler, 1980).

Clearly, one reason for differing opinions regarding the stability of psychological health lies in the fact that the concept incorporates a vast array of partially overlapping terms. Sociologists, psychologists, and psychiatrists each have unique terms and favorite measures to elucidate psychological health. Even within the narrower field of psychology per se, the number of views and measures of mental health is staggering (see, e.g., Kozma, Stones, & McNeil, 1991).

We first give a brief overview of the range of measures of psychological health available for nonclinical community samples,

organized by how scores appear to vary with respect to age. We then discuss our selected measure of psychological health, a clinician-reported aggregate index. Finally, we detail the advantages of our selected statistical technique, latent curve analysis (Meredith & Tisak, 1990), for explicating change and stability in psychological health across the life span.

Decreased Psychological Health With Age

When psychological health is measured with mental health symptom checklists, such as the Hopkins Symptom Checklist (Derogatis, 1983), the Beck Depression Inventory (Beck, 1967), the Center for Epidemiological Studies Depression Scale (Radloff, 1977), and the Cornell Medical Index (Brodman, Erdman, & Wolff, 1956), there is some evidence that psychological health decreases with age. Although cross-sectional studies have produced inconclusive findings with respect to age differences (e.g., Feinson & Thoits, 1986; Gatz, Hurwicz, & Weicker, 1986), a large longitudinal study of 2,041 men involving the Cornell Medical Index used across an average period of 17 years indicated decreased psychological health with age (Aldwin, Spiro, Levenson, & Boussé, 1989). Using hierarchical linear modeling (Bryk & Raudenbush, 1987), Aldwin et al. found an average increase in number of psychological symptoms reported per year of 0.036, or 1 new symptom every 28 years (as opposed to an average increase of 0.340 for physical symptoms, or 1 new symptom every 3 years). A curvilinear relation was found between rates of symptom reporting and age; young adult men reported a new symptom every 10 years, middle-aged men reported essentially no new symptoms, and older men again reported increases in symptoms, with 80-year-old men reporting 1 new symptom every 5 years. Whether the same pattern of results would hold for women is unknown.

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Lack of Association Between Psychological Health and Age

When psychological health is measured with single broad items (e.g., "In general, how do you feel about your life these days?") or instruments such as the Philadelphia Center Morale Scale (Lawton, 1975) to tap concepts such as happiness, life satisfaction, and morale, there is little evidence for a systematic association between age and subjective well-being after control for such confounding factors as physical health and financial resources (Larson, 1978). More recent multidimensional work suggests that underlying the lack of overall significant age differences or changes are differential patterns of differences or changes, depending on the facet of well-being considered (Keyes & Ryff, 1999), but results are inconclusive at this time.

Increased Psychological Health With Age

Finally, other measures of psychological health produce evidence of increasing psychological health with age. For example, measures of positive and negative affect (Mroczek & Kolarz, 1998); positive emotionality, negative emotionality, and constraint (Helson & Klohnen, 1998); and impulse strength, positive expressivity, negative expressivity, and control (Gross et al., 1997) show increases in psychological health with age.

In a cross-sectional survey of 2,727 individuals between 25 and 74 years of age, Mroczek and Kolarz (1998) found a nonlinear relation between age and positive affect for women (lowest for women at the age of 35 years and higher for women at 25 years of age and older than 35 years) and a positive linear relation between age and positive affect for men. Gender differences were similarly found for negative affect. There was no systematic association between age and negative affect for women, and there was a negative linear relation between age and negative affect for men.

Helson and Klohnen (1998) essentially replicated and extended these results in a longitudinal study of women; from the age of 27 years to the ages of 43 and 52 years, women's positive emotionality increased, negative emotionality decreased, and constraint increased. And in a multisample study including African Americans, Chinese Americans, Norwegians, and American nuns, Gross et al. (1997) also found a general pattern indicating that older respondents showed fewer negative emotional experiences and more emotional control than younger respondents.

When the personality trait of neuroticism has been used as an indicator of poor mental health, some evidence of increased psychological health with age has also been found. Large cross-sectional studies of neuroticism show very small correlations with age; longitudinal studies of the same trait show relatively strong stability across time (Costa & McCrae, 1994). More recent work, however, indicates a decrease in neuroticism with age (McCrae et al., 1999). Similarly, Jones and Meredith (1996) found that among a sample of men and women studied longitudinally, self-confidence, a measure similar to (lack of) neuroticism, increased from 18 to 60 years of age when patterns were examined with latent curve analysis (Meredith & Tisak, 1990).

At a higher level of complexity and abstraction, terms such as ego development and psychological defense have been used to describe psychological health. These concepts are generally measured with more than single-item indicators and often explicitly

incorporate theoretical assumptions. Loevinger's (1976) stages of ego development incorporate ideas of increasing maturity and psychological health. A meta-analysis of 65 studies involving the use of the Washington University Sentence Completion Test, a measure of ego development (Loevinger & Wessler, 1970), with participants ranging in age from early adolescence to older adulthood revealed that both male and female participants showed increased ego development with age. Sex differences were apparent, however, with girls showing greater maturity than boys in junior and senior high school. These sex differences disappeared by adulthood (Cohn, 1991).

Vaillant's (1977) classification of 18 defense mechanisms, ranging from psychotic (e.g., delusional projection) to mature (e.g., sublimation), also gives a richness to the idea of psychological health that does not appear in previously discussed operationalizations of the term. Explicitly focusing on the variety of experiences men face through the life span, both pleasant and painful, and the fact that negative life experiences may not necessarily predict poor psychological health, Vaillant (1976, 1977) found some evidence for the maturing of men's defenses across the life span.

Our measure of psychological health, described in more detail subsequently, is also a very broad measure. F. Livson (1981), examining women from 14 to 50 years of age, found individuals who showed essentially stable levels of psychological health across that time period and others who showed significant improvement across that period. Supporting others' related work, women who showed lower psychological health in adolescence and young adulthood had early adopted less traditional gender roles (see also, e.g., Block & Haan, 1971; Helson & Picano, 1990). Although these less traditional women demonstrated lower psychological health during age periods associated with heavy investment in gender-associated roles, their psychological health improved later, when roles became more flexible (see, e.g., Peskin, Jones, & Livson, 1997).

Our Measure of Psychological Health: The Psychological Health Index (PHI)

It is no surprise that different measures give different portraits of change across time, ranging from less psychological health with age (more psychological symptoms with age) to no change with age (subjective well-being) to more psychological health with age (more positive affect, less negative affect, less neuroticism, more mature ego development, and more healthy defense mechanisms with age). Clearly, the range of measures available to assess psychological health reflects the complexity of the concept itself. The PHI addresses the complexity in that it is a clinician-reported and aggregate measure.

One possible difficulty of many psychological health measures is that they rely on self-reported responses to relatively transparent items (e.g., "I hate myself" from the Beck Depression Inventory). A systematic lack of convergence between self-reported and clinician-reported psychological health has been found by some researchers (Jones, Livson, & Peskin, 1995; Shedler, Mayman, & Manis, 1993). Clearly, clinician report of individuals' psychological health is less contaminated by a potentially self-interested, defensive reporter. We argue that, given the positive social value of psychological health, a clinician-reported score is very useful to examine.

In addition, our measure of psychological health is based on ratings of 73 different aspects of personality after clinicians had examined extensive interview material from our participants in adolescence and adulthood. Participants' responses to interview questions at each of five assessment points were transcribed and were then read and rated by at least two trained psychologists using the 100-item California Q-Sort (Block, 1961). For each of the 100 California Q-Sort items, ratings could range from 1 (*least characteristic*) to 9 (*most characteristic*); for each individual, the set of scores was forced to fall into the same essentially normal distribution. Such ipsative scoring is said to reduce response bias and may force raters to more carefully consider scores given to individuals (Ozer, 1993). At least two trained clinicians read all of the available material for a given period and made independent ratings, with no clinician rating an individual for more than a single period. When the correlation between two clinicians across the 100 items was .45 or greater, the score were averaged for that participant. If this correlation was not achieved, additional raters (up to four) were obtained. The mean interrater reliability varied by assessment age, but the median reliability was .67. Psychologists' ratings were composited to obtain a final Q-sort profile for each participant.

The PHI was constructed by N. Livson and Peskin (1967) to take advantage of the powerful nature of the California Q-Sort. The index was created by having four highly experienced clinical psychologists independently provide a 100-item California Q-Sort profile of an "ideally psychologically healthy" individual. The average interrater reliability between psychologists was .82, and thus a highly reliable psychological health composite Q-sort profile was obtained.

For N. Livson and Peskin's (1967) original PHI, the composite idealized 100-item California Q-Sort profile was correlated with each individual's actual composite 100-item California Q-Sort.¹ A PHI score of 1.00 was obtained for a participant who showed a personality profile identical in patterning to that of the idealized psychologically healthy person, and, conversely, a PHI score of -1.00 was obtained for a participant who showed a personality profile identical in patterning to the idealized psychologically unhealthy individual. In this way, a clinician-based aggregate index of psychological health was obtained.

The PHI has been shown to be not only reliable but also a valid measure of psychological health. It is strongly positively related to healthy peer and family relationships (Hightower, 1990); marital satisfaction, effective parenting, and job satisfaction (Peskin & Livson, 1981); and self-confidence and competence (Clausen, 1993).

For the current examination of psychological health, we revised the original PHI in two ways. First, a previous reanalysis of the 100 California Q-Sort item scores revealed a set of items with relatively low interrater reliability at some time points (Haan, Millsap, & Hartka, 1986). The pool of 100 items was thus narrowed to 73 that were parallel in content across all assessment ages and showed more consistent and adequate interrater reliability. To most effectively assess psychological health across the life span, we retained only those 73 California Q-Sort items for our analyses (see Table 1).² To obtain our PHI for each age considered, then, we correlated the composite idealized 73-item California Q-Sort profile with each individual's actual composite 73-item California Q-Sort profile at that particular age.

Table 1
Most Salient California Q-Sort Items Composing the Psychological Health Index

Q-sort rating	Item
Items most characteristic of psychological health	
9	Is a genuinely dependable and responsible person
9	Has warmth; is compassionate
8	Behaves in a giving way toward others
8	Is productive; gets things done (regardless of speed)
8	Is socially perceptive of a wide range of interpersonal cues
8	Appears straightforward, forthright, candid in dealings with others
8	Interested in members of the opposite sex
8	Values own independence and autonomy
Items least characteristic of psychological health	
1	Has a brittle ego-defense system; has a small reserve of integration; would be disorganized and maladaptive when under stress or trauma
1	Feels cheated and victimized by life
1	Is emotionally bland; has flattened affect
2	Gives up and withdraws where possible in face of frustration and adversity
2	Is negativistic; tends to undermine and obstruct or sabotage
2	Is guileful and deceitful, manipulative, opportunistic
2	Aloof, keeps people at a distance; avoids close interpersonal relationships
2	Is basically distrustful of people in general; questions their motivations
2	Is self-defeating
2	Is vulnerable to real or fancied threat; generally fearful

Note. Scores range from 1 (*least characteristic*) to 9 (*most characteristic*). From "Prediction of Adult Psychological Health in a Longitudinal Study," by N. Livson and H. Peskin, 1967, *Journal of Abnormal Psychology*, 72, p. 512. Copyright 1967 by the American Psychological Association. Adapted with permission of the author.

Second, before submitting the 73-item PHI to analyses, we performed a Fisher's *r*-to-*z* transformation. We did so because the PHI is a correlation coefficient and we therefore expected a skewed distribution of nontransformed data (Hays, 1981).

Latent Curve Analysis

Given the complexity of previous research findings, a statistical technique able to correctly capture and model possible interindividual differences in intraindividual change is needed. Here we selected latent curve analysis (Meredith & Tisak, 1990). Unlike repeated measures analysis of variance and correlation coefficients, both of which assume similar change across time for all

¹ Other measures of profile similarity could be used, but, given the ipsative nature of the Q-sort, most other candidates for profile similarity would rank order individuals with respect to degree of profile similarity in the same way as the correlation coefficient. In particular, the squared distance would yield identical, albeit reversed, orderings.

² Perhaps the most controversial of the items composing the PHI is *Interested in members of the opposite sex*. Clearly, this will not be a marker of health in the homosexual or bisexual population. However, for most people, this item appears reasonable.

individuals in a sample, latent curve analysis models each individual's unique pattern of change across time as the sum of products of individual coefficients (analogous to factor scores) with "basis curves" that represent similarity in development. The essential notion is that development is lawful (basis curves), but people differ in the respect to which they manifest that development (individual coefficients).

Latent curve analysis is similar to hierarchical linear modeling (Bryk & Raudenbush, 1987) in its statistical intent, but it allows for greater flexibility in that developmental curves may be pre-established (e.g., linear or quadratic), as is required with hierarchical linear modeling, or the curves may be estimated from the data (MacCallum, Kim, Malarkey, & Kiecolt-Glaser, 1997). In our current investigation, we allowed the curves of psychological health from 14 to 62 years of age to be estimated from empirical data.

Note that although we use the term *latent basis curves*, we estimated the ordinates of the curves only at those points for which data were available. The actual curves between those points could be step functions, piecewise linear functions, or smooth continuous curves. This is even true when, for example, a linear model is invoked.

Method

Participants

For this investigation, we used data from three longitudinal studies based at the Institute of Human Development, University of California, Berkeley. Each study was begun between 1928 and 1931 and is still ongoing.

The first study, the *Berkeley Growth Study* (BGS), began in 1928. Study members, selected from infants born in local hospitals, were extensively observed from infancy through 18 years of age were subsequently interviewed as adults when they were approximately 40 and 50 years old.

The second study, the *Berkeley Guidance Study* (GS), also began in 1928. Study members were selected from the population of every third infant born in Berkeley between January 1928 and June 1929. Half of the GS participants' mothers were offered guidance by the principal investigator about general issues of childhood behavior and development, and the other half were not. For the purposes of this study, we separated these two subgroups of participants. Those given guidance were termed the *Guidance* group; those not given guidance were termed the *Control* group. The Guidance group was interviewed twice in adolescence, at approximately 14 and 18 years of age, and three times in adulthood, at approximately 30, 40, and 50 years of age. The Control group was interviewed only three times in adulthood, at the same ages as the Guidance group. Born in 1929, both BGS and GS members experienced the Great Depression as children; many suffered their family's attendant poverty powerlessly (Elder, 1974).

The third study, the *Oakland Growth Study* (OGS), began in 1931, when the study members were approximately 11 years old. Members were children planning to attend one particular junior high school in Oakland. Members were interviewed at approximately 14 and 18 years of age in adolescence and again at approximately 40, 50, and 62 years of age. Born in 1921, OGS members are about 8 years older than the BGS and GS members. OGS members experienced the Great Depression as adolescents; many were able to assist their families by obtaining part-time jobs (Elder, 1974). A vast majority of OGS men entered World War II as young adults and subsequently experienced delayed parenthood and careers (Elder, 1986). Fewer OGS women than BGS or GS women entered the workforce, and those who entered the workforce were older than their counterparts when they did so (Clausen & Gilens, 1990; for considerably greater detail about these three studies, see Eichorn, 1981).

The initial GS and OGS samples were reasonably representative of children living in Berkeley and Oakland, respectively, in the 1920s, at the beginning of these investigations. The initial BGS members were probably less representative of infants at the time. Participants of all three studies are almost exclusively Caucasian, reflecting the composition of the sampled communities at the time. As would be expected, however, the samples contain an approximately equal number of men and women.

Instruments

The primary data analyzed here were derived from participants' interview responses, rated by judges using the California Q-Sort (Block, 1961). Q-sort data are available for BGS members at approximately 14, 18, 40, and 50 years of age; for the Guidance group of the GS at approximately 14, 18, 30, 40, and 50 years of age; for the Control group of the GS at approximately 30, 40, and 50 years of age; and for the OGS members at approximately 14, 18, 40, 50, and 62 years of age. Participants were included in analyses only if they had at least one of two adolescent data points and at least two of three adulthood data points.³

As discussed previously, each individual's reduced 73-item California Q-Sort profile for a particular age was correlated with the reduced 73-item California Q-Sort "idealized psychologically healthy" profile to obtain the PHI for that individual for that age. The obtained PHI was then transformed, using Fisher's r -to- z formula (Hays, 1981), so that the data would be less skewed. Before PHI data were submitted to latent curve analysis, the groups' PHI means, variances, and covariances were corrected via Little and Rubin's (1987) estimation-minimization algorithm for missing data.

Results

Descriptive Demographic Findings

Throughout our analyses, we separate results by group (Berkeley, Control, Guidance, and Oakland samples) and gender. Although this procedure results in smaller subsample sizes, we believe that it best fits the exploratory nature of our research question.

To place later obtained results in perspective, we first describe some general demographic characteristics of our sample. Separated by original study and gender, it is clear that participants in this study are similar to members of other long-running longitudinal studies, in that they appear relatively well educated and intelligent (see Table 2). As of the most recent extensive follow-up of a subsample of our participants in 1982, the majority were still married to their first spouse, had two or three children, and had high levels of education. The groups' Wechsler Adult Intelligence Scale-Revised IQ means (Wechsler, 1981) run nearly two standard deviations above the overall population mean and indicate that our results may not generalize to less gifted individuals.

Descriptive PHI Findings

Next, to allow an understanding of general trends in the psychological health data, PHI means, standard deviations, and covariances were examined by group and gender. Results indicate a mixed trend toward increasing mean PHI scores with time and

³ These criteria explain why our sample sizes are smaller than those seen in other published works involving data from these same studies.

Table 2
Demographic Characteristics of the Sample

Group	Still married to first spouse (%)	No. of children		Education ^a		IQ ^b	
		M	SD	M	SD	M	SD
Berkeley men	50.00	2.67	1.50	1.92	1.16	140.42	18.75
Berkeley women	68.75	2.75	1.81	2.56	0.96	132.56	18.53
Control men	52.17	1.83	1.59	2.22	0.95	129.48	12.13
Control women	58.82	2.94	1.84	2.97	0.97	125.38	17.95
Guidance men	64.29	3.00	1.70	2.36	1.16	123.30	20.53
Guidance women	63.64	3.09	1.67	2.97	1.15	124.45	16.58
Oakland men	72.22	2.78	1.90	2.39	1.05	122.56	18.98
Oakland women	40.54	2.73	1.26	3.47	0.77	107.62	14.60

Note. The data presented are for those in our sample who were interviewed in 1982 (not the entire sample). Samples sizes were 12, 16, 23, 34, 28, 33, 36, and 37, respectively.

^a As assessed with the Hollingshead scale of education (Hollingshead & Redlich, 1958), ranging from 1 (professional training) to 7 (under seven years of school). ^b As assessed with the Wechsler Adult Intelligence Scale-Revised (Wechsler, 1981).

fairly consistent variability in scores across time (see Tables 3 and 4).

Latent Curve Analysis

To submit the PHI data to latent curve analysis with LISREL, we first faced a modeling complication in that we desired cross-time curves, yet no individual had PHI data for all six time points considered here (14, 18, 30, 40, 50, and 62 years of age). To account for this, we placed "marker" or "phantom" variables, which take on the value of 0 for each individual and consequently have a mean and variance of 0, into the subsamples' mean and dispersion vectors at points when data were not collected.⁴ Phantom variables contribute no empirical information; they merely allow growth curves to be estimated across the entire age range for all subsamples (e.g., McArdle, 1994). We introduced one phantom variable for the BGS group at 62 years of age, two for the Control group at 14 and 18 years of age, one for Guidance group at 62 years of age, and one for the OGS group at 30 years of age.

Finally, using LISREL 8 (Jöreskog & Sörbom, 1996), we performed latent curve analysis with maximum-likelihood estimation procedures. The latent curve model takes the following form: $x_{it} =$

$\alpha_i + \gamma_{1i}w_{1t} + \gamma_{2i}w_{2t} + \dots + \gamma_{ri}w_{rt} + e_{it}$. In this case, x_{it} is the PHI score for individual i at time t ; α_i is an additive constant, which may be set to 0 or allowed to vary by time point, and γ_{ij} are the ordinates of the growth curve(s). The γ_{ij} can be connected over t to form the curve(s). The multiplying coefficients w_{ij} are analogous to individuals' factor scores in ordinary factor analysis. Thus, the w_{ij} for each individual for each curve indicates how an individual's data are unique with respect to the generalized curve. For example, given one underlying increasing linear growth curve, a first individual's large positive w would indicate that his or her data showed a steeper than average increase across time. A second individual's large negative w would indicate that his or her data showed a linear decrease across time.

It is important to note that latent curve analysis can correctly model data such that no underlying curve is obtained, illustrating that no systematic pattern of change is shared among those in the sample. Conversely, one or more than one underlying curve can be obtained, with curves illustrating systematic patterns of change shared by those in the sample.

For all latent curve models attempted, we set α_i to 0, to force elevations of PHI into our growth curves. The only group and gender differences we allowed were in the means of the latent variable(s) and in the variances and covariances of the latent variable(s). The unique variances for each time point—variances not accounted for by the obtained growth curves—were allowed to vary by time point but not by group or gender. Thus, our implicit assumption (which could be rejected by a poorly fitting model) is that the basic developmental path of psychological health does not vary by group or gender, but the elevation of the path (latent variable means) and the amount of individual variability in the shape of the path (latent variable variances) might reasonably vary by group and gender. It would be possible to carry out numerous statistical tests on group and gender differences in elevations and variabilities (and covariances) of latent variables, but, given the

Table 3
Psychological Health Index Means Across Time

Sample	n	Approximate age (years)					
		14	18	30	40	50	62
Berkeley men	12	.32	.46	—	.22	.52	—
Berkeley women	16	.46	.32	—	.31	.42	—
Control men	24	—	—	.09	.29	.46	—
Control women	35	—	—	.13	.64	.57	—
Guidance men	30	.08	.16	.29	.33	.46	—
Guidance women	36	.15	.07	.23	.46	.53	—
Oakland men	41	.09	.12	—	.20	.46	.59
Oakland women	42	.25	.12	—	.24	.50	.55

Note. A dash indicates that data were not available for that sample at that particular age.

⁴ If one uses the program MX or AMOS, the introduction of phantom variables is unnecessary.

Table 4
Psychological Health Index Covariances and Variances

Characteristic	Berkeley sample: approximate age (years)			
	14	18	40	50
Age (years)				
14	—	.09	.08	-.08
18	.08	—	.11	.03
40	.06	.09	—	.08
50	.05	.19	.05	—
Men's variance	.14	.18	.17	.27
Women's variance	.14	.18	.18	.34

Characteristic	Control sample: approximately age (years)		
	30	40	50
Age (years)			
30	—	.05	.04
40	.03	—	.04
50	.03	.06	—
Men's variance	.09	.15	.25
Women's variance	.14	.10	.17

Characteristic	Guidance sample: approximate age (years)				
	14	18	30	40	50
Age (years)					
14	—	.12	.02	.11	.05
18	.11	—	.05	.08	.07
30	.05	.07	—	.03	.08
40	.05	.07	.05	—	.05
50	.07	.08	.07	.04	—
Men's variance	.19	.17	.18	.19	.15
Women's variance	.19	.17	.21	.16	.18

Characteristic	Oakland sample: approximate age (years)				
	14	18	40	50	62
Age (years)					
14	—	.12	.07	.07	.05
18	.04	—	.06	.04	.01
40	.02	.00	—	.09	.08
50	.04	.01	.11	—	.10
62	.03	.03	.07	.10	—
Men's variance	.17	.17	.20	.15	.17
Women's variance	.11	.12	.12	.19	.19

Note. Values for men appear in upper diagonal; values for women appear in lower diagonal.

exploratory nature of our work, we believed that these tests would be unwarranted.

We first attempted a one-curve solution, fixing the first ordinate of the growth curve at 14 years of age to 1 but allowing all other ordinates to be estimated with the data. Such a solution clearly did not fit, $\chi^2(133, N = 236) = 225.07, p = .000$.

We then made the decision to separate adolescent from adult psychological health development. This can be considered a

"piecewise model," with the form of development different for different portions of the life span. We created the first curve to represent psychological health at 14 and 18 years of age. Stability in psychological health in adolescence was modeled by creating a curve with ordinates 1 1 0 0 0 to represent the ages of 14, 18, 30, 40, 50, and 62 years, respectively. We created a second curve to represent psychological health level at the ages of 30, 40, 50, and 62 years, with adolescent ordinates of 0 and 0 and an age 30 ordinate of 1, to fix the scale of measurement for the curve. Ordinates at 40, 50, and 62 years of age were estimated with the data.

Results indicated that such a two-curve solution fits the data well, $\chi^2(117, N = 236) = 141.60, p = .061$ (see Table 5). The first curve—adolescent status—indicates stability in psychological health from 14 to 18 years of age. The second curve—adult development—indicates a steady increase in psychological health beginning at 30 years of age and continuing at 40, 50, and 62 years of age. The variances of error values were low for each time point (averaging from .07 to .15), indicating that the latent construct of psychological health was reliably measured across the entire portion of the life span examined. Note that the two curves—one modeling adolescent development and the other modeling adult development—were successfully constrained to be equivalent across groups and genders, as were the error variances at each time point.

Group and gender differences are apparent, however, in the latent variables' means, variances, and covariances (and correlations). Focusing first on the adolescent status curve, here held constant across 14 and 18 years of age, it can be seen that the BGS men and women showed higher psychological health levels (.40 and .38, respectively) than the remaining groups with data in adolescence. The variances appear similar across the eight groups (ranging from .04 to .11), however, indicating the groups' approximately equivalent amounts of individual variability with respect to level of adolescent psychological health. Focusing second on the adult development curve, here anchored at 30 years of age and then empirically estimated to steadily increase to 62 years of age, it can be seen that the control women had higher adult psychological health (.24) than the remaining groups. Allowing the addition of a constant in the latent curve model for the control women only at 40 years of age improved the fit of our model. However, we could not justify this addition substantively. The variances of the curves across adulthood were nearly numerically identical across the eight groups (ranging from .01 to .02).

Finally, because two curves were extracted from the data, the covariance or correlation between the two curves can be examined by group and gender. A wide range of correlations can be seen, from .28 for Berkeley men to 1.00 for Berkeley women.⁵ Excluding the Berkeley men, remaining correlations were moderate to strong and positive (ranging from .42 to 1.00), indicating that those with the highest adolescent psychological health tended to show the greatest increase in psychological health across adulthood.

⁵ Both of these unusual correlations may be artifacts produced by small sample sizes.

Table 5
*Final Latent Curve Analysis Solution for the Psychological Health Index
 From the Ages of 14 to 62 Years*

Age (years)	Adolescent status growth curve	Adult development growth curve	Variance of error
14	1.00 ^a	0.00 ^a	.08
18	1.00 ^a	0.00 ^a	.07
30	0.00 ^a	1.00 ^a	.15
40	0.00 ^a	2.00	.12
50	0.00 ^a	2.69	.11
62	0.00 ^a	3.46	.07

Latent psychological health				
Group	Adolescence <i>M</i> (variance)	Adulthood <i>M</i> (variance)	Covariance between curves	Correlation between curves
Berkeley men	.40 (.09)	.17 (.02)	.01	.28
Berkeley women	.38 (.08)	.16 (.02)	.04	1.00
Control men	—	.16 (.01)	—	—
Control women	—	.24 (.01)	—	—
Guidance men	.12 (.11)	.18 (.01)	.03	.89
Guidance women	.11 (.11)	.21 (.01)	.03	.89
Oakland men	.10 (.11)	.16 (.01)	.01	.43
Oakland women	.18 (.04)	.16 (.01)	.01	.42

Note. A dash indicates that data were not available for that sample at that particular age.

^a These parameters were fixed.

Discussion

Developmental paths of psychological health were examined for 236 male and female participants of a lifelong longitudinal study of human development. A clinician-reported aggregate index of psychological health, the PHI, was examined for various subsamples of individuals at 14, 18, 30, 40, 50, and 62 years of age, and life span trajectories were modeled via latent curve analysis (Meredith & Tisak, 1990), a statistical technique able to detect and model individual differences in intraindividual change.

We found that a single life span curve could not be successfully modeled. We chose to continue our analyses in a piecewise fashion, examining adolescent psychological health separately from adult psychological health. This approach resulted in a model of reasonable fit and meaning. The adolescent status curve indicates that psychological health, as operationalized via the PHI, can be modeled to be stable from 14 to 18 years of age. Although group and gender differences may exist with respect to the level and variability of psychological health in adolescence, there are no important group or gender differences with respect to the fact that stability exists.

Many believe that adolescence is an important and sometimes abrupt transitional period, allowing for the possible development of psychological disturbance. It seems our samplings of data, at the ages of 14 and 18 years, were too late to capture the transition from childhood to adolescence. Instead, our results suggest that, once in adolescence, individuals' level of psychological health does not systematically increase or decrease. Our results fit with those of Ge, Lorenz, Conger, Elder, and Simons (1994), for example, in their study of boys' and girls' depressive symptoms from 9 to 20 years of age. For girls, the increase in number of symptoms was seen chiefly before 14 years of age. For boys, symptoms increased after 14 years of age but resumed age 14 levels by 18 years of age.

Such results remind us that, despite the fact that the amount of longitudinal data analyzed here was impressive, we certainly are not capturing all points along the life span. Important changes may have taken place before or between assessment ages.

Previous work indicates that girls may differ from boys with respect to levels of psychological health in adolescence. Ge et al. (1994) and Petersen et al. (1991), for example, found higher levels of depression in adolescent girls than boys. In contrast, Cohn (1991), in his meta-analysis of studies of ego development, found that adolescent girls showed more mature ego development than adolescent boys. Inspection of the means of the adolescent status curve indicates that our data show neither systematically higher nor lower levels of adolescent psychological health for girls versus boys. This may, in part, be a reflection of the very generalized operationalization of psychological health used.

It is important to note, however, that we did find some interesting group differences in the level of latent psychological health in adolescence. The reason that the Berkeley samples' means were higher than those of the remaining groups may have been that fewer raw interview and observational data were available for Q-sorting for the Berkeley group for these time periods (only), positively biasing evaluations. Note that, even with such possible biasing, evidence of stability is still seen. Inspection of the variances of the adolescent status curve reminds us that individual differences in adolescent psychological health level clearly exist.

The adult development curve indicates that, in general, psychological health, as operationalized via the PHI, is not stable in adulthood but instead shows a steady increase from 30 years of age to 40, 50, and 62 years of age. As is the case with the adolescent status curve, although group and gender differences may exist with respect to the level of psychological health in adulthood, there are no group or gender differences in the shape of the adult develop-

ment curve. Overall, then, no group or gender differences in the patterns of psychological health development from 14 to 62 years of age were found.

Means for the adult development curve indicate few systematic differences in level of adult psychological health by group or gender, supporting Cohn's (1991) results. Our measure of psychological health, the PHI, is more similar to Cohn's ego development than other researchers' indexes of psychological health; therefore, similarity of results may not be surprising.

Inspection of the variances of the adult development curve reminds us that individual differences in adult psychological health do exist. Although the "average" participant showed moderately increased psychological health, some individuals showed dramatic increases, and some showed little or no increase in psychological health. Clearly, a next step in this line of research is to explore these individual differences with respect to degree of change in psychological health in adulthood.

An important additional finding involves the correlation between adolescent status and adult development psychological health curves. With the exception of data for Berkeley men (again, note that the adolescent data for Berkeley men and women were slightly unusual), all other groups and both genders showed a moderately to extremely strong positive correlation between the two curves. In other words, those with greater psychological health in adolescence tended to show a more positive acceleration of psychological health in adulthood than those with less psychological health in adolescence. Thus, although even those with low psychological health eventually showed improvement, those beginning adulthood with greater psychological health were more able to achieve near peak psychological health by late adulthood. Our results conflict, in part, with those of Clausen and Jones (1998), who found that those with greater "planful competence" (a measure similar to psychological health) in adolescence showed greater stability of personality in adulthood than those with less "planful competence." Clausen and Jones's (1998) results indicate that those who enter adulthood competent experience few internal or external pressures to change. Our data, in contrast, indicate that those who enter adulthood psychologically healthy continue to move toward greater psychological health. We suspect that the more specific focus on psychological health, rather than personality overall, explains the divergent findings. Many aspects of personality are "neutral"; a given level of gregariousness or pace of personal tempo, for example, can be easily incorporated in a variety of lifestyles. In contrast, there are many intrinsic and external rewards for positive psychological health.

Of course, several cautions should be noted when interpreting our results. First, our sample size and sample characteristics do not allow for unlimited generalization. Our overall sample size of 236 was good, but subsample sizes by gender and group were relatively small. We also would have liked to analyze complete life span data for all groups. Remember that each group contributed data for a slightly different portion of the life span: Berkeley for the ages of 14, 18, 40 and 50 years; Control for the ages of 30, 40, and 50 years; Guidance for the ages of 14, 18, 30, 40, and 50 years; and Oakland for the ages of 14, 18, 40, 50, and 62 years. Although the developmental trajectories for each group were successfully equated, note that only one group provided data for 62 years of age.

A second constraint is that our sample consisted of educated, successful, very intelligent people, a biasing typical of long-term longitudinal studies. Our participants are fortunate in that they are the type of people more likely to find and hold challenging careers, create and maintain good marriages, find and keep supportive friends, and afford therapists. Clearly, a replication of results with less advantaged individuals is needed.

Third, our data cannot represent other cohorts with different educational, occupational, or social opportunities. Although we found no significant differences with respect to change in psychological health for the two cohorts considered here, born in 1921 and 1929, respectively, these cohorts together may significantly differ from later-born cohorts. Some suggest that "prebomb" generations may experience vastly different cultural environments than "postbomb" generations, influencing personal changes, including changes in psychological health (Fiske & Chiriboga, 1985).

Fourth, our measure of psychological health, the PHI, may be criticized on several grounds. Although we consider it a strength, the fact that data were derived from clinicians, rather than directly from participants themselves, makes results difficult in some ways to interpret. How our results fit with self-perceptions of psychological health, either retrospectively or prospectively collected, is unclear. Also, although we consider it a strength, the multidimensional nature of the PHI makes results difficult to square with other studies with a more detailed focus on depression or positive affect, for example. A fascinating hint that the PHI may mask interesting, more narrow aspects of psychological health comes from work conducted by Peskin (1998). He found that temporary decreases in late adolescence in such positive characteristics as dependability, lack of defensiveness, and productivity for men and lack of submissiveness, autonomy, and lack of reluctance to act for women positively predict psychological health at 60 years of age. He suggested that the capacity to experiment with such negative aspects of personality in later adolescence may bode well for longer term adjustment. Clearly, we cannot detail such specific aspects of psychological health with our global index of psychological health.

Finally, it may be argued that "ideal" psychological health should change with age (particularly across such a wide age range as 14 to 62 years), and thus the profile used to create the PHI is faulty. We agree that some items might change with age (e.g., *rebellious* may be a positive item for a 14-year-old and a negative item for a 30-year-old). However, given the large number of items incorporated, differences in results should be insignificant. Further evidence that the PHI has cross-time structural stability comes from work conducted by Haan et al. (1986). Analyzing the same 73 California Q-Sort items across an even broader time span, incorporating childhood data, they found the items could be represented by the same six principal components at each time point considered.

It should also be noted that, as with any other study involving structural equation modeling techniques, other, equally reasonable models could have fit the data. We do not suggest that the model presented here is the only one that could be usefully obtained and interpreted with these data.

Despite the preceding caveats, the power of these data should be recognized. These longitudinal studies, systematically and extensively tracking men and women from either birth or early child-

hood through to older adulthood, give a rare picture of how individuals actually mature across a lifetime. Our broad, clinically oriented measure of psychological health, examined across a period of nearly 50 years, indicates that as our 236 men and women made their way through life (certainly not lacking challenges and difficult times, despite their general intelligence and stability), they became slowly more psychologically healthy. Like Vaillant's (1977) analogy, most seemed to use the irritating sand of life to create pearls. Such findings provide insight into many important areas of human development.

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