

Complexity of Life Style and Maintenance of Intellectual Abilities

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Results of longitudinal studies of intellectual abilities show significant individual variation in maintenance or decrement of such functions throughout adult development. The Life Complexity Inventory (LCI) was designed as a questionnaire to investigate those variables present in the day-to-day experience of adults that might relate either to stability or decline of intellectual ability. The LCI was completed by 140 subjects ranging in age from 40-88 years, whose intellectual and personality functioning had been measured in 1956, 1963 and again in 1970. Initial analysis of the data produced eight distinct environmental item clusters. Correlations in the expected direction were found between environmental cluster scores and scores on tests of cognitive function over three time periods. Subject types were obtained from the grouping of individuals by their cluster profiles. Results of the present investigation suggest that those individuals who manifest similar life styles also display similar ability patterns over time.

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For several decades cognitive development theorists have sought to untangle the complex relationships between variables thought to affect maintenance of adult intellectual performance (Baltes, 1968; Labouvie-Vief, 1977; Schaie, 1958; Schaie & Labouvie-Vief, 1974; Schaie & Parham, 1977). Recently, a theoretical framework called "contextualism", which should prove extremely useful in such a task, has been delineated by Labouvie-Vief and Chandler (1978). These authors argue that both socio-cultural and situational factors may have considerable impact on cognitive performance over the adult life span and that without consideration of such factors, inferences made about adult cognition will be inappropriate and misleading.

One of the socio-cultural factors that has generated the greatest controversy among cognitive developmental psychologists studying adult intellectual ontogeny is the "cohort confound" (Nesselroade, Schaie, & Baltes, 1972; Schaie & Strother, 1968). Specifically, the cohort confound occurs when researchers extrapolate from a cross-sectional data base, mistaking generational differences for evidence of true developmental change. This major source of confounding has been demonstrated by use of sequential strategies, methodologies developed to separate cohort and developmental change components (cf. Schaie, 1965). Similarly, life stage issues may also result in inappropriate interpretation of ontogenetic change. For example, "decrements are almost entirely restricted to the post-retirement phase and thus they may be in part a response to social policy issues (e.g. timing of retirement)" (Labouvie-Vief & Chandler, 1978).

Several studies have been designed to investigate the relationship between ability-extraneous variables or situational variables, and cognitive performance. Data from these studies have strongly suggested that factors such as fatigue (Furry & Baltes, 1973), anxiety (Labouvie-Vief & Gonda, 1976), cautiousness (Okun & DiVesta, 1976), reinforcement conditions (Birkhill & Schaie, 1975), and basic unfamiliarity with and meaninglessness of testing materials and procedures (cf. also Schaie, 1978) may reflect "non-cognitive interference" and, in effect, reduce intelligence scores in this age group (cf. Baltes & Labouvie, 1973; Labouvie-Vief & Chandler, 1978).

A third group of contextual variables, the impact of which must be considered, includes cultural and sub-cultural differences (Labouvie-Vief & Chandler, 1978). For instance, such factors as socio-economic status, birth order, presence of cultural amenities and the availability of reading material have been found to

correlate with *children's* intellectual performance (Bayley, 1979; Rees & Palmer, 1970). Some progress has been made in this area by researchers examining similar variables for the adult age group (Granick & Freedman, 1973; Honzik & MacFarlane, 1973; Jarvik, Bennett & Blummer, 1973; Lawton & Nahemow, 1973; Oden, 1968; Schoenfeldt, 1973; Thurnher, 1973; Troll, Saltz & Dunin-Markiewicz, 1976). However, a comprehensive study of variables that make up the adult individual's micro-environment, i.e., those variables present in the day-to-day experience of adults that may be assumed to affect the maintenance of cognitive functioning, has not been attempted. Furthermore, no study examining any group of these factors has been tied to multiple longitudinal investigations of adult cognition. Therefore, the present study was designed to determine significant life-style patterns and their relationship to cognitive change in a longitudinal panel of adults.

DESIGN OF THE STUDY

Subjects

Initially, 500 subjects were sampled from a population base of approximately 18,000 members of a prepaid medical plan in the northwestern area of the United States. A more detailed description of the sampling procedure has been reported earlier (Schaie, 1959). Repeated measurement data for the Primary Mental Abilities (PMA) and the Test of Behavioral Rigidity (TBR) obtained in 1956, 1963, and 1970 were available for 161 of these subjects, who ranged in age from 22 to 70 years at the time of first testing (1956) (see Schaie, 1979, for further details).

During the Spring of 1974, 140 of the 161 subjects who had been tested on the three previous occasions were interviewed using the Life Complexity Inventory (LCI). (Of the 21 not tested, five had died and the others could not be located.) These 60 men and 80 women at that time (1974) ranged in age from 40 to 88 years. For convenience of analysis, subjects were divided into seven seven-year age cohorts. The relationship between environmental factors and cognitive function measured over two seven-year periods (from 1956 to 1963 and from 1963 to 1970) will be reported.

Survey Instrument

In order to obtain a comprehensive overview of the daily activities of our subjects, a 29-page questionnaire, the Life Com-

plexity Inventory (LCI), was developed. This instrument examines a broad range of adult activities and interests and includes a retrospective section to obtain data on life style activities as they prevailed 11 years previously. The interval for the retrospective inquiry was chosen to obtain a point in time equivalent to the second cognitive data collection which also permitted a check on the validity of retrospective information, since some of the LCI items had been collected concurrently in 1963. From the initial analysis of the LCI results, eight clusters of item scores were developed. These clusters represented the following areas: a) homemaker activities; b) level of social status; c) subjective dissatisfaction with life status; d) disengagement; e) semi-engagement; f) a noisy environment; g) dimension of family solidarity, ranging from being embedded in a nuclear family unit to family dissolution; h) maintenance of acculturation. (Table 1 lists items defining these clusters.)

RESULTS

The LCI data were analyzed in the following sequence: 1) Cluster scores were used as dependent variables in a 2(sex) x 7 (cohort) ANOVA. 2) Cluster scores were correlated with cognitive functioning scores. 3) Subjects were clustered using item clusters as variables to obtain "subject profiles." 4) Subject profile clustered groups were compared on cognitive abilities over time.

Relationship Between Sex, Age, Cohort and LCI Item Clusters

Results of the 2 (sex) by 7 (cohort) analysis of variance revealed significant sex differences only on two clusters. Women had higher scores on Homemaker Role ($F = 332.34, p < .001$), and were more Disengaged than men ($F = 11.91, p < .001$). Younger cohorts were higher on Social Status ($F = 10.42, p < .001$), while older cohorts were more Disengaged ($F = 18.60, p < .001$) and had higher scores on Family Dissolution ($F = 9.82, p < .001$). Mean cluster scores by cohort and sex are presented in Table 2.

Given the traditional roles allocated to females in this society, particularly for women of the generations examined here, the higher scores for women on the Homemaker Role cluster is to be expected. The score on the Disengagement scale may be high because that cluster reflects involvements that are not, by and large, a function of the traditional female homemaker role. In other words, society perceives the female as a homemaker and

TABLE 1
VARIABLES COMPRISING ITEM CLUSTERS

Cluster	Description
A. <i>Homemaker Role</i>	younger than spouse; widowed or not married; much time spent in homemaking activities; much time spent in solitary activities; now and previously, spent much time working with hands; never in military service; now and previously, high on unnecessary conversation; female
B. <i>Social Status</i>	high level of education; high present and previous income level; high present and previous occupational status; perceived time pressure; many magazines read; large number of rooms in home
C. <i>Dissatisfaction with Life-Status</i>	high present and retrospective dissatisfaction with life; high present and retrospective dissatisfaction with job; fewer friends
D. <i>Disengagement</i>	high number of passive activities; few changes in professional roles; relatively more advanced age; many solitary activities retrospectively; few past and present hours spent reading; low involvement in people-related activities; low present and past involvement in work activities
E. <i>Semi-Engagement</i>	retrospective upper-middle class life-style; present home-related activities high; high number of friends with diverse interests
F. <i>Noisy Environment</i>	living now and previously close to freeways, airports, etc.; living in an environment described as noisy in general and bothered by it; in particular, present and past environment filled with traffic noise
G. <i>Family Dissolution</i>	number of changes in residence during the past five years; number of spouses lost by death; living in multiple unit dwelling; living in neighborhood with large elderly population; widowed or not married retrospectively
H. <i>Maintenance of Acculturation</i>	high number of fiction and nonfiction books read; high number of university and/or adult education courses taken; high number of weeks spent in educational activities

TABLE 2
MEAN SCORES ON CLUSTERS BY COHORT AND SEX
(SCORES STANDARDIZED AT MEAN = 50, STANDARD DEVIATION = 10)

Mean Age	Cohort	N	Clusters							
			A	B	C	D	E	F	G	H
1(85)	Male	7	37.8	39.5	46.7	66.5	44.3	52.9	56.6	47.7
	Female	5	56.6	45.7	48.0	62.4	48.9	49.9	56.4	45.0
	Total	12	45.6	42.1	47.3	64.8	46.2	51.6	56.5	46.6
2(78)	Male	2	34.1	53.5	50.2	59.7	51.1	59.3	45.2	49.0
	Female	12	60.2	38.5	51.6	60.6	47.7	50.1	67.4	50.8
	Total	14	56.5	40.6	51.4	60.4	48.1	51.5	64.2	50.5
3(71)	Male	8	40.2	45.3	50.6	50.6	45.8	48.8	48.4	50.2
	Female	14	58.8	45.5	50.0	55.1	53.8	55.4	50.1	50.4
	Total	22	52.0	45.4	50.2	53.5	50.9	53.0	49.5	50.3
4(64)	Male	16	41.7	52.4	50.0	44.3	45.4	53.3	48.9	45.2
	Female	14	57.5	54.0	48.4	47.8	52.2	49.3	48.7	55.3
	Total	30	49.1	53.2	49.3	46.0	48.6	51.4	48.8	49.9
5(57)	Male	10	41.6	51.8	52.3	44.0	50.0	42.6	45.1	49.1
	Female	12	56.3	46.8	54.1	46.6	54.2	48.3	49.1	48.0
	Total	22	49.6	49.0	53.3	45.5	52.3	45.7	47.3	48.5
6(50)	Male	10	38.0	57.5	51.1	40.7	51.4	45.6	46.4	47.6
	Female	13	54.6	57.6	46.5	49.1	50.8	49.8	45.9	54.1
	Total	23	47.4	57.6	48.5	45.4	51.0	47.9	46.1	51.3
7(43)	Male	7	42.9	57.4	45.3	39.5	53.1	47.2	45.4	50.3
	Female	10	56.4	52.8	52.5	49.9	49.8	51.2	45.0	53.3
	Total	17	50.8	54.7	49.5	45.6	51.2	49.5	45.2	52.0

expects her to function as such, no matter what her age is. The cohort effects for Social Status, Disengagement and Family Dissolution give further evidence of the influence of societal expectations, role allocation and socio-economic changes on the aging individual's life style.

It is noteworthy that there are no significant cohort effects for Homemaker Role, Noisy Environment, Semi-Engagement, Dissatisfaction with Life Status, or Maintenance of Acculturation. Consequently, life style patterns based on the scores from the latter item clusters do not appear to be age specific.

Relationship Between Environmental Pattern and Cognitive Functioning

Subject cluster scores were correlated with a series of scores from the 1956, 1963, and 1970 testings. These scores included

ability scores on: Verbal Meaning (V), Space (S), Reasoning (R), Number (N), Word Fluency (W) and summary scores on Intellectual Ability (IA) and Educational Aptitude (EA) from the Primary Mental Abilities Test (Thurstone & Thurstone, 1949). They also included scores on Motor-Cognitive Rigidity (MCR), Personality-Perceptual Rigidity (PPR) and Psychomotor Speed (PS) from the Test of Behavioral Rigidity (TBR) (Schaie & Parham, 1975). These correlations are presented in Table 3. Positive correlations should be interpreted as indicating that the particular cluster is associated with higher ability or greater flexibility.

The reported correlations show appreciable consistency. The Social Status cluster was positively correlated with all test scores over all measurement periods (correlations ranging from .19 to .55, $p < .05$), while there were negative correlations for all test scores with the Disengagement cluster (correlations ranging from $-.12$ to $-.49$, $p < .05$). Results for the other clusters were not as striking; however, all clusters except Semi-engagement show a relationship across time with at least one ability measure. Maintenance of Acculturation was positively correlated with Verbal Meaning, Word Fluency, Educational Aptitude, Personality-Perceptual Rigidity, and Psychomotor Speed; Family Dissolution was negatively correlated with Reasoning, Educational Aptitude, and Psychomotor Speed (for the 1963 and 1970 assessments). Homemaker Role was negatively correlated with Intellectual Ability and Number (at least for the 1956 and 1963 assessments), while Noisy Environment showed a positive relationship with Word Fluency.

The most consistent significant correlations were obtained for the Social Status and Disengagement clusters. These results permit the inference that societal and environmental factors may indeed influence the individual's intellectual and psychological functioning. As for the other significant relationships: they were of low magnitude and were relatively inconsistent; hence it would be preferable to await replication with larger samples before attempting further interpretations.

Subject Profile Typology

The LCI cluster scores were used as variables to identify a typology of subject types, by treating subject profiles in terms of their distance function (Dixon, 1975). This method produced eight types; four of these included a total of eighty subjects, and were sufficiently large for interpretation. Table 4 provides mean scores and standard deviations for the four types on the 8 LCI clusters.

TABLE 3
CORRELATIONS OF ENVIRONMENTAL CLUSTER SCORES FROM THE LCI (1974), WITH SCORES FROM THE PRIMARY MENTAL ABILITIES AND THE TEST OF BEHAVIORAL RIGIDITY AT THREE EARLIER ADMINISTRATIONS (N = 140)

		A	B	C	D	E	F	G	H
V	1956	-.02	.42**	-.14*	-.25**	.03	.05	-.10	.19*
	1963	-.09	.51**	-.13	-.36**	.01	.03	-.13	.17*
	1970	-.07	.52**	.03	-.48**	-.02	-.04	-.21**	.12
S	1956	-.15*	.31**	-.13	-.34**	.03	.11	-.13	.05
	1963	-.22**	.35**	-.01	-.38**	-.04	.10	-.14*	.01
	1970	-.16*	.33**	.06	-.43**	-.01	.01	-.18*	-.12
R	1956	-.00	.45**	-.10	-.31**	.03	.06	-.11	.13
	1963	.00	.53**	-.13	-.38**	.06	.03	-.20**	.16*
	1970	.02	.55**	-.10	-.46**	.09	-.02	-.21**	.11
N	1956	-.04	.28**	-.19*	-.19*	.03	.16*	-.01	.06
	1963	-.07	.27**	-.19*	-.24**	-.01	.11	-.04	.02
	1970	-.03	.32**	-.13	-.28**	.03	.08	-.08	.00
W	1956	.17*	.22**	-.11	-.14*	-.07	.24**	-.00	.14*
	1963	.11	.32**	-.13	-.22**	-.09	.20**	-.01	.22**
	1970	.13	.34**	-.02	-.22**	.07	.15*	-.10	.25**
I	1956	-.02	.45**	-.19*	-.32**	.01	.17*	-.08	.12
	1963	-.07	.53**	-.18*	-.42**	-.01	.13	-.13	.15*
	1970	-.03	.54**	-.06	-.48**	.05	.05	-.20**	.09
E	1956	-.02	.46**	-.14*	-.28**	.03	.06	-.11	.18*
	1963	-.07	.55**	-.14*	-.37**	.03	.03	-.16*	.18*
	1970	-.05	.55**	-.00	-.49**	.01	-.04	-.22**	.12
M	1956	-.04	.39**	-.03	-.25**	-.09	.13	-.13	.08
	1963	-.17*	.30**	.18*	-.42**	-.02	.08	-.15*	-.00
	1970	-.01	.38**	.05	-.32**	-.02	.08	-.14*	.13
P	1956	-.00	.19*	-.09	-.12*	.04	.03	.09	.21**
	1963	.05	.32**	-.02	-.24**	.11	.02	-.07	.16*
	1970	.04	.32**	-.08	-.28**	.17	.04	-.08	.18*
P	1956	.18*	.44**	-.09	-.14*	.06	.13	-.12	.16*
	1963	.16*	.50**	-.13	-.28**	.02	.05	-.18*	.17*
	1970	.18*	.53**	-.10	-.31**	.10	.07	-.25**	.19*

* $p < .05$

** $p < .01$

Type 1 subjects (15 men and 6 women) are of average social status, live in a relatively noise-free environment, have largely intact family units, maintain an average level of acculturation and are quite engaged, but voice strong dissatisfaction with their

TABLE 4
SCORE MEANS AND STANDARD DEVIATIONS ON THE ENVIRONMENTAL CLUSTER SCORES FROM THE LCI FOR THE FOUR MODAL SUBJECT TYPES

Item Cluster	Type 1 (N = 21)		Type 2 (N = 29)		Type 3 (N = 19)		Type 4 (N = 17)		All Types (N = 86)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
A Female Home-maker	45.3	7.8	44.9	7.1	57.7	5.4	58.3	7.2	50.5	9.4
B Social Status	50.0	6.1	57.7	6.0	48.4	4.9	39.6	5.8	50.1	8.6
C Dissatisfaction with Life Status	59.7	3.8	44.0	5.6	48.2	5.7	55.7	7.3	51.1	8.5
D Disengagement	44.2	4.8	44.3	6.4	54.6	4.0	60.1	7.6	49.7	8.8
E Semi-Engagement	44.4	4.2	48.7	5.9	51.7	7.9	46.8	4.9	47.9	6.3
F Noisy Environment	42.8	10.0	53.0	7.1	55.7	6.0	47.9	9.6	50.1	9.4
G Family Dissolution	48.6	4.7	45.5	2.8	46.5	3.9	65.8	6.4	50.5	8.8
H Maintenance of Acculturation	47.0	4.2	48.6	5.2	44.9	3.6	48.6	6.8	47.4	5.2

life status. Type 2 subjects (18 men and 11 women) have high social status, are well satisfied with their life status, have intact families, indicate slightly above average maintenance of acculturation and live in a relatively noisy and accessible environment. Both Type 3 and Type 4 are made up almost entirely of women (19 women, 1 man and 17 women, 1 man respectively). Type 3 are homemakers of average social status, have average satisfaction with life status and have intact family situations. They are low on maintenance of acculturation and live in noisy, but accessible, environments. They are above the average on disengagement and have the highest mean on the semi-engagement pattern. Type 4, like Type 3, are homemakers; however, they are dissimilar in all other respects. They are older, all of them are widowed, they have low social status, are dissatisfied with their life status, and are highest on disengagement items, although they do not show the semi-engagement pattern. They live in noise-free but probably inaccessible environments and are the highest on family dissolution. Thus, the types of our classification range from the high status engaged (Type 2), through the average status engaged (Type 1), to semi-engaged homemakers (Type 3) and disengaged homemakers (Type 4).

Subject Type and Level of Cognitive Ability Over Time

Our final analysis concerns the question of whether or not there are significant differences, by subject type, for levels of cognitive ability over time. To examine this question, the four subject types were used as independent variables in a repeated measure (1956, 1963, 1970) analysis of variance for each of the 10 measures of cognitive functioning. Results for the cognitive variables, by type, are presented in Table 5.

Statistically significant differences in cognitive abilities by subject type were found for all abilities except Number. As would be expected from the item cluster correlations, the Type 2 subjects (the high status engaged) were consistently high on all abilities, while the reverse was true of Type 4 (the disengaged). Type 3 subjects (the semi-engaged) were fairly average on all tests, showing consistency over time, with the exception of Word Fluency and Intellectual Ability, where there was evidence of decrement. Type 1 subjects (the average status engaged) were also fairly consistent across testing periods; however, in general, their scores were average or slightly below.

Significant repeated measure effects were found for Word Fluency, Intellectual Ability and Psychomotor Speed. As can be

TABLE 5
COGNITIVE VARIABLES BY TYPE*

		Mean Scores				Analysis of Variance		
		Type 1	Type 2	Type 3	Type 4	Type (T)	Year (Y)	T × Y
V	1956	52.8	57.8	53.7	49.5	9.82***		3.98***
	1963	53.9	59.6	52.9	48.1			
	1970	56.4	59.2	53.5	45.1			
S	1956	52.5	56.1	51.3	46.5	4.06**		
	1963	53.9	56.1	51.9	47.3			
	1970	53.5	55.0	52.8	46.4			
R	1956	53.0	56.9	56.5	49.5	6.78***		
	1963	53.6	57.4	55.4	46.9			
	1970	52.8	57.9	54.6	46.3			
N	1956	49.2	53.1	52.1	49.2			
	1963	51.0	55.6	50.8	47.7			
	1970	50.2	53.8	51.2	47.6			
W	1956	54.7	57.2	61.1	52.7	3.25***	28.88***	
	1963	49.6	54.0	53.8	49.4			
	1970	51.0	53.0	54.9	47.1			
I	1956	52.5	57.5	56.0	49.5	8.00***	6.71***	4.29***
	1963	52.8	58.2	53.5	47.2			
	1970	53.0	57.3	54.2	45.6			
E	1956	53.0	58.0	54.7	49.5	9.63***		4.59***
	1963	54.1	59.7	53.8	47.8			
	1970	55.8	59.4	54.1	45.2			
M	1956	52.1	54.7	51.5	45.4	7.85***		
	1963	54.7	56.3	51.7	48.5			
	1970	53.4	54.1	53.2	45.2			
P	1956	48.1	57.4	49.4	51.6	7.65***		
	1963	47.7	56.9	51.7	50.5			
	1970	48.9	56.9	51.6	48.8			
P	1956	50.3	57.5	53.9	52.6	7.26***	14.96***	3.06***
	1963	47.4	55.5	51.7	45.5			
	1970	49.6	56.4	53.2	44.9			

*N = 140; degrees of freedom: T = (3,82); Y = (2,164); T × Y = (6,164)

**p < .01

***p < .001

seen in Table 5, these effects resulted from a decrease in scores on Word Fluency over time ($p < .01$) and a decrease in Intellectual Ability ($p < .01$), primarily attributable to decreases by Type 4 (as evidenced by the mean scores) as well as a Type x Repeated

Measures interaction. A significant decrease in Psychomotor Speed was also noted ($p < .01$), again primarily attributable to decreases by Type 4, while losses suffered by Types 1, 2 and 3 from 1956 to 1963 were for the most part regained from 1963 to 1970. Other significant Type x Repeated Measures interactions included Verbal Meaning ($p < .01$) and Educational Aptitude ($p < .01$), in which scores for Types 1 and 2 increased, Type 3 remained stable, and Type 4 decreased.

It should be noted that scores on all ability tests are T-scores (mean = 50; s.d. = 10) which were originally standardized on the entire population from which this sample was selected. Examination of the mean scores for all types show that means for this sub-sample are consistently higher than the population means. Standard error of the mean tests on each variable for each Type, however, showed no differences for Types 1 and 4, and significantly higher scores on only a few variables for Types 2 and 3.

DISCUSSION

Consistent with the theoretical perspective of contextualism, this study is an attempt to evaluate factors that may affect cognitive functioning across the life-span. Our results show that individuals of particular types are more or less prone to quite specific change on cognitive variables. These typologies may prove more useful than cohort-based independent variables that have been used in past studies.

A comparison of Type 1 versus Type 2 subjects may offer a good example of the usefulness of the typology. There are major differences in these two types of subjects on demographic characteristics, life styles, and intellectual performance. Type 2 subjects were consistently high on all cognitive abilities; Type 1 subjects were fairly consistent across testing periods, with scores average or slightly below average. Type 2 subjects had the highest education (and increased that education over both time periods), the highest job status, and the highest life satisfaction and job adjustment scores. Type 1 subjects had low occupational status and moderate education, yet the highest income. They had the most change in profession and the least life satisfaction for both of the time intervals studied.

While cluster types are not related to specific cohort membership, there are some differences in terms of the age range represented within each cluster. Types 1, 2 and 3 consist of people ranging in age from 40-74 years, and Type 4 from 68 to 88

(but there were two younger outliers in Type 4, aged 64 and 57 respectively, and one older outlier in Type 3, aged 84 years). The lack of representation of the oldest cohorts in Types 1 and 2 and the youngest in Type 4 is not all that unusual, considering that the age range represented covers nearly half a century. The surprising finding is that such a broad age range is found within the cluster types. It must be remembered, however, that these clusters were formed from a longitudinal sample, and therefore a sample reflecting selective attrition. With a larger, more heterogeneous sample, cohort effects might become more pronounced.

Our correlational data do not permit us to conclude directly that differences in life style caused, or even preceded, the observed differences in intellectual functioning across time. The reverse sequence may also be plausible; i.e., changes in cognitive ability may lead to life style changes. The latter explanation might initially be suggested by the Type 4 data, whose mean performance at all test occasions is substantially lower than for the other types. It can be rejected, however, because, due to regression effects, we would actually expect gain over time for the lowest scoring sub-sample (cf. also Baltes, Nesselroade, Schaie & Labouvie, 1972). Thus, the "drop" in scores for this group is greater than expected. Further, it is of interest to note that all Type 4 subjects were widows, a fact not likely to be produced by a decline of cognitive functions! But it is clearly the combination of widowhood and other adverse life style characteristics that is implicated, rather than widowhood per se, since some widows are found in the other Type clusters. Nevertheless, further inferences as to causal directions must await the application of formal causal modeling techniques to these data.

Since we did not manipulate either life style or intellectual abilities, we do not know if some other variables that we did not measure may have led to the changes found here. We can state with some assurance, though, that in this sample, sets of individuals who manifest similar life styles also display similar ability patterns over time, and that these patterns differ from those shown by other sets of individuals who have alternate life styles.

Thus, our research suggests that gerontological researchers need to consider the life-environment context in which the individual exists in order to understand more completely the complexities of cognitive development over the adult life-span.

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