Cultural Change and Repeated Assessment in the Study of the Adult Personality[1]

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Abstract

It is proposed that the acceptance of the stability model for adult personality development does not imply that the developmental psychologist should cease to concern himself with the period beyond adolescence. Instead it is argued that highly significant age differences may be found which most parsimoniously can be attributed to be the function of generational differences. Moreover, it is argued that socio-cultural changes will lead to changes of performance level on personality tests over all age levels examined and that such performance may also be modified over time as a function of the experience of being tested. Samples of Ss from seven seven-year cohorts with mean years of birth ranging from 1889 to 1931 and mean ages from 32 to 74 years were studied in 1963 and 1970 at first and second testing to differentiate the effects of prior experience, socio-cultural change and age-cohort level. Variables examined were motor-cognitive rigidity, personality-perceptual rigidity, psycho-motor speed and social responsibility, all from Schaie's Test of Beahvioral Rigidity. Data for 1963 were also examined for samples tested the first and second time while controlling for effects of experimental mortality.

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Introduction

The systematic treatment of personality development beyond adolescence has always been fraught with a number of basic conceptual and methodological problems which have discouraged many workers and which has resulted in a relative paucity of useful data both on the structure of personality at various adult age levels as well as on the development of specific variables over wide ranges of the adult life span (cf. Kuhlen, 1959; Chown, 1968; Schaie & Marquette, 1971). The primary conceptual problem has been the question whether there is any personality development at all once maturity is reached. The major personality theorists do not extend their systems into the adult years (cf. Riegel, 1959) and attempts to selectively extend constructs derived from such theories (e.g., Erikson, 1950; Schaie, 1962) have as yet not been adequately supported by relevant data. Specific systems of describing personality structure in the aged, such as the disengagement model of Cummings and Henry (1961), and the maintenance of life-style models provided by Buhler (1961) and by Reichard, Livson and Peterson (1962), are curiously vague (perhaps due the difficulty of adducing proper evidence) on the stability or alteration of personality structure during adulthood.

Although the preponderance of theoretical models seems to argue for stability of the adult personality, there is at least some evidence from

cross-sectional studies (Chown, 1968) that adult age differences can be observed on many personality variables. This brings us to the methodological problem, which is of course not unique to the study of personality change over age, that cross-sectional studies will confound age changes with generation differences. That is, we do not know whether the reported differences between smaples of different ages mean that there is indeed personality change beyond adolescence, or whether we are simply noting the maintenance of personality styles acquired early in life but which differ for successive generations. The latter hypothesis would seem to be supported by a variety of short-term longitudinal studies reported over the last few years (Riegel, Riegel & Meyer, 1967; Schaie & Strother, 1968a, 1968b), but there are other methodological concerns which preclude definitive conclusions at this time.

One of the major problems in the longitudinal study of psychological variables is the fact that in this approach we confound the effect of age changes with the temporally unique environmental input during the time period over which we conduct our analysis and when the same individuals are tested repeatedly we do not know to what extent the measurement operation itself has served to modify the trait whose development we wish to observe. I have therefore made the point elsewhere (Schaie, 1972b) that single cohort longitudinal studies cannot be used for the study of psychological development and have proposed alternate designs which should be substituted therefor (Schaie, 1965, 1970, 1972a). It is the purpose of the present paper to report the application of such designs to differentiate the effects of chronological age, secular trends, generation differences and the effects of repeated measurement upon selected personality variables for samples of adult Ss ranging in mean age from 25 to 81 years.

Designs Required to Unconfound Sources of Variance

In order to unconfound the sources of variance which might be mistaken for adult personality change it will be necessary to assess two or more cohorts (generations) at two or more measurement points where for each combination some subjects have been assessed for the first and some for a second or subsequent time (cross-sequential method). Alternately we can assess individuals at two or more age level at two or more measurement times varying again the level of measurement (first or second) time for each other combination (time-sequential method). The first plan is most appropriate if we assume the validity of the model stating that adult personality is stable and wish to differentiate measurement effects, from differences between generations and transient secular trend. The second plan must be used if there is reason to believe that there are indeed age-related developmental trends for the variables under study. When in doubt, we would advocate the first design since it permits identification of age differences (i.e., age confounded with cohort differences as in cross-sectional studies) and age changes (i.e., maturational change confounded with environmental impact specific to a given time period) if the assumption of the stability model has been violated.

For either analysis it is necessary to have data on Ss who have been tested prior to the points of time for which differentiation of variance components is to be attempted. Tables 1 and 2 present the sampling plans and ANOVA design necessary for this purpose (cf. Schaie, 1965, 1972a).

Procedure

Subjects. All Ss were members of a pre-paid medical plan in a metropolitan

area of the Pacific Northwest, with a population base of approximately 18,000 members at the time of initial data collection. Detailed accounts of the sampling plan and procedures have been reported elsewhere (Schaie, 1958, 1959). In summary, quota sampling was conducted in 1956 for each 5 year interval from 21 to 70 years of age and in 1963 from 21 to 75 years of age with approximately equal numbers of men and women in each age interval. In addition approximately 60% of the 1956 sample was retested in 1963. Because of the seven year testing interval the samples have now been reorganized into seven year cohorts with mean years of birth ranging from 1889 to 1945.

In 1970 a second follow-up was conducted in which the residual samples from the 1956 and 1963 studies were retested. Also new random samples were drawn from the parent population for all cohorts tested previously plus the next younger one. As a consequence we have now available repeated measurement data for all three data points for a sample of 162 Ss now ranging in mean age from 21 to 84 years, for two data points (1956-63) a sample of 300 Ss ranging in age from 28 to 77 years and another sample (1963-70) of 409 Ss ranging in age from 28 to 84 years. Single point independent random sampling data are available for the 1956 series on 490 Ss, for the 1963 series on 960 Ss, and for the 1970 series on 701 Ss. Although attrition in the repeated measurement samples has appeared to be random with respect to most socio-economic variables, subject loss has been found to be biased with respect to the psychological variables (cf. Baltes, Schaie & Nardi, 1971).

Measures. The SRA Primary Mental Abilities Test, Schaie's Test of Behavioral Rigidity (TBR) a socioeconomic status questionnnaire and a survey on satisfaction with the pre-paid medical plan were administered in group sessions handling from 10 to 50 Ss and lasting approximately two hours each. The present report will be concered only with the factor scores of motor-cognitive

rigidity, personality-perceptual rigidity, psycho-motor speed, and a scale of social responsibility all from the Test of Behavioral Rigidity (Schaie, 1955, 1960). Data from this study bearing upon the question of ontogenetic vs. generational change on measures of intellectual ability are reported elsewhere (Schaie, 1971).

Analysis. To facilitate comparisons, all raw scores were converted to a common base in the form of T scores with a mean of 50 and a standard deviation of 10, using as a reference the first test administration for all three series to a combined group of 2251 Ss. From the available data sub-samples were then combined for the cross-sequential ANOVA according to the scheme shown in Table 1. That is, we are comparing samples from seven cohorts with mean birth years from 1889 to 1931 (mean ages at first time of measurement: 32 to 74 years). For each cohort we have four samples, two of these were tested in 1963 and two in 1970. At each time one of the samples was examined for the first time, while the other had been examined on the same measures seven years previously. For the time-sequential ANOVA data were reorganized according to the scheme shown in Table 2. Here we are assessing samples from seven age levels (mean age: 32 to 74 years) at two points in time, again matching samples at each point which did or did not have prior testing experience. Finally a cross-sectional ANOVA was conducted for the single time point 1963 comparing Ss then tested for the second time with Ss tested for the first time but who were known to have returned for a second test seven years later. This analysis equates the two sets of samples for effects of experimental mortality (attrition effects).

Results

The outcome of the cross-sequential analysis of variance has been summarized in Table 3. If our basic assumption of the stability of adult personality were correct, then these results must be interpreted as providing highly significant evidence for strong generational differences on our personality measures. Moreover, except for the scale of social responsibility significant differences are also found between times of measurement. The latter differences would represent the impact of socio-cultural shift over the intervening seven year period. Moreover, significant interactions were found between cohort and time of measurement for personaltiy-perceptual rigidity and pscyho-motor speed. In both instances the impact of socio-cultural change is geater upon the younger cohorts. Significant sex differences were found, with the women more socially responsible and higher on psycho-motor speed than he men, and the men scoring in the more flexible direction on the motor-cognitive rigidity measure.

Let us next consider the effects practice or prior testing experience. Mean scores were found to be significantly higher in positive direction for all variables except personality perceptual rigidity for those Ss who had experienced the same test seven years previously. A significant test by cohort interaction was found for the motor-cognitive rigidity measures where the prior experience effects were noted for the middle-aged but not for the oldest or youngest cohorts. On the social responsibility scale an interaction was found between time of testing and prior experience. That is, the prior experience effects were much more pronounced in 1963 than in 1970 although they were observed at both points.

Figures 1 through 4, present the cross-sectional age-level-cohort gradients obtained for each of our four variables at the two times of measurement and

under the two conditions of prior experience. These graphs were drawn for the combined male and female sample, since none of the interactions involving sex differences were significant at or beyond the 1% level of confidence. These graphs if redrawn separately by sex would therefore differ in level but not in slope.

It was noted earlier that the component of socio-cultural change identified in the cross-sequential ANOVA, if our assumption of stability of personality did not hold, could be confounded with maturational change occurring over the seven year period under study. This question can readily be approached by re-organizing our data as indicated in Table 2 and conducting a time-sequential ANOVA. In this alternative design we are differentiating age levels and socio-cultural change while confounding generation effects. But just as the seven year aging effect will appear in the cross-sequential ANOVA in the seven year time main level rather than the 49 year cohort level, so will the generational confound covering a 49 year range appear in the 49 year age level effect than the seven year time of measurement effect. Consequently, those time-of-measurement effects which remain significant can now be attributed unambiguously to socio-cultural impact, while those which disappear can be attributed to maturational factors. Likewise, F ratios for age levels which are equivalent or lower than the comparable ratios in the cohort analysis will still be interpretable as generation differences, and only in those instances where the F ratio is increased markedly will we now have to consider revision of our basic assumption of the stability model.

Results for the time-sequential ANOVA are presented in Table 4. F-ratios for age differences are all significant but are not increased over the cohort differences in the previous analysis. We will thus continue to interpret them as generation differences. The time of measurement differences for personality-perceptual

rigidity and psycho-motor speed remain significant and account for a larger proportion of variance in this analysis. It can therefore be concluded that socio-cultural impact is significant in producing greater flexibility over all age levels over time on these two dimensions. The same does not hold true for motor-cognitive rigidity. Here it appears that the time of measurement difference found in the previous analysis was caused by the age confound. Sex differences and time by age level interactions are replicated in this analysis. Now, effects of prior testing are found for all four of our variables. Of some interest, further, are the significant interactions between age-level, time and prior experience for motor-cognotive rigidity and psycho-motor speed. The nature of these complex interactions is best described by Figures 1 to 4.

The careful reader may have noted that there is a problem in the unambiguous identification of the effects of prior experience in our present design. Of necessity we are including data for individuals at first testing, who are a reasonably random sample from the parent population. The data at second testing must, of course, come from the attrited sample of Ss who were re-tested. If experimental mortality leads to a selection of Ss who differ from their attrited peers by an amount which approximates the same magnitude as does the difference between Ss at first and second test, then experimental mortality would suffice to explain our observed differences.

Unfortunately some samples of Ss from the cohorts examined would be needed at four data points to examine this question in a sequential design. We do have the data, however, to conduct a cross-sectional ANOVA for a single time point where we can control for the effects of experimental mortality. The results of this analysis are presented in Table 5. In this analysis significant differences are found again for all variables for the age-cohort levels, sex differences occur in 1963 only for the motor-cognitive rigidity and psycho-motor speed variables. The effects of prior experience are much reduced but they do

remain significant at or beyond the 5% level of confidence for all variables except psycho-motor speed. Moreover, there is a significant age-level by prior experience interaction for all variables except social responsibility. These interactions are shown in Figures 5 to 8.

Discussion

Two kinds of personality variables are reported upon in the present study. The first involves measures of personality style, psycho-motor speed and motor-cognitive rigidity, while the second involve measures of personality traits, personality-perceptual rigidity and social responsibility. In addition the former measures are obtained from performance tasks, while the latter involve questionnaire response. All four measures show significant age differences which on the basis of the replicated cross-sectional and short-term longitudinal data (discussed in more detail elsewhere) must be interpreted as generational differences. However, effects of socio-cultural impact are strongest upon the measures of personality style, while effects of prior testing seem to be important to all measures. In fact, the effect of prior testing experience seemed strongest for the scale of social responsibility which shows lesser age differences than do the other measures.

The data presented in this study, all of which are basically consistent with a stability model of adult personality, nevertheless suggest that many interesting phenomena can be observed by the developmentalist interested in adult personality even though these phenomena do not necessarily change the basic pattern of personality presented in young adulthood. Instead, the phenomena to be investigated would seem to involve very substantial generational differences in level and perhaps structure of many personality dimensions, as well as the

effects of more transient socio-cultural phenomena, differentially effecting samples belonging to different generations. Although the data presented here are essentially replicated cross-sectional studies, they do elicit data on the effects of repeated measurement which are equally applicable to studies of ontogenetic changes within generations. The finding of significant effects of prior testing extending over a seven year interval which was replicated for two data collections, seven years apart, suggest that changes which might be attributed to aging could well be a function of the long-term effects of previous assessment. This finding was supported further even when effects of experimental mortality were controlled in collateral study. In sum, it would seem that what is changing over time is not the response-pattern within the single individual, but rather the socio-cultural impact upon successive generations which lead to clearly observable age differences in personality at any single historical point.

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Table 1

Sampling Plan and Generalized Analysis of Variance Model
for the Cross-Sequential Model
Controlled for Effects of Practice

a. Sampling Plan*

Time of Test	Samples Tested
T 0	Random halves of samples C_iT_k and C_jT_k
T 1	All of C_iT_k and C_jT_k; random havles of C_iT_1 and C_jT_1
T 2	All of C_iT_1 and C_jT_1

*Scores obtained on the first test for each sample are disregarded. The second set of scores for the random halves tested initially and the only set of scores for the random halves without practice enter the analysis.

b. Generalized Analysis of Variance Model

Source of Variation	Degrees of Freedom
Between Cohorts (C)	C - 1
Between Times (T)	T - 1
Between Practice Levels (P)	P - 1
Cohort x Time interaction	(C - 1) (T - 1)
Cohort x Practice interaction	(C - 1) (P - 1)
Time x Practice interaction	(T - 1) (P - 1)
Cohort x Time x Practice interaction	(C - 1) (T - 1) (P - 1)
Error	N - (C) (T) (P)
Total variation	N - 1

Table 2

Sampling Plan and Generalized Analysis of Variance Model
for the Time-Sequential Method
Controlled for the Effects of Practice

a. Sampling Plan*

Time of Test	Samples Tested
T 0	Random ahlves of samples A_mT_k and A_nT_k
T 1	All of A_mT_k and A_nT_k; random halves of A_mT_1 and A_nT_1
T 2	All of A_mT_1 and A_nT_1

*Scores obtained on the first test for each sample are disregarded in this analysis. Thus the second set of scores for the random half tested initially and the only set of scores for the random half without practice enter the analysis.

b. Generalized Analysis of Variance Model

Source of Variation	Degrees of Freedom
Between Times (T)	T - 1
Between Ages (A)	A - 1
Between Practice Levels (P)	P - 1
Time x Age interaction	(T - 1) (A - 1)
Time x Practice interaction	(T - 1) (P - 1)
Age x Practice interaction	(A - 1) (P - 1)
Time x Age x Practice interaction	(T - 1) (A - 1) (P - 1)
Error	N - (T) (A) (P)
Total variation	N - 1

Table 3

Cross-sequential ANOVA for Effects of Cohort Differences, Sex, Time of Measurement and Previous Testing (F ratios, df for error term = 2140)

Source of variance	df	Motor cognitive Rigidity	Personality perceptual Rigidity	Psycho-motor Speed	Social Responsit
Cohorts	6	97.32**	60.78**	108.99**	2.26*
Time of measurement	1	14.90**	5.86*	42.56**	1.15
Sex	1	10.64**	2.16	124.83**	15.24**
Prior Testing	1	13.42**	3.47	9.65**	15.15**
Cohorts x Time	6	1.17	3.63**	3.29**	..
Cohorts x Sex	6	1.80	1.27	1.21	1.55
Cohorts x Prior Testing	6	4.39**	1.70	1.76	1.12
Time x Sex	1	3.43	..	..	..
Time x Prior Testing	1	2.41	2.01	3.52	12.76**
Sex x Prior Testing	1	..	1.02	1.85	..
Cohorts x Time x Sex	6	1.39	..	2.14*	2.05
Cohorts x Time x Prior Testing	6	1.40	..	2.59*	..
Cohorts x Sex x Prior Testing	6	..	..	..	..
Time x Sex x Prior Testing	1	3.47	..	..	1.83
Cohorts x Time x Sex x Prior Testing	6	..	..	..	..

*Significant at or beyond the 5% level of confidence
**Significant at or beyond the 1% level of confidence

Table 4

Time-sequential ANOVA for Effects of Age Differences, Sex, Time of Measurement and Previous Testing (F-ratios, df for error term = 2086)

ource of variance	df	Motor-cognitive Rigidity	Personality-perceptual Rigidity	Psycho-motor Speed	Social Responsib.
ge levels	6	102.14**	62.73**	106.26**	2.38*
ime of measurement	1	..	20.26**	115.96**	2.02
ex	1	7.34**	1.06	123.74**	15.62**
rior Testing	1	15.26**	4.11*	9.67**	13.16**
ge x Time	6	..	2.88**	2.96**	..
ge x Sex	6	1.26	1.72	1.56	2.23
e x Prior Testing	6	1.41	..	..	..
me x Sex	1	1.69	..	..	..
me x Prior Testing	1	1.77	2.10	2.96	13.85**
x x Prior Testing	1	1.24	..	2.91	..
e x Time x Sex	6	1.43	..	1.77	..
e x Time x Prior Testing	6	..	..	..	..
e x Sex x Prior Testing	1	2.91	..	..	4.17*
e x Time x Sex x Prior Testing	6	..	..	..	..

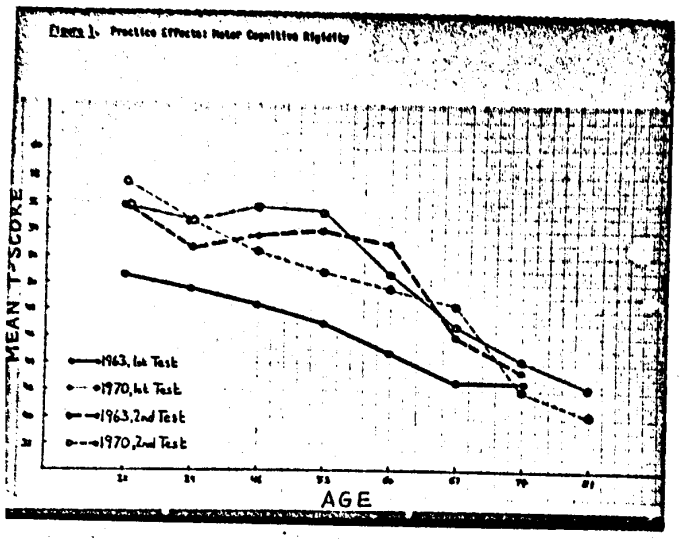
ignificant at or beyond the 5% level of confidence
Significant at or beyond the 1% level of confidence

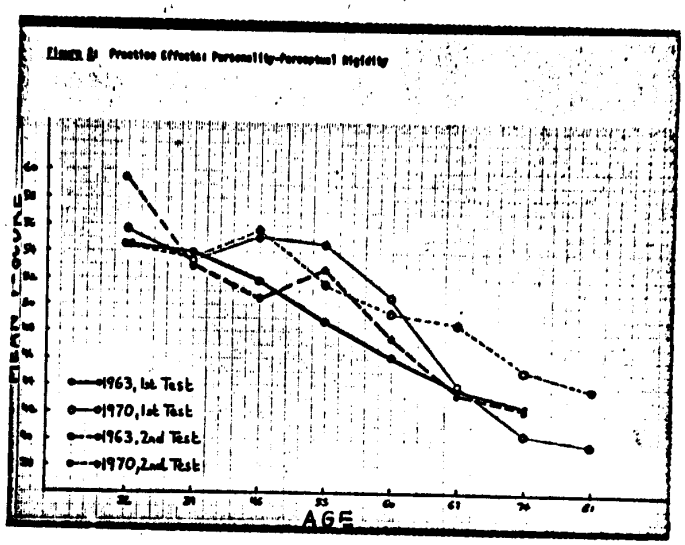
Table 5

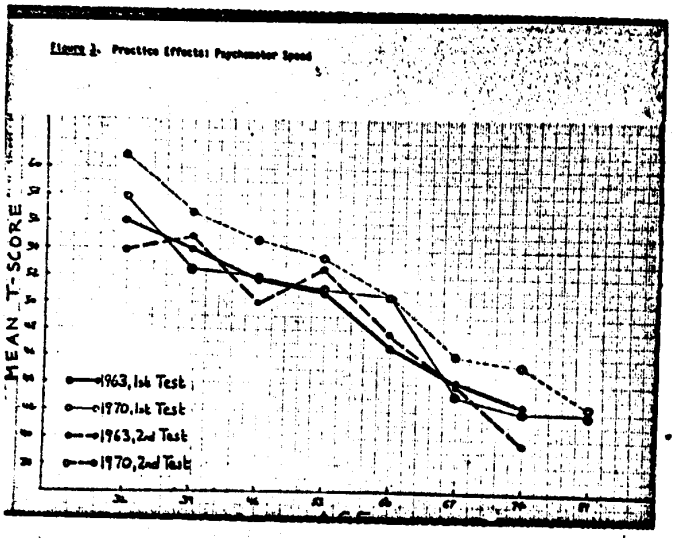
Cross-sectional ANOVA for Effects of Age-cohort Differences, Sex and Previous Testing Controlled for Experimental Mortality (F-ratios, df for error term = 646)

Source of variance	df	Motor-cognitive Rigidity	Personality-perceptual Rigidity	Psycho-motor Speed	Social Responsibility
Age-cohort levels	6	20.04**	21.44**	23.42**	2.16*
Sex	1	6.34*	..	36.96**	1.80
Prior Testing	1	4.37*	4.70*	3.24	3.82*
Age-cohort x Sex	6	..	..	..	..
Age-cohort x Prior Testing	6	2.65*	2.99**	3.10**	..
Sex x Prior Testing	1	1.61	..	..	3.17
Age-cohort x Sex x Prior Testing	6	1.15	..	1.69	1.21

*Significant at or beyond the 5% level of confidence
**Significant at or beyond the 1% level of confidence


MEAN T-SCORE
AGE
1963, 1st Test
1970, 1st Test
1963, 2nd Test
1970, 2nd Test


MEAN T-SCORE
AGE
1963, 1st Test
1970, 1st Test
1963, 2nd Test
1970, 2nd Test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1963, 1st Test
1970, 1st Test
1963, 2nd Test
1970, 2nd Test

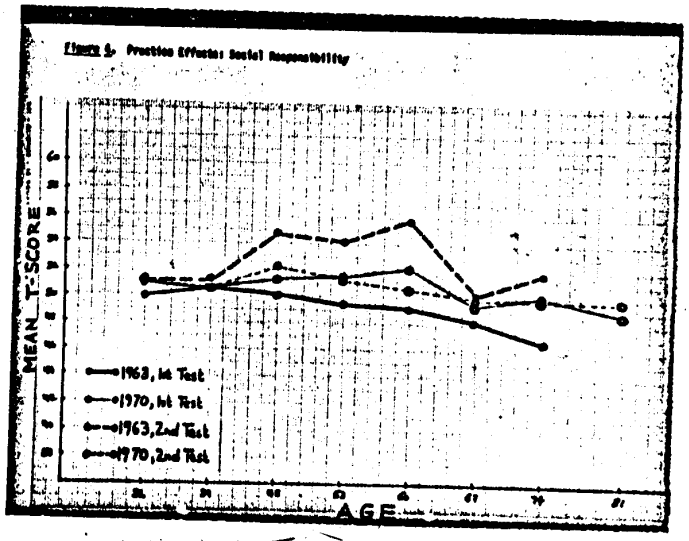
MEAN T-SCORE
AGE
1963, 1st Test
1970, 1st Test
1963, 2nd Test
1970, 2nd Test

Figure 5. Practice Effects Controlled for Experimental Mortality: Motor Cognitive Rigidity

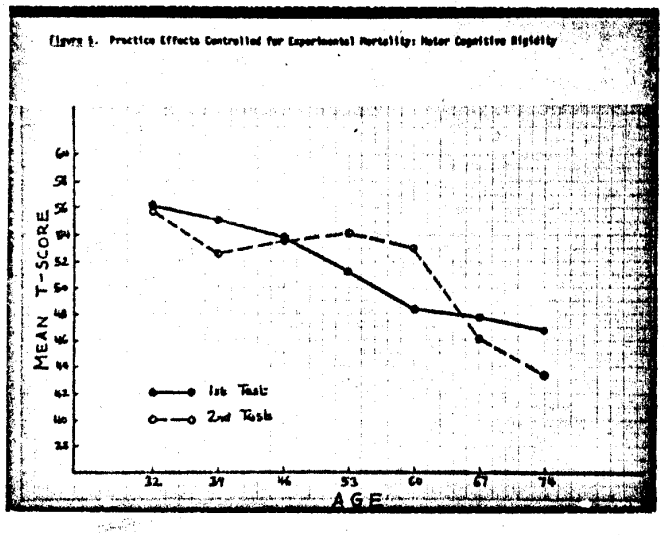

Figure 6. Practice Effects Controlled for Experimental Mortality: Personality-Perceptual Rigidity

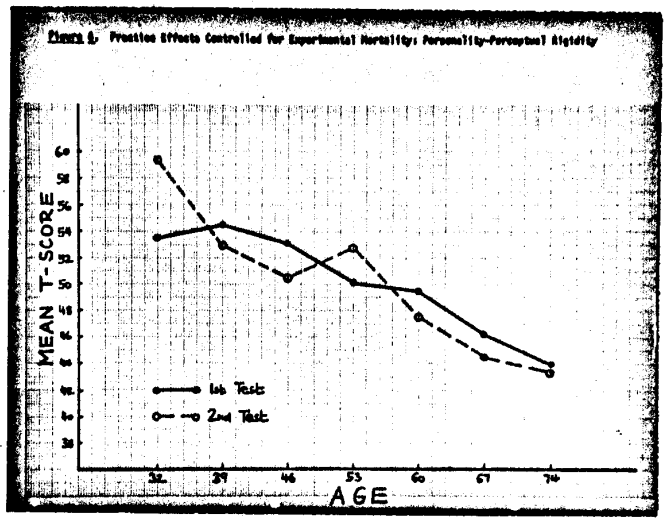

Figure 7. Practice Effects Controlled for Experimental Mortality: Psychomotor Speed

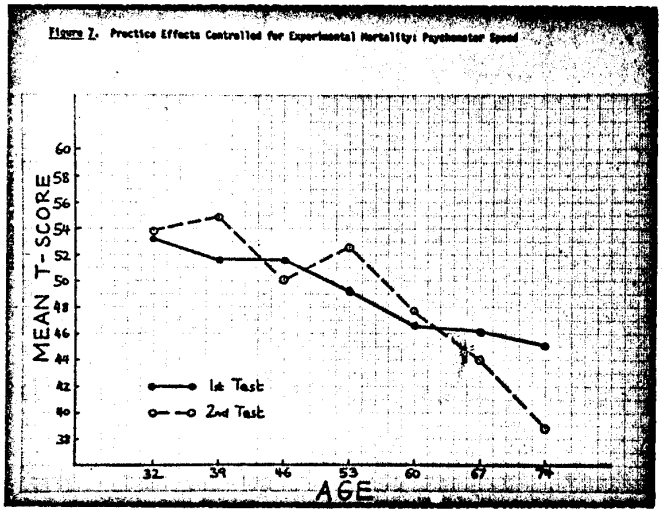

Figure 8. Practice Effects Controlled for Experimental Mortality: Social Responsibility