

# Translations in Gerontology— From Lab to Life

## *Intellectual Functioning*

K. WARNER SCHAIE *University of Southern California*<sup>1</sup>

Developmental psychologists often find themselves in a cross fire between their more traditionally oriented colleagues who distrust the need for the quasi-experiment, which must be one of the major thrusts for the developmentalist, and the clinician or other applied professionals who feel that the data provided by the scientist prove the obvious or are quite unintelligible. It is the purpose of this article to speak to this issue and to show that people like myself do perhaps have ways of combining the rigor of the scientific method with an address to problems that may indeed be of social consequence.

A substantial portion of this article will be concerned with the myth of intellectual decline. That is, I will try to spell out as simply as possible why the presumed universal decline in adult intelligence is at best a methodological artifact and at worst a popular misunderstanding of the relation between individual development and sociocultural change. Second, I will briefly examine some possible ways in which old adults may differ qualitatively in their approach to intellectual performance, paying attention mainly to motivational factors which may indeed interfere in the performance of old adults on intelligence tests as well as life tasks designed for young people. Third, I shall then examine certain social policy implications which follow from the very different reading of the data on intellectual functioning in adulthood and old age which I and my associates have found necessary (cf. also Baltes & Schaie, 1974; Schaie, 1973b).

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Requests for reprints should be sent to K. Warner Schaie, Gerontology Center, University of Southern California, University Park, Los Angeles, California 90007.

### *The Myth of Intellectual Decline*

It has long been the popular notion that old people may have much wisdom based on a long life, but that they should not really be allowed to apply that wisdom to any matter of consequence or be entrusted to perform important societal functions because it is assumed that they are no longer capable of sustained high-level intellectual performance. This view has been strongly supported by some of the early cross-sectional studies of intelligence (e.g., Jones & Conrad, 1933; Wechsler, 1939). These studies indeed showed that on comparable tasks, peaks of intellectual performance occurred in late adolescence, with consistent decrement thereafter.

This view was first challenged by some early longitudinal studies of adult intellectual performance (Bayley & Oden, 1955; Owens, 1953) that found maintenance of most intellectual functions at least into the early 50s. Some of this evidence was soon dismissed as being due to the use of highly selected samples or the hypothesis that age may be kinder to the more gifted who were examined in these studies. Nevertheless, it has now become incumbent to take a close look at the issue of the discrepancies between the results of cross-sectional and longitudinal findings, and much of my own work during the past decade has addressed itself to that particular issue (cf. Schaie, 1965, 1970, 1973c).

In order to understand the evidence on intellectual change in adulthood and to infer social implications we must address three issues: The first deals with the question of whether intellectual decrement is a general or specific phenomenon, the second is concerned with the differentiation of ontogenetic changes in function from differences in performance level between generations, and the

third is concerned with the issue of individual differences in intellectual development.

#### INTELLECTUAL DEVELOPMENT: GENERAL OR SPECIFIC

The early history of intelligence testing was greatly concerned with attempts to develop homogeneous indices that would maximally predict school performance, and later attempts to develop instruments more suitable for adults maintained the notion of the desirability of a single composite index of intellectual ability. But quite early factor analytic studies showed that there were indeed many different building blocks of intelligence (Guilford, 1967; Thurstone, 1941), and it did not seem unreasonable to assume that such differential abilities might follow different life courses. Such evidence was presented in cross-sectional as well as longitudinal studies (Owens, 1953; Schaie, Rosenthal, & Perlman, 1953). Schaie et al. found that older people did much more poorly on abilities such as spatial visualization and reasoning than was the case for tests of verbal meaning and word fluency.

Cattell (1963) pushed the argument a step further by proposing that there were certain crystallized abilities that were culturally overdetermined, and consequently once an asymptote was attained these abilities should not be subject to decrement, while fluid abilities being basically innate and biologically determined as a species characteristic should consequently also be subject to the decrement phenomena associated with the life rhythm of the species. Although the isomorphism with respect to the physiological base of the fluid abilities as opposed to the acculturated base of the crystallized abilities is currently under challenge (Arnold, 1973), there is evidence that would at least be compatible with Cattell's point of view requiring different developmental histories for different abilities (see Schaie, 1970). This evidence then suggests strongly that old people as a population subgroup perform better on certain abilities than on others. And this seems to be true for individuals as well, so that a single measure of intellectual ability may be particularly misleading for older individuals in describing their actual level of performance.

But the evidence from the cross-sectional studies showing that peaks of performance may occur at different ages for different abilities and that old

people do better on some tasks than on others does not directly address itself to the question whether or not there is indeed decrement in intellectual functioning. This question must now be considered.

#### COHORT DIFFERENCES VERSUS ONTOGENETIC DIFFERENCES IN INTELLECTUAL FUNCTIONING

More than 30 years ago Kuhlen (1940) alerted us to the problem that not only do people age but so do cultures, and that it is therefore possible that the perceived deficit of the old may be no more than obsolescence in the face of a rapidly changing sociocultural environment. Unfortunately, neither cross-sectional nor longitudinal studies can deal with this question directly. Cross-sectional studies compare members of different age groups at one point in time who are consequently also members of different birth cohorts who must have had differential experiences that may or may not have anything to do with age. It could therefore be argued that the differences found by such studies during periods of rapid technological change ought not be interpreted as age differences at all but rather as evidence for differences in performance level occurring as a function of membership in different generations. But longitudinal evidence does not by itself bring us any further. As I have previously documented (Schaie, 1972), in the behavioral sciences we are forced to accept the fact that environmental impact has profound importance on determining changes in behavior. Consequently any change in performance over time must confound whatever maturational changes are occurring with those events attributable to the unique environmental impact occurring over a given period of historical time which may equally affect individuals at all ages. Results of a single-cohort longitudinal study may therefore be parsimoniously interpreted as being relevant to the chronicling of change occurring at a particular period in time, but not necessarily as reflecting ontogenetic change.

The way out of this dilemma is, of course, the adoption of sequential methods of data collection and analysis (Schaie, 1965, 1973c). Two approaches are needed: The first requires the replication of cross-sectional studies over several points in time. The second involves the carrying of several cohorts over the age ranges of interest. In our own work we have now done both and the

results are indeed revealing. They show with great clarity that a much larger proportion of the variance associated with age can be attributed to generation differences than to ontogenetic change and that both peak levels and slopes of change in ability are changing in a positive direction. In other words, there is strong evidence that much of the difference in performance on intellectual abilities between young and old is *not* due to decline in ability on the part of the old, but due to higher performance levels in successive generations. Some decrement, particularly on tasks involving motor speed, remains to be accounted for, but its onset does not seem to occur until the 60s, and large individual differences remain (Baltes & Labouvie, 1973; Schaie & Strother, 1968b; Schaie, Labouvie, & Buech, 1973; Schaie & Labouvie-Vief, 1974).

We have concluded then that the overall group data require us to consider most of the intellectual decline in the healthy old to be a myth. Nevertheless, we must consider that for given individuals there may indeed be significant decrement with age, but alternatively that there might be growth until very old age.

Two lines of argument should be pursued here. The first is concerned with the evidence that there may indeed be significant decrement in intellectual function for every or most individuals as a precursor to their physical demise. That is, changes in psychological function may occur concomitantly or even ahead of the final period of life. Evidence along this line has been presented by Riegel and others (Reimanis & Green, 1971; Riegel & Riegel, 1972; Riegel, Riegel, & Meyer, 1967).

The second approach to the matter of individual differences comes from a careful analysis of individual life patterns. Such analyses show that at each age-cohort level there are some individuals who (at least over a 14-year period of time) gain and others who lose, while many remain stable (Schaie, 1973a). Moreover, analyses of current life-styles and retrospective history of the very old, as well as the analyses of homogeneous groups of the highly successful elderly, reveal vast differences in the degree to which differences in performance are maintained in the later years of life (cf. Reichard, Livson, & Peterson, 1962; Schaie & Strother, 1968a). In sum, the old are no more homogeneous a group than the young, and aging is no kinder to the able than to those at a low level of functioning (Baltes, Nesselroade, Schaie, & Labouvie, 1972). We may suspect that knowing

more about the microenvironment in which individuals live will give us a better handle on these differences, but work in this area has only begun.

*Motivational Factors in the Intellectual Functioning of Old Adults*

No matter what interpretation is placed on the comparison of old and young on tests of intelligence it is readily accepted that most of the devices used were constructed for the assessment of young people and that the experience of the old in dealing with the task situation may be quite different, while no doubt the motivational factors operating have altered. These issues will now be attended to.

CAUTIOUSNESS AND RISK-TAKING BEHAVIOR

It has been observed that old people are consistently more cautious than the young. This has been effectively demonstrated by Wallach and Kogan (1961), who used 12 different life situations, and replicated by Botwinick (1966a), who adapted the task especially appropriate for aged subjects. Interestingly enough, older people tended to avoid taking any course of action if this was a permissible alternative. But when risk taking was required it was noted that old people were not more cautious than the young (Botwinick, 1966b). How does this cautiousness apply to behavior on tasks of intellectual ability? Birkhill and Schaie (in press) administered the Primary Mental Abilities Test to a group of elderly subjects under high- and low-risk conditions, each condition further under a choice or no-choice set of instructions. A highly significant Choice  $\times$  Risk interaction was found. That is, there was no difference in performance under the no-choice instruction, but under the choice instruction subjects performed significantly better under low-risk conditions. We may suspect, then, that at least some older people do less well when they are afraid that involvement in a task involves unreasonable risk of loss or embarrassment, but that careful control of instructional set may well induce the older person to consider alternatives he might otherwise eschew.

COHORT-APPROPRIATE ASSESSMENT TECHNIQUES

Although the Wechsler-Bellevue was one test especially constructed to counter the objection to the Stanford-Binet that it was not age appropriate, little has been done to continue the search of ma-

materials that might be appropriate to the careful definition of intelligence for adults and particularly the aged. The problem here is that once again we are confusing the contribution of ontogenetic and sociocultural change to the study of age differences. In other words, a test is not inappropriate for old people because it was constructed for young adults, but rather because it was constructed for the members of a different cohort with different sociocultural exposure. Paradoxically, I suspect, the original Wechsler-Bellevue would likely now discriminate against young adults. And R. F. Monge and his associates (personal communication, 1971) have shown that it is quite possible to construct tests<sup>2</sup> at will which favor the members of earlier cohorts (also see Demming & Pressey, 1957). I am suggesting then that our findings on cohort differences call for the development of more cohort-appropriate assessment devices, carefully linked by comparative factor analysis (Nesselrode, 1970), before the conventional young-old comparisons so popular in the gerontological literature can become truly meaningful. Along these lines, we may further question whether or not the kind of techniques that appeal to young children simply on the basis of curiosity or competence motivation can have similar appeal to adults. Yet there must be many life situations that are saturated with the factors relevant to the construct of intelligence which offer rich promise to future investigators.

#### *Implications for Social Policy*

I have previously argued that there may well be a conspiracy on the part of the middle aged to remove the old from active participation in society. I suggested (Schaie, 1973d) that it is quite true that in a primitive society cumulative trauma will lead to loss of energy level and functions with increasing age, such that old age and increasing pathology, and therefore deficits, are virtually synonymous. But this relationship has in the main been broken, and we can assume that in our present highly automated society, age differences in intellectual performance, while statistically significant, may in absolute magnitude be so small as to have virtually no social consequence.

We are now ready to deduce public policy implications from what we now know about the in-

tellectual functioning of the aged. In the light of what we have said thus far it is reasonable to conclude: (a) that much of the presumed intellectual decline of the old is a myth, (b) that there are indeed age differences in intellectual performance due to different educational exposure and unequal access to life support systems required to remain at an asymptotic level, (c) that the level of intellectual functioning of those of us who will become old will be higher than that of those who are old now, and (d) that manipulation of motivational factors related to intellectual performance in the aged is feasible.

The most directly discernible consequences of this proposition seem to me to be found in the areas of adult education, the issue of variable retirement, and the question of age segregation.

#### ADULT EDUCATION

The evidence on intellectual performance in old age clearly suggests that people can and do function at a high level throughout life, and thus can be expected to continue the educational process into very old age. However, contrary to past practice, it is not good enough to think of "retirement skill," hobbies, and the like in planning adult education for the middle aged and aged. A consequence of our finding of significant differences in levels of functioning between generations would be the development of specific educational programs designed to reverse the cultural and technological obsolescence of the aged. I would argue that it might be highly desirable to have "Head Start" types of cultural exposure programs for today's elderly to permit them to share more adequately in our present society. Upgrading job skills for the middle aged and second- and third-career education at many life stages should be in high demand if introduced in a meaningful manner.

But this may be the crux of the matter. What we have said about the problem of cohort-appropriateness of measures of intelligence applies equally to adult education in general. We must carefully define what sociocultural skills have been missed by today's aged, and we must structure materials and instructions in ways that are appropriate for the old. For example, since we know that the old will avoid risky situations given a choice, it might well be that we have to introduce some compulsory education requirements for adults also, or alternately to set up adequate reward con-

<sup>2</sup> Unpublished experimental tests from the Syracuse adult development study.

tingencies for voluntary participation. We must furthermore adapt current technology of information acquisition to the special problems of the old. That is, we must recognize that there is a high frequency of sensory problems in old people. Thus, special materials using large type faces, learning programs having more redundancy, and computer-aided instructional devices specially programmed for the slower response of the aged may all be needed.

#### VARIABLE RETIREMENT

The data about stability of intellectual performance until shortly before death certainly argue for a reexamination of mandatory retirement policies. I would like to repeat my argument here (Schaie, 1973d) that age is a totally inappropriate criterion for determining whether or not performance is adequate for a given vocational skill. But we do have enough information on age differences for various skills and their relation to occupational requirements to develop formal techniques for appraising whether or not retirement is desirable or mandatory. Such procedures have been used successfully for years in determining fitness for persons in critical occupations such as pilots. I believe that any support for a rationale that mandated retirement by chronological age because the latter was a useful predictor of the criterion of intellectual lack of competence must now be laid to rest. In fact, if we had to select a chronologically meaningful retirement age (say, using the same criteria that might have led to age 65 when the social security laws were first written), it would now have to be at least a decade later than would have made sense 20 years ago.

Even more important are the data on vast individual differences in individual patterns of development. Thus, individuals who are still engaged in intellectual growth, no matter at what age, are not ready to retire from active involvement with the work of the world, while those who are on the downgrade early in life should not be required to contribute what they no longer can provide.

#### AGE SEGREGATION

The evidence on the preponderance of generational variables in age differences might superficially suggest that segregation of different cohorts in their

own communities might relieve intergenerational conflicts and might permit the provision of simplified environments for the aged individuals who early in life had been able to cope well when the environment they were required to deal with did not meet the complexity currently encountered. It is, of course, desirable to reduce the complexity of the environment for all of us and to build life support systems, but the aim here should be to build complex support systems to permit well-differentiated patterns of behavior, rather than reduce the stimulation provided by the environment. It is not unreasonable to predict that more detailed analyses of an individual's microenvironments will show that maintenance of cognitive function is significantly affected by the complexity of the world we live in.

Indeed it may be argued that the difficulties encountered by the aged due to progressive cultural obsolescence can best be countered not by greater age segregation but by intervention early in life to reduce age segregation. That is, we need to rebuild our communities in ways that permit greater contact between the generations. We need to provide other than child-centered recreational and entertainment facilities. We must break the generational gaps by permitting opportunities for children and old people to interact without demanding a return to the extended family structure. Old people (and people of any given life stage) stick together not necessarily because they have common needs and concerns, but because they have had common previous life experiences not shared by others. But this fact is indeed a consequence of age segregation, rather than the justification for it.

#### Conclusion

We have suggested that the major finding produced in the gerontology laboratory in the area of intellectual functioning is the demolishing of the myth of serious intellectual decrement in the aged. Related to this were issues regarding risk-taking behavior and intellectual performance and the appropriateness of assessment devices in cross-cohort comparisons. From these findings we suggested that there are policy implications for many areas but specifically for revisions of thinking in the programming of adult education, as evidence for the desirability of variable retirement policies

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and as evidence against the desirability of age segregation.

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