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AGE RELATED CHANGE AND THE INDIVIDUAL

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Social scientists are increasingly examining issues related to the aging of individuals and the aging of society. Ageism, the "process of systematic stereotyping of and discrimination against people because they are old,"¹ has long been recognized by social scientists as a destructive force for society and the individual. Under the mandate of the Age Discrimination Act of 1975, as amended,² the courts and the legal profession will increasingly be asked to judge whether or not a person has been discriminated against on the basis of age in the delivery of services and benefits supported by federal funds. Consequently, behavioral scientists are now being asked by the legal community about the characteristics of individuals in relation to age. These scientists are being put in the precarious position of having to provide definitive answers for legal purposes when, in their research, they have not dealt with certainties but with probabilities.

The use of age as a predictor or index of a given behavior or characteristic is highly complicated. Age can be a quick and inexpensive index to a likely characteristic of an individual because more facts about people are related to age than to any other single variable. At the same time, the young and the old are extremely heterogeneous groups, and because this is so, the use of age as an index has severe limitations. To judge a person solely on the basis of age will ultimately put to risk the capabilities and individuality of each human being. Therefore, it is important to understand both the advantages and disadvantages of utilizing age as an index.

A rather simplistic example of the problem is the establishment of a minimum drinking age. Society demands that persons should not be allowed to drink alcoholic beverages until they are physically and emotionally mature enough to handle alcohol. Accordingly, specific ages

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1. R. BUTLER, WHY SURVIVE? BEING OLD IN AMERICA 12 (1975).
2. 42 U.S.C. §§ 6101-6107 (1976 & Supp. III 1979).

are set which imply that an individual is mature enough to drink. Yet, it is common knowledge that persons at any age may have serious difficulties with drinking. Some individuals can be responsible and drink alcohol without psychological damage at age 17, while other individuals over 30 cannot do so. Thus, age is not always an accurate predictor in this situation.

There are two concerns in this example: damage to the individual and damage to society. The latter concern involves highly complex social issues. For example, individuals much older than the usual age of university students are increasingly applying for admission to graduate schools. Currently in Sweden, the oldest medical school student is 67, having been admitted to the school at age 65. Similarly, a 77-year-old man recently applied to a major university in the United States to work toward a Ph.D. on the psychology of aging. In order to eliminate age and other biases in admission decisions, some universities are beginning to use lotteries to make selections once applicants have met certain minimum standards. The first question to arise in considering this issue may be whether an older individual is capable of withstanding the rigors of professional school according to what is known about older persons in general. The psychophysical characteristics of aging individuals then enter into the discussion, with special attention focused on competencies exhibited at particular ages. In this example, a second question will undoubtedly arise: "Should society's resources be used only for those age groups that will provide society with the greatest return on its investment?" Society will inevitably be forced to respond to such complex issues now that it has been determined that age discrimination is unlawful.

SOCIAL ISSUES ASSOCIATED WITH THE USE OF AGE AS AN INDEX

It is apparent that while age is a convenient and powerful index, it also discounts individual differences and therefore may be a dangerous criterion for judging individual merit. Discrimination on the basis of age limits the opportunities and privileges of an individual, preventing him from developing his full potential and barring him from full and equal participation in society. In this connection, Gordon Streib has said about the elderly, "True, many aged persons possess distinctive physical characteristics. But even here there is a broad spectrum, and these 'stigmata' do not normally justify differential and discriminatory treatment by others."³

3. Streib, *Are the Aged a Minority Group?*, in *APPLIED SOCIOLOGY* 311, 323-24 (1965).

The personal risk to the individual when age is utilized as an index is clear. But in what way, if any, is society affected by using age as a predictor? Popular consensus suggests that society suffers as much or more than the individual when a policy of "age indexing" is maintained. In her book *Children's Rights and the Wheel of Life*, Elise Boulding comments that age seems to be the primary sorting device for the first and last parts of the life-span.⁴ This process, in turn, creates the social attitude towards childhood and old age that persons in these age categories have nothing of importance to contribute to society. Arguing against the continuation of these attitudes, Boulding says nations cannot afford to exclude their young and their old from active partnership:

As the world moves toward population equilibrium with declining resources, an aging society will need the fuller participation and wisdom of its elders, as well as the awareness, inventiveness, and energy of its young.

. . . .

In terms of the ideal of a heterostatic society engaged in a continuous process of complex balancing of human capacities, needs and resources, . . . the rigidities of age sorting are clearly counterproductive.

. . . .

Most important, the rediscovery of the wise elder and the child opens up the possibility of drawing on a wider range of human experience for social problem solving.⁵

Boulding advocates that society rethink the use of age in establishing social categories lest it use classificatory concepts that destroy the personhood of human beings and limit its own potential for growth.⁶

While the continued reliance on age as an index may be costly to society because of the loss of capable resources, there might be comparable losses if age were not used. If those social institutions which now use age as a basis for determining the delivery of services or benefits were to forego the use of age and were to seek new variables on which to base their decisions, it would entail drastic institutional adaptations which could prove costly in terms of both time and money.

A study by the United States Commission on Civil Rights of age discrimination in ten federal agencies and programs concluded that such discrimination was widespread in those agencies and programs. As part of the study, the Commission also attempted to seek out all of

4. E. BOULDING, *CHILDREN'S RIGHTS AND THE WHEEL OF LIFE* 104 (1979).

5. *Id.* at 133, 136-37.

6. *Id.* at 138.

the justifications offered for age discrimination. The five justifications most frequently offered were listed by the Commission as follows:

- *“Resources are too limited to meet the needs of all persons.”*
- *“The cost, the benefit to society, or the probability of success of serving persons of different ages allegedly differs, and therefore resources should be focused on those age groups that will provide society with the greatest return on its investment.”*
- *“Persons in certain age groups should be denied access to services designed to enhance employment opportunities because these opportunities are more limited for persons of these age groups than for persons of other age groups.”*
- *“Participation of persons in a certain age group in a program for all age groups should be restricted if an age categorical program exists to serve persons of that age group.”*
- *“Administrators when confronted with limited resources should be permitted, in the interests of the most effective use of resources, to restrict services to specific age groups to the exclusion or limited participation of other age groups.”⁷*

The Commission found each of these justifications to be unacceptable.⁸ While the Commission easily denounced these attitudes, troublesome questions persist. For instance, which person is to be admitted to medical school when the choice is between two equally qualified individuals, one age 21 and the other age 65? Common sense dictates that the 21-year-old should be admitted because he will probably have a longer career and there will be a greater return to society. Is this age discrimination? Clearly, there is an issue here of career length compared with career productivity, an issue which may not be easily resolved.

The development and the ultimate feasibility of indices other than age create other problems. Many societal programs and services would need to resort to more costly data and measurements. For instance, age is currently used as the index for determining when a child enters school. Although all children are not intellectually, psychologically, or socially prepared to enter school at age five, the use of age is extremely convenient and serves adequately for the great majority of youngsters. What if society decided that this method of determining entrance to school was not precise enough? A system of assessing the performance and skills of each child could undoubtedly be instituted, but it would

7. U.S. COMM'N ON CIVIL RIGHTS, THE AGE DISCRIMINATION STUDY (PART I) 79-81 (1977).

8. *Id.* at 78.

be mind-boggling in terms of the time and the numbers of professionals it would require. The cost to society would be tremendous, then, if school readiness rather than age were to be the criterion for admission.

Although such an example may appear far-fetched, comparable situations do exist. For instance, the study by the Commission on Civil Rights detailed the existence of age discrimination in programs providing employment training services with funding obtained under the Comprehensive Employment and Training Act (CETA). In fiscal 1976, the population 55 years of age and over represented 8.9% of the unemployed population, but made up only 2.7% of CETA enrollees. At the same time, the population under 19 years of age represented 17.1% of the unemployed but made up 35% of the CETA enrollees.⁹ If, as the Commission recommended, age were not used to choose CETA enrollees, what could be used as entrance criteria? An assessment of the learning skills, degrees of motivation, or personality aspects of all applicants? Again, the costs in time and money would be enormous.

No one wants to deny services or benefits to an individual simply because of his age. One can appreciate the need to protect both the individual's right to work and the employer's right to avail himself of the skills of the individual. However, to abandon the use of age would have far-reaching implications for society's resources, its personnel pool, and its concepts of fairness.

One final social issue deserves mention—the concept of veteranship. Very simply, such a policy would give bonus points to the older individual who is competing for a particular service or program, so that he would have an immediate advantage because of age. Veteranship represents one response to societal discrimination against older persons. But what types of reactions would this policy provoke from younger generations? Would veteranship be a form of reverse discrimination?

AGING AND THE INDIVIDUAL

The following discussion will first address age as a variable in behavioral science research, indicating why the use of age in legislative and judicial decision-making creates discomfort among social scientists who see age as a complex concept. Attention will then be directed to what is known about age-related changes in various human characteristics.

9. *Id.* at 15.

Age As a Variable in the Behavioral Sciences

Age, most simply defined, is the length of time an individual has lived. Aging refers to the processes of change in the functions and structures of living organisms as they move forward in time. While age is often used as a quick index to outcomes of aging, age and aging are not the same thing. In everyday life, age stands for the results of aging and is a quick index to the likely characteristics of an individual for someone of his age.

The behavioral scientist uses age as a quick way of grouping information. In research studies, persons are usually divided into age groups for analysis of data because, as already mentioned, one can predict more facts about individuals by knowing their age than from any other single variable. It should be noted, however, that age does not explain anything in the sense of pointing to the underlying processes of aging. For instance, because the probability of dying is related to age, one can use age as an index to the probability of dying. This use of age is very important in the insurance industry, but age does not give any clues as to the determinant process whereby the probability of dying increases with the passage of life time. Furthermore, of course, one can improve the prediction of the probability of dying by adding factors other than age, such as the individual's health status.

Individual Differences

Just as there are individual differences in the time of dying, there are individual differences in all known human capacities and the way they change with the passage of time. The measurement of a human trait results in a distribution of individual values which follows a bell shaped curve; that is, some persons fall at each extreme of the distribution, but most persons fall near the middle. This gives rise to the concept of the average man around whom extremes are distributed. If one separates from a total population distribution the distribution of persons of a given age group, one narrows the range of observed individual differences in the smaller group.

To the natural distribution of individual differences, one should also add the effects of error of measurement. The behavioral scientist takes it for granted that the measured value is probably not the "true" value, but one that falls within some range of a hypothetical "true" value. This is an important notion to the behavioral scientist who is reluctant to make a flat statement, for example, that a particular individual is or is not competent. He could first state that a given individ-

ual is relatively competent compared to his peers. He can then state that the individual is *probably* competent within varying degrees of error of measurement. The translation of the probabilistic training of the behavioral scientist into the categorical position often required by the law is, therefore, a process that often makes the behavioral scientist uncomfortable.

Multiple Definitions of Age and Aging

The biological sciences for the most part regard aging as a progressive limitation on the organism. For example, Handler defined aging as "the deterioration of a mature organism resulting from time-dependent, essentially irreversible changes intrinsic to all members of a species such that, with the passage of time, they become increasingly unable to cope with the stresses of the environment, thereby increasing the probability of death."¹⁰ There are two important elements in this definition. The first points to a progressive deterioration in the organism; the other to the concept of the increasing probability of death. In a similar way, Comfort defined senescence as "a change in the behavior of the organism with age which leads to a decreased power of survival and adjustment."¹¹

These two definitions of aging do not allow for the expanding competence of the individual with age, but deal only with decremental changes which occur over the life span. Birren and Renner use a broader definition: "Aging refers to the regular changes that occur in mature genetically representative organisms living under representative environmental conditions as they advance in chronological age."¹² This definition provides for the fact that there can be incremental changes in capacities with age as well as decremental changes.

It is useful to describe three different definitions of the age of an individual. *Biological age* is the individual's present position with respect to his potential lifespan. A person with a young biological age has a long life expectancy when compared to the average for the species. Presumably, by measuring performance levels of various vital organ systems, one may derive a measurement of biological age. This would lead to a determination of whether the particular individual is older or younger biologically than other persons of the same chronological age.

10. Handler, *Radiation and Aging*, in AGING 199, 200 (N. Shock ed. 1960).

11. A. COMFORT, THE BIOLOGY OF SENESCENCE 190 (1956).

12. Birren & Renner, *Research on the Psychology of Aging: Principles and Experimentation*, in HANDBOOK OF THE PSYCHOLOGY OF AGING 3, 4 (1977).

In a parallel way, *psychological age* can be used to refer to the capacity for adaptation to environmental change. An individual's psychological age is his status in comparison with the average capacities of persons of the same chronological age. Clearly, psychological age is influenced by, although not fully determined by, the health of the organism, particularly the brain and the cardiovascular system.

Another age that may be ascribed to individuals is *social age*, which refers to roles and social habits. Compared with the expectations of the society, does an individual behave typically younger or older than one would expect of a person of his chronological age?

The organism can age in different ways at the same time. Rather than thinking of one single process of change over time, it is useful to envision three separate processes. One is the process of *senescing*, whereby the probability of dying increases with age. The second is *geronting*, which consists of changes in the individual's capacity to adapt to environmental demands. The third, *eldering*, consists of progressive changes in roles and social habits. If the biological, psychological, and social processes of aging were completely interdependent, one would never see a sick elderly person who is wise. But common observation is to the contrary. There are individuals who age in an accelerated manner biologically but who are spared intellectually. Conversely, there are others who deteriorate intellectually but whose bodies are in excellent condition and who may survive a long time even though they have little awareness of their environment.

Research suggests that different dimensions change with time at different rates. Reichenbach and Mathers point out that, in a large and complex system, time direction can be different for its sub-systems.¹³ For an individual there may be a sub-system which is growing older at the same time that another sub-system is growing younger. This suggests that while the individual may have an overall or average biological age, the various vital organs may each have their own biological age.

The failure of a critical vital organ can limit the survival of the whole organism even though some organs may be relatively young at the time of death. Thus, knowing the biological age of a sub-system or organ system of the body does not necessarily permit a valid prediction of the organism's survival. In sum, these authors view aging as a process of the individual organism moving forward in time with many si-

13. Reichenbach & Mathers, *The Place of Time and Aging in the Natural Sciences and Scientific Philosophy*, in *HANDBOOK OF AGING AND THE INDIVIDUAL* 43, 76-80 (J. Birren ed. 1959).

multaneous, but independent processes going on. The search for contingencies among the probabilities of events that occur with increasing age is the issue in organizing information about aging. Within the limits of present knowledge there appears to be no single factor governing the rate of human aging and this makes for diversity and individual patterns of aging.

To repeat an earlier point, this circumstance results in the fact that some behaviors may improve with age and the individual may become more competent while at the same time, because of biological processes which usually degrade with age, the same individual may become more vulnerable to dying.

Disease and Age

In addition to being aware of individual differences in measured characteristics, there is also an important distinction to be made between disease-related and age-related phenomena. If one takes a measured behavioral characteristic such as memory or learning ability and applies an experimental measure to a given sample of persons, say a sample aged 65, one will obtain a broad distribution of values. If one then separates from that sample the individuals with diagnoseable cardiovascular disease and cerebral vascular disease, one will find that the distribution is narrowed. Usually in such circumstances, the distribution of 65-year-olds who are free from diagnoseable serious disease is more parallel to the distribution of 25-year-olds than to the distribution of 65-year-olds who have the disease. In other words, the measured characteristics are more influenced by their association with disease than they are by the other variables involved in aging.

THE RELATIONSHIP OF COMPETENCY TO AGE

Competency refers here to the capacity for adapting or meeting environmental demands. To be competent means one is able to survive and be effective in a particular environment. A global trait of competence, of course, must be broken down into component elements. One necessity for competence is a vital brain well supplied with blood flow and nutrients.

Aging of the Nervous System

Among the various organ systems of the body, the one of predominant importance in relation to behavior and in relation to competence is the nervous system. The neurons which compose the functioning

units of the nervous system are relatively fixed in number at birth or shortly thereafter; with time they lose their capacity for further cell division. The nervous system is not only essential in regulating the vital processes of the body, it is also concerned with the processing of information in dealing with such matters as symbols and reasoning. Ultimately, the quality of life is limited by the integrity of the aging nervous system.

Among various brain functions that change with age, the electrical activity of the brain is one that has long been studied by psychologists. The measurements of the electroencephalogram show that there is a basic frequency of brain waves in the range of 8 to 13 Hertz per second. With age, there tends to be a drift toward slower alpha frequencies and lower amplitudes. It is likely that some of the larger changes in the alpha frequency accompany such phenomena as reduced blood flow to the brain, due particularly to arteriosclerosis. But even in relatively healthy older adults, one sees a small tendency toward a slowing of the dominant brain frequency. Differences between healthy young and healthy older adults and differences between healthy persons and those with a suspected intellectual deterioration have shown both age-related and disease-related phenomena, with disease-related phenomena being more significant than the age-related.¹⁴

This research on electrical activity of the brain illustrates a more general principle of importance in the study of aging, and one that may have important implications for the legal profession as well: namely, that changes which have often been regarded as normal processes of aging are instead processes of disease. This may be the case, for example, with regard to senile dementia, where the view is now emerging that senility is not a normal accompaniment of aging, even among those persons who live to the most advanced ages, but is a disease that manifests itself only in certain older persons.

Physical Performance

One of the issues in the measurement of component intellectual and physical capacities is their relationship to the performance of a particular individual in a particular environmental setting. The aspects of physical performance may be conveniently divided into four categories: strength, endurance, speed, and agility or flexibility. If one samples such characteristics in a population of individuals of different ages,

14. Straumanis, Shagass & Schwartz, *Visually Evoked Cerebral Response Changes Associated with Chronic Syndromes and Aging*, 20 J. GERONTOLOGY 498, 499 (1965).

one finds that the performance of older adults is usually lower than the performances of younger adults. Subtracting from the sample those individuals with diagnoseable disease, the average values tend to be significantly better.

All other things being equal, the older person shows less agility in movement than a younger person due to lack of flexibility in the limbs. Some part of this may be the result of disuse. One research project examining age differences in finger movement flexibility found that, with exercise, older adults improve at the same rate as young adults. Thus, along with the contribution of disease to age-related measurements, there is the contribution of disuse. On the average, a less active person has less physical flexibility in any real life situation than does a more active person.

The speed of performance, whether it has to do with the maximum speed of running or the speed of single movements, seems to be slower with advancing age.¹⁵ Experimental studies of animals indicate that speed of movement is not significantly altered by practice. In contrast, endurance or the reaction to fatigue is improved with practice in old animals.¹⁶

Physical strength also seems to be in part a function of disuse. Indeed, there is data suggesting that the largest amount of reduction in strength with age is in the muscles of the back, whereas strength is most retained in the muscles of the hands. One can see in this the results of living in a sedentary environment in which the back muscles are used less than the hands.

Strategies of Compensation

Conceivably, one might combine a group of measurements of agility, speed, endurance, and strength, then attempt to predict what an individual would do in a real life situation, and then study the differences related to age. This is not so simple, however, because of the fact that older adults may adopt work methods or mental strategies which obviate their physical limitations. Thus, the individual with a limitation in speed will tend to manage appropriately those aspects of his tasks where speed is a particular priority, perhaps by avoiding them. The concept is that the active older person still manages to avoid plac-

15. Birren, Woods & Williams, *Behavioral Slowing with Age: Causes, Organization, and Consequences*, in *AGING IN THE 1980s* 293, 305 (L. Poon ed. 1980).

16. Kay & Birren, *Swimming Speed of the Albino Rat: II Fatigue, Practice, and Drug Effects on Age and Sex Differences*, 13 *J. GERONTOLOGY* 378, 385 (1958).

ing stress or an overload on his capacities. It is no surprise that older persons are usually less embarrassed by a task requiring strength of performance than by a task requiring speed of performance.

Adults may compensate for limitations and losses by appropriate strategies or work methods. In observations of pedestrians crossing a busy street intersection, it has been found that some older adults cannot cross the street in the time allowed by the traffic signals because they cannot quickly handle all the tasks involved: scanning the oncoming traffic, noting the changing of the lights, stepping down from a curb without falling or tripping, and then initiating the crossing. An older adult may simplify the task by attaching himself to a bystander and cross the street as a convoy, often without the awareness of the guide. This is clearly a strategy which obviates his speed limitation.

Another way that older individuals may compensate for their limitations is by concentrating attention on crucial aspects of a task. Younger persons may often need to process more information than older adults because they do not have the experience to look for the crucial elements. Older workers often maintain their output by changing their approach to the work task in this manner.

The difficulty of predicting competence in a real life situation arises in other ways. For example, surveys indicate that in England most older individuals with diagnoseable organic brain disease live in their own homes, where presumably they have become practiced in managing themselves in a familiar environment.¹⁷ These older individuals with significant amounts of brain damage might not be able to handle new situations, but they apparently have the residual competencies to reside in their normal residences.

The long term strategies that individuals develop to meet daily life circumstances are most difficult to describe, let alone to assess. The important point is, however, that one does not easily predict from the measurements of separate abilities or task components what an individual will do in a real life situation. The *geronting* individual is one who can in actuality not only adapt to his own limitations but also adapt to the environment in such a way as to avoid a particular limitation. Work methods and strategies that result from experience may so adequately compensate for the limitations in component abilities that the effectiveness of the individual in his customary environment is greater

17. See Kay & Bergmann, *Epidemiology of Mental Disorders Among the Aged in the Community*, in HANDBOOK OF MENTAL HEALTH AND AGING 34, 43-44 (1980).

than it was in his earlier years. This is perhaps most clear in the area of intellectual behavior.

Intelligence

It is often found that older adults perform poorly on the types of intelligence tests typically given to children or young adults. Recent investigations have shown, however, that many aspects of verbal intelligence, including vocabulary size and verbal comprehension, may continue to increase after the age of 65, or if not increase, at least show no decrement.¹⁸

Slowness in intellectual performance tests has been observed even in older subjects who have been selected for their high education and good health. Schaie and Strother studied a group of superior men and women who were retired university faculty members or professional workers. The most common physical findings were problems of vision and hearing which appeared in almost 90% of the group, and cardiovascular problems which appeared in about 20%. On tests of primary mental ability the group performed at about the level of a 17-year-old population. However, the group showed decreased psychomotor speed, where they performed well below the level expected of middle-aged people. The study also suggested that some of the components of intellectual performance are modified by the amount of social interaction the individual has in the course of his daily life.¹⁹ It is therefore necessary to qualify any inference that an older person's score is low as a result of a physiological loss. It may be low also because of disease or disuse.

Information Processing

The issue of speed in processing information has been well explored in experimental laboratory studies. For instance, there are studies showing that, in experimental settings, older persons take longer than younger persons to discriminate between relevant and irrelevant items of information, and that they seem to process information in smaller units.²⁰

One is again faced with the problem of how the measurement of

18. Botwinick, *Intellectual Abilities*, in HANDBOOK OF THE PSYCHOLOGY OF AGING 580, 590-91 (1977).

19. Schaie & Strother, *A Cross-Sequential Study of Age Changes in Cognitive Behavior*, 70 PSYCH. BULL. 671, 673-79 (1968).

20. See, e.g., Rabbitt, *An Age-decrement in the Ability to Ignore Irrelevant Information*, 20 J. GERONTOLOGY 233, 237 (1965).

an isolated factor of performance relates to performance in the context of real life. That is, if older subjects are, say, more distracted by irrelevant information or if they must sample information from the environment in smaller units, it is also possible that because of past experience they can generalize successfully from smaller amounts of information. As mentioned before, work methods that grow with experience can result in quicker recognition of what is relevant.

One form of compensation for diminished capacities may be that information is "batched" or made accessible by "concepts." This can be illustrated by analogizing to the filing of correspondence. If the only file one has is arranged chronologically, it may be difficult to gain access to individual items in the file since the only way to do so is to remember when a letter was written. However, a branching-tree system of filing could be entered in several different ways: by chronology, by an individual's name, by the institution's name, or by the activity mentioned in the correspondence. This example is very much like the access of memory. The more associations an item of memory has accumulated, the more likely it is to be recalled. Consider now the fact that with increasing age an individual has more stored information. Given a tendency to search the file more slowly, an older individual may easily find it tedious or become distracted before finding the relevant item. An offsetting compensation may be "conceptual" filing, that is, filing items of memory according to conceptual meanings.

The foregoing leads to the notion of the embarrassment of riches, whereby an older individual is forced to be slow because the older he is, the more information he has to scan in order to locate a relevant item. If, at the same time, an individual becomes slower in scanning information, he may become more susceptible to distraction.

From a variety of research sources it would appear that the older nervous system perceives less information because of sensory deficits and becomes slower in processing information. Competency, if directly proportional to such changes, would be severely restricted. However, compensation may occur by which the mature person organizes information conceptually and therefore has to process fewer bits of information to classify events, retrieve information, and respond appropriately. Thus, the experienced lawyer knows what to look for in a particular case, and an experienced physician focuses only on the critical aspects of a problem. A study carried out by one of the authors showed that middle-aged professionals may be able to handle a larger volume of

cases per day, but in fact may be processing less information.²¹ The young professional, not knowing exactly what to look for, must immerse himself in a broader range of data. This leads to the paradox that a professional person may be more competent in his later years, while at the same time, he shows a decline in component abilities and speed of information processing. It seems realistic to suggest that some individuals mature with time and become wiser and more effective even while their component capacities diminish. The terms "wise" and "mature" imply an active transcendence of the limitations that occur with age in the perceptual and intellectual abilities involved in problem solving.

Personality and Motivation

Generally, the research literature on personality indicates stabilization with age in a variety of characteristics. Research based on follow-up samples of the same individuals has shown that their personality characteristics were remarkably stable over a 25 year period.²²

One quality of maturity is a tendency to avoid crises, and to manage emotions to avoid over-reaction that destroys an objective approach to problem solving. Middle-aged adults tend to view themselves as more in control than they were as young persons.²³ The first time a crisis of a given type occurs, the individual is much more likely to become emotional and allow anxiety or fear to interfere with the problem solving aspects of the task. Later, as these emotional components are mastered, individuals can be more effective.

The Elusive Quality of Wisdom

Wisdom is an integrative concept which implies a growth in competence in complex problem-solving in late adulthood. The concept of wisdom has always been positively associated with the later years of life. Wisdom might prove to be an important criterion in judging competence, although its measurement is elusive. Wisdom may be an emergent aspect of development in the later years; it may be a term that describes successful adaptation.

Previous difficulties in dealing with a broad concept like wisdom

21. Birren, *Age and Decision Strategies*, in *DECISION MAKING AND AGE* 23, 25 (1969) [hereinafter referred to as *Age and Decision Strategies*].

22. Woodruff & Birren, *Age Changes and Cohort Differences in Personality*, 6 *DEV. PSYCH.* 252, 256 (1972).

23. See *Age and Decision Strategies*, *supra* note 21, at 29.

have led to its relative neglect in empirical research. The concept of wisdom, however, may be used more frequently as behavioral scientists realize that measurements of component abilities do not in themselves yield direct predictions or descriptions of the individual's performance in real life situations.²⁴

Wisdom seems to include both reflective and affective components, as well as intellectual skills for evaluating information. Thus, it is clearly a multidimensional attribute. Individuals can identify other persons they know as being more or less wise. Individuals identified as being wise appear to have qualities of understanding and empathy. Generally, young people attribute wisdom to older persons, although older persons themselves do not necessarily judge themselves as possessing more or less wisdom than do middle-aged or young individuals.²⁵ One task for researchers studying the concept of wisdom is to identify the criteria that could be used to separate wise from unwise individuals. The historical literature suggests that wisdom is manifested in an individual's actions, judgments, values, and personality characteristics. Certainly the wise individual is presumed to be more likely to survive. In a broad sense, wisdom is the highest form of competence since it reflects how well an individual will adapt to change.

At the present time, the behavioral sciences are in a hiatus. It is possible to measure narrow component abilities with a high degree of precision and reliability, but behavioral scientists are unable to describe or measure the ways these abilities combine in creating competence or effective problem solving in real life situations. Until such time as behavioral scientists can move from rigorous but limited samples of behavior to the prediction of larger aspects of competence, they must be content to infer competence from naturalistic observations of behavior. That is, if one wishes to assess competence, one must observe the behaviors of people in life-like circumstances, those that allow for the compensatory functions of wisdom, maturity, and strategies that result in higher levels of competence. And until such time as behavioral scientists have made more progress along these lines, they are likely to make only limited contributions to the field of age and the law.

CONCLUSION

The purpose of this article was to describe the use of age as an

24. Clayton & Birren, *The Development of Wisdom Across the Life Span: A Reexamination of an Ancient Topic*, in 3 LIFE-SPAN DEVELOPMENT AND BEHAVIOR 103, 129-31 (1980).

25. *Id.* at 119.

index by behavioral scientists and to discuss some of the current thinking of behavioral scientists about the relationship of age, age changes, and competencies.

Age is used as an index to the outcomes of aging because it is useful in grouping information and enables one to predict more about an individual than can be predicted from any other single variable. The distinction between "age" and "aging," however, is important. Since aging consists of simultaneous biological, psychological, and social processes, behavioral scientists seek variables other than chronological age as explanations of change. Different human characteristics change with time in different ways and at different rates. The diversity and individuality of aging patterns is the essential fact. Thus, while the behavioral scientist may use age as an index, he takes it for granted that at any given age there are large individual differences in traits.

Also discussed was the topic of competency, the capacity for adapting or meeting environmental demands in relation to age. Behavioral scientists currently have the ability to measure component capabilities with a high degree of precision and reliability. For instance, it has been found through research that older adults tend to be slower, less agile, and have less physical strength than young adults. Verbal intelligence remains the same or increases with age, while the speed of intellectual performance slows with age. However, it is not yet clear how much of the differences are due to disuse, poor health, or some unspecified intrinsic change with age.

Two important points are apparent in the discussion of competency. First, while certain competencies may be limited with age, research and observation suggests that older adults may utilize appropriate strategies to compensate for limitations and losses. Second, behavioral scientists recognize that because of adaptive strategies and compensatory work methods, measurements of component capacities may not be congruent with the competencies exhibited in real life situations.

The use of age as an index by society requires detailed examination, especially after noting the manner in which age indexing may limit individual opportunities and privileges. If age is commonly used in making policy and program decisions, society's growth potential will be limited by not using the capacities of older adults, and older adults may be discriminated against. On the other hand, if age is not used, the cost may become too great to society in terms of the time and money

needed to make more refined measurements and decisions about individuals.

In the relationship between the behavioral sciences and the law, behavioral scientists remain uneasy because their probabilistic approaches do not mesh well with the categorical decision-making of the legal community. While it may be maintained that the law operates on probabilities in its process of arriving at decisions, it is called upon to, and ultimately does make, categorical decisions. The scientific and legal communities should acknowledge and respect the roles which are performed by each and the varying ways in which information is used.

A final point to be made concerns the working relationship between behavioral scientists and the legal community. The scientific community is willing and eager to aid the legal system in carrying out its role in an informed and purposeful way. A more appropriate and rational service for scientists, however, may lie in their contributions to the legislative branch by giving testimony when legislation is being drafted, so that better laws about age discrimination are enacted.