

# Extending Longevity: Dignity Gain – or Dignity Drain?

*Over the last decades, gerontological science, social policy, and cultural, medical, and economic advances have formed a powerful coalition that has resulted in major increases in longevity and the quality of human aging. However, new scientific evidence about the oldest-old, the Fourth Age (80 plus), dampens this positive spirit. The oldest-old are at much greater risk of major losses in quality of life and functional status than the young-old. **PROF. PAUL B. BALTES**, Director at the **MAX PLANCK INSTITUTE FOR HUMAN DEVELOPMENT** in Berlin, argues that this dilemma between extending life and maintaining human dignity is a major societal issue in the 21st century. To deal with this dilemma, gerontology needs to become a cornerstone of the scientific agenda.*

In industrialized countries, we witnessed truly astonishing increases in life expectancy during the 20th century, which rose from about 45 years in 1900 to about 75 years in the year 2000. This phenomenal increase in average length of life was also accompanied by a substantial improvement in the quality of life for the elderly. Knowledge gained in basic research on aging, as well as ongoing advances in medicine, cultural studies, psychology, and economics, has contributed to this development. Will this historical trend continue as the population reaches higher and higher ages, as more and more people live to be 90 or even 100 years old? In recent studies, it has been shown that as people reach the older ages, they exhibit larger losses in physical, mental, and social functioning than those observed for the young-old. In fact, there is reason to ask whether the resulting state of affairs challenges our basic conception of what it means to live and die in dignity.

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The Janus face of aging becomes apparent when we compare what are called the “Third” and “Fourth” Ages of life. The Third Age begins at about 60. The Fourth Age commences when half the original “birth cohort” is no longer alive. In developed countries, this is generally around the age of 80. Recent advances in gerontological scientific research have centered on the Third Age and its potential or plasticity. In contrast, the Fourth Age makes explicit the biological shortcomings of the human organism – and based on current evidence there is little hope of the oldest ages becoming the veritable “golden age.” Under today’s conditions, the Fourth Age promises to create major problems for our society and to pose great challenges for research in the future.

Of special importance is new evidence that the increase in life expectancy also applies to the oldest ages and is not restricted to the younger age ranges. Today, 80-year-olds have a statistical life expectancy of another

er eight years. This is twice as much as three decades ago. If this upward trend in life expectancy were to continue more or less linearly, nearly half the people born today could theoretically reach an age close to 100 years. Although a linear prediction of this type is constrained by the “shortsightedness” of the present, nonetheless societal reflection and possibly appropriate action are in order.

To appreciate the part societal factors play in this historical increase in life expectancy, it is important to reflect on the role that genetic factors play in this scenario, especially in light of the current-day emphasis on genetic determinism. While it is true that certain genes play a key role in determining the life span of human beings, they cannot explain the rapid increase in life expectancy in the 20th century. Changes in the human genome occur gradually, over much longer periods of time. The primary reason for the increase in human life expectancy during recent times is the improvement in many aspects of our living conditions. This advancement in cultural and societal evolution has permitted full utilization of the plasticity built into the human genome.

### Wisdom and Experience - Strengths of the Aged

What about the relationship between life expectancy and quality of life? Often these go hand in hand. In the last century people lived longer and better lives. For instance, the 70-year-olds of today are physically and mentally about as fit as 65-year-olds were 30 years ago. Thus, the “young-old” have gained around five “good” years. Furthermore, when all people older than 60 are considered, today’s older population enjoys better health than people their age did in earlier times.

There is much evidence supporting the good news about the aging mind. Researchers at the Max Planck Institute for Human Development, for instance, have done extensive research on intelligence and the human mind, and how both change with age. They have found that old people still have remarkable mental potential. Within the context of aging, intelligence should not be viewed as a single, homogeneous capacity; intelligence consists in the “fluid” mechanics of the mind, which, in analogy to the idea of computer hardware, dictate the sheer speed and accuracy with which information is processed. This capability increases rapidly during childhood but gradually begins to wane in early adulthood. Intelligence also includes the “crystallized” pragmatics, which, in analogy to computer software, reflect culture-specific knowledge and reasoning. Included in this area are vocabulary, specialized knowledge, and the mastery of emotions as well as social skills. These abilities can be retained throughout old age, provided they are used and are not impaired by brain disorders.

Mental capacities that are particularly pronounced in the elderly are emotional intelligence and wisdom. Emotional intelligence is the ability to understand the causes of feelings such as hatred, love, and fear. It is also the ability to develop strategies to avoid emotional conflicts or at least to lessen their negative effects. Older people are usually endowed with more emotional intelligence than younger people.

Potentially one of the elderly’s most impressive characteristics, wisdom, or knowledge of the *conditio humana*, provides insight into how to combine virtue and knowledge in leading one’s life. Of course, simply growing old is not enough to become wise. When life experience is paired with the necessary personal qualities and thinking patterns, however, old people often perform extremely well when addressing wisdom problems. This also applies to certain areas of art and professional expertise. Older composers and conductors, for instance, are often among the best in their fields. Specialized professional knowledge is also unaffected by age, as long as the aging person remains professionally active, is spared specific aging-associated illnesses such as a stroke, and the knowledge does not become obsolete from a societal point of view.

Another strength of the elderly is their ability to maintain their self-image and a satisfying life. Older adults possess an exceptional ability to adapt their lives in such a way as to maintain a positive feeling about themselves - despite increasing restrictions to their sphere of activity and physical abilities. They ensure a subjective feeling of well-being by adapting their expectations to reality. Many old people claim they feel just as healthy as young people, even though - objectively speaking - they are not.

This “adaptive self-plasticity” has an effect on everyday life and corresponds to the theory of selective optimization with compensation developed at the Max Planck Institute for Human Development. Orchestrating selection, optimization, and compensation occurs throughout all phases of life, but often their joint mastery becomes a fine art in old people. When he was 80, the pianist Arthur Rubinstein was asked how he still managed to give such excellent concerts. He offered three reasons. First, he played fewer pieces - an example of selection; second, he practiced these pieces more often - an example of selective optimization; finally, he used tempi of larger contrasts to make it appear as though he were playing the piano faster than he was actually able to - an example of compensation. People who apply selection, optimization, and compensation as behavioral strategies feel better about themselves and go further in life, especially when resources start to dwindle, as they do in old age.

Gerontologists and social politicians were thrilled with this kind of good news about age and its potential. Many believed that social progress would guarantee a

golden future for old people. However, not everyone - and particularly not old people themselves - shared this optimism. They asked: Why is it then that people want to get old, but don’t want to be old? And why do people always want to be a bit younger than they actually are as they are growing older? In his late work, the Italian philosopher Noberto Bobbio coined the phrase “happy gerontologists.” He suggested that this exaggerated optimism about becoming old was attributable to many gerontologists having not yet taken a proper look at older ages.

In the meantime, we have done just that. For over 10 years, gerontology has been focusing increasingly on the “oldest-old.” For example, the Berlin Aging Study, based at the Max Planck Institute for Human Development and conducted in collaboration with the Humboldt University and the Free University of Berlin, held the oldest-old as its primary focus. In a collaborative study of approximately 500 old people assessed five times over a period of almost ten years, more than 50 medical experts, psychologists, sociologists, and economists looked closely at people between 70 and over 100 years old. The results confirmed what the philosopher Bobbio had suggested: This optimism about becoming old needs to be more closely scrutinized. Although some people remain very agile and emotionally well-off in their old age, their numbers begin to dwindle as age increases. Physical and mental capabilities increasingly diminish the older someone gets. This clearly contradicts the belief that people who live long are spared the negative experiences of aging. The “happy days” of the Third Age become “unhappy days” for more and more people in the Fourth Age.

One of the first things to suffer is the potential to learn, as tests using a certain memory technique called the “method of loci” show. Whereas the young-old tend to do very well, many people over 85 are no longer able to learn this memory technique. (People suffering from dementia were excluded from this research.) The bottom line is that even people who are mentally fit for their age have difficulty learning new things. At the same time, people in the Fourth Age have a more fragile self-image and are much more vulnerable to changes in degree of satisfaction with life than young-old people, who can generally maintain the same level of well-being thanks to their ability to reinterpret reality for purposes of self-enhancement. In the oldest-old, this adaptive self-plasticity is limited. Indicators of well-being, such as life satisfaction, social integration, a positive attitude toward life, and aging satisfaction, clearly start to fall.



A number of other physical, psychological, and social functions also start to decline in the oldest-old. Almost five times as many people over 85 suffer from chronic impairments and exhibit low functional scores across a wide range of indicators compared to 70- to 85-year-olds. This data confirms that life’s journey tends to take a turn for the worse in old age as the limits of human adaptability are reached, and often even exceeded. The fact that

the physical and mental capabilities of old people have improved substantially in recent years can at best only buffer the negative effects of old age and not completely eliminate them. The magnitude of the aging effect is much larger than that of historical improvement.

The losses of the Fourth Age are particularly apparent in the dramatic increase in dementia confirmed by the Berlin Aging Study. According to the study, less than 5 per cent of 70-year-olds suffer from some form of dementia. This increases to 10-15 per cent among 80-year-olds. Among 90- to 100-year-olds, almost every second person suffers from dementia. Dementia, especially Alzheimer’s disease, leads to a gradual deterioration in many basic human characteristics, including abilities for intentionality, independence, identity, and social integration. These characteristics play a key role in defining human dignity and allowing individuals to autonomously exercise their “human rights.” To date we have no effective prophylaxis or therapy against Alzheimer’s disease. At the risk of sounding cynical, the best prophylaxis at the moment is to avoid getting too old.

### Evolution Ignored Old Age

We are now faced with a new challenge: to conserve human dignity in the later years of life. Healthy and dignified aging has its limits. Gerontology’s leitmotif, “add more life to years, not more years to life,” seems less and less applicable to very old age. There are also theoretical explanations that speak against an optimization of old age due to fundamental imperfections in the biological-genetic architecture of the life course as a result of evolution. To put it another way, evolution ignored old age. It was selecting and optimizing the reproductive abilities of humans during early adulthood. Thus, with old age the human genome gradually loses its efficiency and power. It starts making more and more mistakes, its self-preserving regulatory mechanisms deteriorate, and the potential for its plasticity becomes smaller and smaller. These bio-genetic losses of human aging are less obvious in the Third Age because culture-based improvements have been successful in compensating for this deficit. With our relatively static genetic make-up, to live longer

we need a constant increase in cultural development.

And precisely here lies the crux of the problem. Cultural support mechanisms lose their effect as our biological potential decreases in old age. This is especially true for the oldest-old, for whom more and more cultural intervention is required. For instance, older people need much more practice than young people to achieve similar progress in a cognitive task. Furthermore, the ability to acquire new knowledge and thought patterns is severely limited in very old age.

Today, one of the core questions faced by gerontology is to what extent further scientific developments can offer new insights and ways to ameliorate the conditions of the Fourth Age. Biomedical research would have us believe we can improve the Fourth Age, just like we improved the Third Age. Unfortunately, this optimism must be met with skepticism. As theoretical arguments and recent research suggest, plasticity is fundamentally limited in very old age. It is unpredictable and less readily influenced by internal and external factors.



ing old age into a “belle époque” of life. Improved environmental conditions and age-friendly behavioral strategies alone will not suffice.

Our future lies in old age. For societal reasons, it is thus of utmost importance to pursue gerontology as a cornerstone of science in the 21st century. The United States has already recognized this fact: almost \$2 billion in public spending is directed to gerontological research each year. The private sector con-

tributes close to another \$1 billion. This total of close to \$3 billion spent on gerontology each year amounts to more than the entire research budget of the Deutsche Forschungsgemeinschaft (German Research Foundation) or of the Max Planck Society.

Notwithstanding a few excellent research groups, Germany has a great deal of catching up to do in the field of gerontology. This is a matter of top priority. In the future, the contributions of science to the general welfare of the nation will also be judged by whether they benefit the state of people in old age. Research will be expected to provide its share of solutions to optimizing the Third Age and reducing the “unhappy days” of the Fourth Age.

What type of gerontological research is most promising? This question is currently the subject of intensive international debate. It will be important to address not only the positive potential of the Third Age, but also the vulnerability and obstinacy of the Fourth Age: “Hope with a mourning band” may be the motto best suited to this situation.

Age and aging encompass biogenetic-medical, psychological, social, and technological issues and, thus, require interdisciplinary research. Furthermore, gerontology makes a distinction between normal, optimal, and pathological aging. This results in two different research approaches. The first focuses on the normal aging process and how it might benefit from improvements in medicine, psychology, technology, and social conditions and support. It is based on the promising news of the potential of the Third Age and the idea that it is more important to improve the quality of life than to extend it even further.

The second approach focuses on finding remedies to the accompanying pathological and otherwise debilitating effects of aging. The aim is to develop preventive and corrective treatments to at least lessen the maladies of the Fourth Age, even if it is not possible to eliminate them completely. Thus, we urgently need, for instance, to find ways of treating the various forms of dementia and morbidity that are increasingly common in old age. James Fries, professor of medicine at Stanford University, developed an interesting model called “compression

of morbidity.” He suggested that, assuming the human life span is biologically predetermined, we should try to delay the occurrence and extent of all diseases and ailments associated with age to a point in time beyond the “natural” time of death. With such a strategy, it may be possible to “compress” diseases into a short time window in the last years of life. Although the final evidence is not in, this vision is plausible and promising.

The economic sector can also be expected to be supportive of more gerontological research. There are two key economic incentives - apart from the fact that economic leaders would probably appreciate a longer, happier life themselves. The first incentive is that old people represent a significant economic factor in a service- and knowledge-oriented society. They not only have needs, but on average also the resources to pay for the services to address those needs. In this spirit, and similar to considering the glass half full, rather than half empty, old age can be a catalyst for development and progress, rather than only a burden. As already demonstrated in some countries, the gerontological service sector can be a driving force of cultural evolution.

The second economic incentive is the human capital of the young-old, which is presently virtually untapped. As the young generation increasingly shrinks in size, the human capital of the Third Age could experience a boom, also in economic terms. However, it will not suffice simply to extend the working age - say to 67. Although this might make economic sense, it can only be effective if an “old-age work culture” is developed at the same time. Such a culture of old-age work is unlikely to be established through repairs of the existing system. What is needed is fundamental reform, developed through interdisciplinary efforts, including gerontological research.

Healthier and more active aging are the hallmarks of the recent past. The path from the Third to the Fourth Age is difficult. However, it also offers new opportunities and challenges for innovation. More research is needed to identify and seize these opportunities. Without change, the dilemmas of the Fourth Age will become amplified and affect us all, both old and young. ●

More Research is Our Only Hope

Theoretically, there is hope of genetically altering the biogenetic architecture of the life course to make it more susceptible to cultural and psychological influences. However, such speculations put us on extremely shaky ground - not only in terms of research, but also in terms of the ethical-religious debate on human nature. From a purely scientific standpoint, any kind of genetic engineering involves a number of unknowns due to the complexity of the human genome. Any attempt to intervene in this highly intricate system risks producing unpredictable side effects. Moreover, the aging process and many of its associated diseases are based on a multitude of biogenetic factors, including their interaction with numerous behavioral and environmental parameters. This makes things more complicated than with “simpler” monogenetic diseases for which gene therapy currently seems to harbor a promising answer. Monogenetic diseases, however, are demographically less significant. They affect only a small fraction of the aging population.

Many biomedical scientists agree that knowing the genetic factors involved in the aging process does not automatically mean that a quick and standardized means of “artificially” perfecting the biocultural architecture of the aging process is available. These factors are simply too complex and differ too greatly from individual to individual. Nonetheless, one can argue that in the long term only biomedicine has a chance of truly transform-

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