

The Agequake Associated with an Aging Population:  
Lag Effects in Society, Institutions, and Individuals  
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The shifting age structure of our country has introduced new metaphors to capture the nature of this change. We use the term "age wave" and others, but the one I like is "Agequake" because it implies the vast array of impacts of an increasingly older population. Our culture, our institutions, our professional practices, and our personal lives are beginning to feel the "tremblers" of the coming agequake. The crest of the quake is projected to occur when the middle aged "boomers" reach their sixties. But why is this shift in the age structure of society called an "agequake"?

I was introduced to the term a few years ago when I attended an international conference on aging held in Australia. Many participants were there from Asia and I was impressed with how seriously they were viewing the changing age structure. Apparently a representative introduced the term to the United Nations from South America. Multiple factors are contributing to the magnitude of the coming the agequake. Not only are we living longer and more actively, but also our country has changed from the agricultural age to the industrial age and now we are in the information age. Another factor contributing to the agequake is the falling birthrate. The speed of such changes has made many of our ideas about aging and being old out of date. Let me present a picture of the past and the speed of changes that have resulted in many lag effects in our ideas and in our regulations about age.

The Agricultural Age

In the 1800s America was an agricultural country. In 1900 47% of the labor force was in agriculture. Today barely 2% of the labor force is in agriculture; the largest portion of it is in service industries. When men worked on farms they could cut half an acre of grain a day with a sickle. When the scythe was introduced, a man could cut an acre a day. But in the beginning of the 20th century, the steamroller could pull a reaper and could cut 100 acres a day. Industries were created in the cities to manufacture engines and then to make gasoline motors and automobiles.

On farms, large families were the typical pattern. Children and older adults were useful on farms. When families moved to the cities where living space was tighter, families had fewer children. In the farm era, seven or more persons per household were common. Today the average number of children is slightly under two, just below the replacement level. Family structure has also changed. More generations are alive as we live longer. A friend of my wife and me went to see her grandmother one morning and then went to sit with her grandson in the afternoon. In the same day contact was across five generations. A few years ago there was a picture in a Philadelphia newspaper of a woman surrounded by her family, which consisted of six generations. By contrast, in 1900 the average family disintegrated by the death of one of the spouses before the last child left home. Orphaned children were a major social concern and special institutions were created to care for them.

Of course the health of children has improved and the infant death rate has fallen dramatically and parents are living longer. In 1900 the average life expectancy was 48 years; today it is about 75 years. The birth rate has fallen. In 1910 the number of births per 1000 population was 30.1 and in 2004 the birthrate per 1000 was 14.0. There are fewer children and people are living longer. More years were added to the average life expectancy in the 20th century than were added from the Roman days to 1900. Average life expectancy has not only increased from birth but also in late life as well. In 1935 life expectancy at age 65 was 11.9 years

and in 1999 it was 17.7 years (Manton, 2007, p. 63). It is expected to rise still further at age 65 and even at age 85. The years of active life expectancy have been increasing while the expected years of disability have been growing smaller. For example, it is expected that at age 85 in the year 2015, total life expectancy will be 7.0 years and active life expectancy will be 4.1 years and expected disabled years will be 2.9 (Manton, 2007, p. 63).

In 1900 the largest portion of the population was young children, aged up to nine years, the smallest proportion was that of persons over 60. Today that has shifted; children are the smallest proportion and adults over sixty are the largest. This change has resulted in the age pyramid of our society being turned on its head. The growing size of the older population is what gives rise to the notion of the agequake. The census data of the year 2000 showed that America already had 34,991,753 persons over the age of 65. That is slightly higher than the entire population of Canada and of many countries of Europe (Time Almanac, 2006). In the year 2000, the census of California indicated that its population was 33,871,648. Of the total population, persons over 65 were 10.6% or a total of 3,590,395.

An article by Meyers and Eggers (2007) cited figures that the world populations over the age of 65 years more than doubled between 1950 and 1990 from 144,380,000 to 325,747,000 by 2025, and is expected to increase more than five-fold to 809,381,000 by the year 2025. In America the total population in 2000 was 281,421,906 and those over the age of 65 was 34,991,753, or 12.4 percent of the population. The population of children up to the age of nine years was 37,725,303 or about 14 percent (Meyers & Eggers, 2007, vol, p.282). Currently households with children under the age of 18 years are about 32.8% of the total households. Households with someone over the age of 65 are about 23.4% and are rising. The very old are also increasing in numbers since life expectancy in the later years has been increasing. Peds (2007, vol. 1, p.269) who has made a specialty of research on centenarians pointed out that the reduction in mortality at the oldest ages has resulted in an increase in the number of centenarians to about 1.2 per 10,000 or about 3376 in the total population.

By the year 2025, the over 65 population will be a greater proportion than will be children under the age of nine. The size of the American older population is already larger than the total population of Canada and many countries of Europe. America already has a nation of older persons and it is growing.

Not only has life expectancy been increasing at birth from about 47 years in 1900 to 77 years today, but life expectancy over the age of 65 has also been increasing. Manton (2007, vol.2 p. 63) reported that not only has life expectancy risen after age 65 but also active life expectancy has been increasing more. His analysis indicated that active life expectancy as a ratio of life expectancy has been increasing in recent decades. Today, at age 65 one might expect about 18 years of life expectancy and about 15 years of active life expectancy. His data indicated that the average number of disabled years is now about 3.3 and is projected to fall in the next decades. Life expectancy and active life expectancy have also been rising after age 85. An implication of this is that individuals in their later years should not only think about possible years of dependency but also about how to use the much larger and increasing number of their active life years. This presents us with a two faced view of the aging populations, that of the "growers" and the "needers".

The shift in the age of our population is increasing pressure on our social priorities and on our institutions and there are many lag effects in our adaptations to the changing age structure.

## Lag effects

The rapidity of the change in the age structure of society has occurred at the same time as the business and labor structure of society has dramatically changed from the agricultural age to the industrial age and now to the information age. This rapid change has resulted in many lag effects in our institutions, customs, regulations, and expectations. One of the less obvious changes in society has been the increase in power devices that have reduced need for strong male muscle power. When the automobile was introduced it had no power steering, no power brakes, and it needed to be cranked by hand to start it. Few women drove the early cars largely because of the demands for physical strength. Today a physically limited person can drive a modern powered car.

Robotics has reduced the need for manpower. Computers now assemble complex machines with energy provided by non-human sources. Human skills are increasingly involved in developing the programs to control complex devices. Robotic devices are sent to Mars to assess the structure of its surface without the need for a human to be present. Robotics has evolved during the information age and the importance of manpower or muscle power has been dramatically lowered. It also results in the fact that women as well as men can manage production with robotics, challenging our traditional views of occupational roles for men and for women, and also for the roles of older persons because the need for physical strength has been minimized.

There are many lag effects in our institutions as they adapt to the growing pressures of an aging population and they will increase in the coming agequake when the boomer generation becomes elderly. Of course all age groups have stereotypes about each other, such as what the skate boarding teenagers are like, or the young singles who make dates on the website, or retired persons who buy rocking chairs and talk about the past. Beyond the stereotypes there are many rules, regulations, and ideas that come from the past and which block or slow transitions into a new era. In this brief presentation I will explore a few of the lag effects in our institutions. Universities have had lag effects in recognizing the changing age structure of the population in the new information age. The old model of the university student body was that of a teen aged and young adult population who received an education that ended by their early twenties. It was like an immunizing dose of education that was expected to last a lifetime. Now the shift to the information age has changed career patterns. Individuals increasingly shift jobs if not careers, three jobs in a lifetime is replacing one work life job. Science and technology bring in new discoveries and information that require an up dating of useful skills. Universities are beginning to have older graduate students return but most mid-life and older person education is being carried out outside of the universities.

I had a startling experience at UCLA a few years ago when I contacted the Graduate School of Education to identify a faculty member who might be doing studies about the mature and older learner. There was not a single faculty member who could be identified as being expert in the characteristics of the mature and older learner. I don't think this is exceptional and I believe that most schools of education do not have active programs in research and study of the mature and older learners, their personal abilities, motivations, needs and of their emerging roles in a changing society.

A survey was conducted by the Andrus Gerontology Center at USC of the professional schools of universities in California in the late 1970s. What it found was that none of the schools of medicine, social work, education, law and other professional fields were devoting any attention to the issues of aging. For example medical residents in psychiatry medical schools did

not see older patients and were qualified by their board examinations to practice psychiatry without any examination of their knowledge of mental illnesses of later life.

Influencing the lag effects were the paradigms of the different professions about aging. Early in the 20th century when children received much health attention, infectious diseases were the greatest concern. Infectious diseases invade the human organism whereas chronic diseases that later became the major causes of death and disabilities are usually an expression of the vulnerabilities of the host. The attention of medicine to chronic diseases of the older person evolved after World War II and the National Cancer Institute, the National Heart Institute, and the National Institute of Neurological Disease and Blindness were founded but they often had legacies of past paradigms. I will give you a few examples from my personal experience to illustrate this point.

In the late 1950's a group of researchers at the National Institute of Mental Health were ready to publish a monograph on their study of a sample of men over the age of 65. In the study was a finding that indicated that psychosocial loss in the older years influenced individuals' physiology. Publication of the monograph was delayed a year while the staff members disputed and raised the question of whether life experiences could influence a person's physiological well-being. The monograph did get published and the rigidity of the old paradigm that physiological conditions could not be influenced by environmental conditions was weakened.

I experienced another example of a rigid paradigm or theory when my colleague, Robert Butler, and I proposed to establish a laboratory on aging in the National Institute of Mental Health. It was declined by the senior directors as not being feasible. Beneath the surface was then dominant psychoanalytic view that the basic structure of the individual was laid out in the very early years of life. So what could be learned by studying the mental health of older adults? Change came later when the National Institute on Aging was established in 1975 and Robert Butler became its first director and Alzheimer's disease was included as one of the important areas for research.

In 1964 when I was a staff member of the National Institute of Child Health and Human Development I was asked by the director to suggest some behavioral variables that might be added into an expanding New England longitudinal study of heart disease. None of the behavioral variables were taken seriously because at that time heart disease was considered a physiological phenomenon, so how could a social environmental factor such as stress influence its etiology and its outcome? Today, of course, stress is recognized as an important factor in the course of cardiovascular disease as well as factors of diet and exercise.

### Diversity of the aged

All of us probably have some out of date biases, models or paradigms that block our vision of the emerging agequake and what should be done about it. One of these perspectives is to regard the aged as a single entity. Older adults are very diverse, if not more diverse in many of their characteristics than are the young. A British biologist, Medwar (1957), thought that the evolutionary force of selective survival brings about a precession of favorable traits toward the age of reproduction and a recession afterward. This suggests that biological processes get increasingly varied the further from the age of reproduction organisms live.

The older population is very diverse. At the same time as we have many persons with many incapacitating diseases such as Alzheimer's disease, there are many others who are seeking growth experiences. One term that is used to refer to the growers is the "late life bloomers", those

who contribute new things after they retire from their earlier life careers. There are many examples of late life bloomers to be identified.

In Britain, Mary Wesley wrote her first best selling novel after she was 70. Locally we have the example of Ethel Percy Andrus who was principal of Lincoln High School. After she retired she promoted health insurance for persons over sixty-five and worked with the Retired Teachers Association. Her efforts led to the creation of the American Association of Retired Persons that now publishes the world's widest circulating magazine. At the time she tried to develop health insurance for older persons the many insurance companies she contacted turned her proposal down because they felt that offering health insurance for older adults would not be a profitable venture. They were proven wrong when she got a trial project going with retired teachers in the state of New York. It was a success and so the companies who declined to work with her began to come into the field that Andrus had identified.

I rather like an example of late bloomers I learned from a small farm my family had when we lived in Maryland. There was a native persimmon tree that didn't produce its ripened fruit until after the first frost in autumn. By analogy, human late life bloomers may not release their life fruits until they feel the "first frost" of late life. Of course another factor is the freedom from early life obligations, which for Ethel Percy Andrus was being a teacher and a school administrator.

#### Interactions of length of life, health, culture, institutions and individuals

History shows that changes have always accompanied human existence. Floods, wars, crop and economic successes and failures have resulted in migrations and shifts in life patterns. However changes in the last century have been much faster in affecting cultures, health, and length of life. Some older persons today grew up in the agricultural era, matured in industrial era and are retired in the information era. Now they are living longer and are more active physically. Their interpretations of how they grew up and their values may challenge the views of those who relate to them, such as their physicians, nurses, social workers, clergy, family members and members of the communities in which they live.

A physician in British Columbia, Canada did a Ph.D. dissertation on views of dying by interviewing terminally ill patients, their physicians, health facility staff members and family members (Kuhl, 2002). His study showed that physicians are not trained to relate to dying patients and those they tend to avoid open conversations with terminally ill patients.

Family members may also block off opening the views of the older patient. I had the personal experience of visiting a middle aged colleague who was hospitalized for a back problem. In the other bed in her room was a terminally ill elderly woman who was talking to her daughter who sat in a chair along side the bed. The mother was describing the new television set she had bought and told the daughter to take it and enjoy it. The daughter responded by saying, "No mother you will be coming home and you will enjoy it". Later, the mother tried again to discuss something else she wanted to pass on but the daughter blocked the conversation. Passing on things would have given the mother a sense of satisfaction but the daughter did not want to discuss or face the reality of her mother's impending death.

Culture can enlarge the impacts of the agequake as the generations interact. When I gave a workshop in Singapore a few years ago I learned that not only were the people living longer but that there were increasing tensions surrounding it. People said that their society was more deeply involved in the information age than is America. They claimed that they had more cell

phones per capita than we did and that their cell phones were busy in the elevators of their tall buildings. Young women were expected to work in the high tech society, marry, have children, and take care of their husbands' elderly parents and their own elderly parents. That is a large set of obligations and a common reaction has come to be not to marry or marry a man from outside the culture, e.g., a man from Australia.

The rapid changes in the health and longevity of Asian countries is strongly interacting with the cultural traditions and is creating many tensions. In India young people are moving into the metropolitan areas to work in jobs opened by the information age. The older generation is being left behind in agricultural areas, but who is to take care of them in their final years? There are yet no universal policies for pensions and health care. The agequake is also causing many tensions in the developing countries where life expectancy is increasing, birth rates are falling and cultures are being slow to respond. The smaller number of children in the cities and the elderly living in the country side have become detached from each other and from their long standing cultures. One feature of the agequake of the developing society is shared with our developed society, the isolation of many of the elderly and their detachment from the mainstreams of their changing cultures.

In this era of great changes as we face the agequake, it is of increasing importance to find out where older persons are coming from, where they are and how they are going to spend their modern gift of long life in the information age. Many tensions, ambiguities and problems have to be resolved.

#### Autobiography and reminiscence

In our growing efficient but impersonal society, more mature people are becoming interested in sharing their life stories. Reminiscence, guided autobiography, and other approaches to the telling of our life histories apparently have many benefits in addition to passing on life stories to families, friends, and colleagues (Birren & Deutchman, 1991; Birren & Cochran, 2001; Webster & Haight, 2002). Sharing life stories contributes to a rise in self-appreciation for surviving many life events and apparently leads to motivation to contribute more by volunteering.

Exploring the lives of older persons is also contributing to a recognition that wisdom can be found in persons who have lived through many of life's challenging episodes and eras. Long neglected as a province of philosophy, the empirical behavioral sciences are opening windows on late-life talents (e.g., Sternberg & Jordon, 2005).

#### Occupational lag effects

A modern example of lag effects is illustrated by the present interest in raising the retirement age of airline pilots from age 60 to age 65. In 1959 a meeting of consultants to the Federal Aviation Agency suggested adopting the regulation of retirement at age 60 for pilots. At that time there were 17 deaths of pilots in the cockpits of American airlines, although not all of them were the captains. Younger crew members also had heart attacks and strokes while flying. The perceived threat was having an older pilot crashing a large plane in a metropolitan area causing many deaths. At that time assessment of health risk factors was limited and there was little data on abilities of pilots in relation to age. The age 60 was adopted with the recommended proviso that the age limit be raised or lowered depending upon what future research showed. At

that time a person might collapse after a health examination and after being told he or she was healthy. Now our physical examinations are much more sophisticated with stress tests of cardiac function assessing the likelihood of sudden heart problems. Also, technology has produced flying simulators in which pilots respond with their skills to simulated in-flight demands. In-flight records are also kept of pilots' performance. Thus we are in the era of high objectivity for measuring pilots' skills, in-flight performance and health risks. Why was the age limit of 60 not changed for 46 years? Apparently more issues have evolved.

At the time the age 60 retirement rule was adopted, the membership of the Airline Pilots Association consisted of the senior pilots, the captains. They opposed the rule and went to court to have it revoked. The courts denied the suit and the Pilot Association had a large lawyers bill to pay. They paid the expenses by increasing their membership to include the younger pilots. Then the younger pilots moved the Association's position toward maintaining the age 60 retirement rule. Why? Because they wanted the jobs and salaries of the senior captains. Also the economics of the rising salaries of the senior pilots was a concern of the airlines and they favored maintaining the age 60 rule. So the age 60 rule has stayed in place for a long time not necessarily because it improved public safety but for complex economic reasons.

Like young and older automobile drivers, the age of pilots is related to accidents but of different sorts. There is some evidence that young pilots do have flight accidents and that the rate falls with age and then rises a bit toward the age of retirement. Young pilots may act impulsively. A young British Midlands pilot was faced with a fire in one of his plane's two jets. He reacted quickly and shut off the wrong jet and the plane crashed killing all aboard. As the older population expands, more and more pressure will develop about the role of older car drivers. How long should people drive? In an extended area like Southern California, driving is a very important factor in maintaining an established style of life. But should we use advanced age as a reason to stop driving? Age doesn't tell us anything about the driving skills of an individual. Driving skills and health of older drivers, like that of airline pilots, can be assessed to protect society but also to protect the life style of individuals.

The age quake is bringing with it many new issues (Haight & Gibson, 2005; Kimble & McFadden, 2005). The lag effects sometimes result in stereotypes and prejudices about old age that need to be replaced by research and study. Wisdom and diversity are features of the young as well as of the aged that should be respected and cultivated.

### Summary

The term "Agequake" is a useful metaphor to refer to the changes facing cultures, societies, and individuals as the growing numbers of older persons challenges them. Older persons have replaced young children as the largest portion of the American population. Individuals are living longer and are more active and also the birthrate has fallen.

Facing the agequake requires new insights into growing up and growing old. But also the dramatic growth of the older population is resulting in challenges to the traditions of our cultures, institutions, and individual values that give rise to tensions and conflicting motives. As the boomer population approaches what was the customary retirement age of the past, the larger older population will increasingly challenge our age-related customs, laws and regulations, institutions, and our individual values and interpretations of life.

It isn't just the growing number of older people that is producing the tremblers signaling the approaching agequake. The older population is occurring in a new age, the information age. Within the life-spans of the very oldest persons, society has been transformed from the

agricultural age to the industrial age, and now to the information age.

Our personal models of living in the later years of life are being transformed from the lives of our grandparents and parents. Also, the agequake is challenging the institutional and professional paradigms and concepts about older populations. New concepts of aging have emerged. One of them is that the older population is very diverse. There are older individuals with life threatening or debilitating diseases that lead to early deaths or disabilities but at the same time there are competent elderly persons who seek new growth experiences as well as centenarians who are living independently.

The integrated organism is another concept that arises from our growing awareness of the interactions of medications, the biological systems of the body, and the influences of the environment on the expression of genetics. This results in a picture of aging as being a result of individuals' ecology, the physical, social and personal environments in which they have grown up and are growing old.

Lag effects in our explanations of aging and the customs of our institutions and professions are being examined as we become aware of how the sciences and professions have become expert in taking the organism apart. But our sciences and professions have been less focused on understanding how individuals develop and becomes older living in particular environments. The ecology of human aging is likely going to receive more attention as studies look in greater detail at the course of individual lives.

A difficult step forward is the acceptance of the concept that age doesn't cause anything. Age is a convenient index to unrelated positive, neutral and negative events, processes, and outcomes. Evidence based explanations are increasingly requiring the replacement of age with the causal forces that result in what we attribute to age.

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