

**The Fourth Age:
A Period of Psychological Mortality?**

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Introduction

Although there is general agreement that the present and future cohorts of older adults can, on average, expect to live longer than previous generations (e.g., Vaupel et al., 1998), there is much debate about the quality of life that will accompany these additional years. There are two predominant viewpoints in this debate: One prognoses that, for most people, these extra years, in principle, could be characterized by positive life quality. In part, this positive outcome may arise due to processes associated with the plasticity of aging: Processes of senescence might be slowed or delayed in the interactive context of environments supportive of longevity (e.g., Finch, 1998; Rowe & Kahn, 1987). The other viewpoint is more negative. It suggests instead that the extra years of life will be characterized by frailty, impairment, multimorbidity, loss of autonomy, and loss of personal identity. According to this viewpoint, the additional years are not related to a delay of biological decline but rather related to “manufactured survival” (e.g., Olshansky, Carnes, & Grahn, 1998).

Because research in the field of gerontology is a relatively new science, an end to this debate is not in sight. Indeed, some researchers suggest that both viewpoints may be correct, primarily because the human culture of old age is still evolving and the architecture of ontogenesis is incomplete

(Baltes, 1997; Baltes & Smith, 1999). In this context it may be especially useful to consider old age as involving not one but several life phases and to ask whether these life phases exhibit different qualities. Proposals have been made, for example, to distinguish between the *young old*, the *old*, and the *oldest old* (e.g., Neugarten, 1974; Suzman, Willis, & Manton, 1992) and between the *Third Age* and *Fourth Age* (e.g. Baltes, 1997; Baltes & Mayer, 1999, Laslett, 1991).

What evidence is there for these proposed different phases of old age? Is positive psychological well-being restricted to the Third Age for the majority of older people? Are the changes observed in psychological functioning during the Fourth Age associated more with distance-from-death (mortality) than age-related factors, or indeed the interaction of these factors? These questions form the basis of this paper.

Proposals about a Third and Fourth Age of Human Life

Proposals to distinguish a Third from a Fourth Age in the human life course came to the fore in the 1980s when researchers in the fields of demography, biodemography, gerontology, and sociology recognized that average life expectancy in western societies had increased and that the oldest subgroup of the population over age 60 was growing rapidly in absolute numbers (e.g., Pifer & Bronte, 1986;

Science Special Report, 1996). The definition of subgroups of the elderly population was one attempt to specify factors linked to the heterogeneity of the older population in terms of social participation, mortality, morbidity, and service needs.

The precise definition of subgroup membership, however, is still an open question. Whereas, for example, retirement from productive participation in the workforce is usually regarded as defining the beginning of the Third Age, there is less agreement about the definition of entry to the Fourth Age.

Some demographers have identified age 85 as the entry criterion for membership in the group of the oldest old (Suzman, Willis, & Manton, 1992). Presently, individuals aged 85 in western societies have survived several years beyond average life expectancy and are approximately located at the modal age for death: In western societies, for example, average life expectancy for men ranges from age 72 to 77 and for women between age 78 to 83 (United Nations Demographic Yearbook, 1997). Indeed, it has been suggested that age 85 may represent the ultimate peak of average human life expectancy (Fries, 1980; Olshansky, Carnes, & Désesquelles, 2001).

The population over age 85 also has a unique set of demographic features: Unlike any other age strata, it is characterized by an unique excess of women over men, higher

levels of comorbidity and institutionalization, and greater consumption of medical and care services (Suzman et al., 1992). Furthermore, individuals born between 1890-1915, who comprise the oldest old observed in 2000, exemplify a set of characteristics that are cohort-specific: For example, they have a lower level of education compared with subsequent cohorts and a higher likelihood of longterm widowhood.

Whether age 85 is a fixed or movable criterion for the end of the Third Age and entry to the Fourth Age is also open to debate. The answer here depends, in part, on whether the Fourth Age is defined by the demographic features outlined above or by biological, functional, or quality of life characteristics. According to the latter perspective, the Third Age exemplifies positive characteristics and the Fourth, dysfunction and death. Neugarten (1974), for example, described those in the Third Age (young old) as retirees from the work force who are in relatively good health and are socially engaged. For her, the Fourth Age (oldest old) was typified by the onset of all the negative stereotypes of old age. Similarly, Laslett described the Third Age as an era of personal achievement and fulfillment and the *Fourth Age* as an era of final dependence, decrepitude, and death. Based on these criteria, there is some evidence to suggest that the boundary may be dynamic. In 1980, Fries proposed that

increased life expectancy would be accompanied by *a compression of morbidity* — an average increase in the proportion of life spent free of disease or disability. Epidemiological analyses indeed suggest that, in successive cohorts, the proportion of elderly who are disabled is decreasing and the chronological age at which the majority in a cohort have multiple functional impairments increasing (e.g., Crimmins, 2001; Manton, Stallard, & Corder, 1997). Individual differences in biogenetic factors, sociocultural experiences, and life history would also be expected to contribute to heterogeneity in the onset of Fourth Age characteristics *within* a cohort.

Psychological Perspectives on the Third and Fourth Age

Psychologists are only beginning to empirically address questions about possible differences in functioning between the Third and Fourth Age. At this stage, there are conflicting theories about expected trajectories of intraindividual psychological change during old age which have implications for proposed distinctions between the Third and Fourth Age.

Theories specific to a domain of functioning (e.g., intelligence, cognition, self, or personality) propose either that change trajectories during old age are linear and continuous or that there is no change. Intelligence and cognitive functioning

are expected to show decline during old age (e.g., Baltes, Staudinger, & Lindenberger, 1999; Salthouse, 1991; Schaie, 1996) whereas personality, self-regulation, and a sense of well-being are expected to be maintained and to be relatively stable (e.g., Costa & McCrae, 1992). Together, these theories imply that no transition from the Third to the Fourth Age should be observed on a psychological level.

In contrast, systemic models of functioning in old age which consider complex interdependencies across domains imply that there may be different orchestrations of psychological functioning in the Third and Fourth Age (Baltes, 1997; Baltes & Smith, 1999; Birren & Schroots, 1996). It is argued that even though the onset time and regulation of decline may differ across psychological domains, all domains will eventually exhibit some type of dysfunctionality and that this may take the form of a cascade of decline. The Fourth Age would thus be characterized by a functional breakdown of the psychological system and less-desirable psychological profiles (e.g., loss of positive well-being, psychological dependence on others, poor memory and impaired reasoning: M. M. Baltes, 1998).

Associated with a systemic perspective is the idea that whereas functioning in the Third Age may be primarily age-related, functioning in the Fourth Age becomes more death-

related. Gerontologists have long posited a period of *terminal decline*, five to seven years prior to death in very old age, during which accelerated decline and functional breakdown is expected in many psychological domains (e.g., Berg, 1996).

The Berlin Aging Study (BASE):

Multidisciplinary Research on the Third and Fourth Age

In collaboration with Medical and Psychiatric Departments of Berlin Universities, the Max Planck Institute for Human Development in Berlin has been engaged in a large research program designed to investigate questions about the Third and Fourth Age. Before outlining some of our findings, I will briefly describe the design and scope of this program.

The *Berlin Aging Study* (BASE: Baltes & Mayer, 1999; Baltes, Mayer, Helmchen, & Steinhagen-Thiessen, 1993) was initiated in 1989 and, with funding from several Federal Ministries (BMFT, BMFuS) as well as the Max Planck Society, has collected cross-sectional and longitudinal data from a locally representative sample of men and women aged 70 to 100+years. Details about the study design, sample, and cross-sectional baseline findings are reported in Baltes and Mayer (1999; see also Mayer & Baltes, 1996) and summarized on the study website (www.base-berlin.mpg.de). In addition to discipline specific topics, four integrative

theoretical orientations have guided the investigation and data analyses: (1) differential aging, (2) continuity versus discontinuity of aging, (3) range and limits of plasticity and reserve capacity, and (4) aging as a systemic phenomenon.

Figure 1 outlines the longitudinal design of the study. The initial focus of BASE (1990-1993) was to obtain an age by sex stratified heterogeneous sample of 70 to 100+ year olds who completed a 14-session Intensive Protocol (involving detailed measures from the 4 disciplines involved: medicine, psychiatry, sociology, and psychology). 516 men and women from the western districts of Berlin participated. Four longitudinal follow-ups of the survivors from this initial sample involving different amounts of assessment have been completed at approximately two-yearly intervals. A single-session multidisciplinary assessment was collected in 1993-1994 (N = 361), reduced versions of the Intensive Protocol (six sessions) were collected in the periods 1995-1996 (N = 206) and 1997-1998 (N = 132), and in 2000 there was a repeat of the Psychology Battery together with multidisciplinary outcome variables (e.g., screening for dementia, assessment of well-being: N = 82). In addition, we also follow the mortality of entire BASE sample. I will focus on findings from the Psychology Unit of BASE which examined three domains of functioning: (a) intelligence and cognition, (b) self and

personality, and (c) social relationships (Smith & Baltes, 1999).

Figure 1

Psychological Functioning in the Fourth Age: Findings from the Berlin Aging Study

In this section, I describe four sets of findings from BASE which illustrate proposals about psychological functioning in the Fourth Age. These data suggest: (1) that there is a negative trajectory in various dimensions of subjective well-being and that this generally begins after the age of 80; (2) that despite much heterogeneity in levels of functioning, cognitive abilities show average decline during old age; (3) that the Fourth Age (age 85 and above) is associated with a greater risk for less-desirable overall profiles of psychological functioning compared with the Third Age; and (4) that psychological profiles of the Fourth Age are death-related.

1. Well-being Declines in the Fourth Age

Cross-sectional analyses of BASE data indicated that several dimensions of subjective well-being may decrease from age 70 to 100 (Smith, Fleeson, Geiselman, Settersen, & Kunzmann, 1999). Although the majority of BASE participants were typically satisfied with their present life conditions, those in the Third Age (70 to 84 years) reported significantly higher positive well-being, and higher satisfaction with life in general compared with those in the Fourth Age (85 to 100+). Considerable individual difference variance in well-being was accounted for by physical illness and functional impairment (e.g., vision, hearing, mobility, strength).

Figure 2 illustrates the data that we use to estimate longitudinal change trajectories from 70 to 100+ years (latent growth curve modeling). It appears complicated but let me lead you through it because in fact it tells a very interesting story. The Figure includes graphs of individual trajectories over time in one dimension of well-being, the experience of positive affect (a sense of happiness, of interest in the world, and excitement about what is going on around one). Each dot or line in the Figure represents one or more person at a particular age. A dot means that we were only able to capture information about positive affect from these participants on one occasion. The lines vary in length depending on the

number of years an individual was in the study: the lines join two, three, or four measurement occasions and the age of the participant at that measurement point can be read from the x-axis. At each successive longitudinal follow-up, fewer and fewer of the BASE participants survived for re-assessment. Clearly, no person was followed over 30 years; at the most, BASE has followed 82 individuals over 8 to 10 years. Techniques such as longitudinal latent growth curve analysis allow us to make use of all available data at all measurement points in order to estimate a 30-year trajectory of change in well-being. We ask whether change is best represented by a linear model or a model in which change is located primarily in particular phases of old age (e.g., the 80s decade versus the 70s decade).

Figure 2

Our analyses to date reveal negative change trajectories, particularly in the positive dimensions of well-being — in the reported experience of positive affect, satisfaction with aging, and satisfaction with life in general (Kunzmann, Little, & Smith, 2000; Smith, in press; Smith, Borchelt, Maier, & Jopp, in press; Smith, Freund, Kunzmann, & Baltes, 2001). The total estimated level of decline from 70 to 100+ years for

positive affect was equivalent to 0.7 SD (for life satisfaction it was 0.8 SD, and for satisfaction with aging, 1.1 SD). The experience of negative affect (feelings of frustration and sadness) was characterized by stability: There was neither average decline nor increase in very old age.

There are large individual differences in the average level of each component of well-being, but no significant interindividual differences in intraindividual change (i.e., regardless of level, individuals changed at approximately the same rate and amount). Models testing whether stability was the best estimate for the 70s and decline for the 80s were found to fit well for the dimensions aging satisfaction and positive affect (as illustrated in Figure 2).

These findings suggest that the period of transition from the Third to the Fourth Age may be especially critical for losses in positive well-being. The cumulative health-related chronic life strains which characterize the Fourth Age may set a constraint on the potential to experience the positive side of life.

Interestingly, the majority of those few oldest old individuals whom we have followed from age 95 to 100+ years, showed significant increases in positive affect around the time of their 100th birthday. This effect (“happy to reach 100”) needs to be replicated of course, but it does point to the

importance of life context effects in measures of well-being. In old age, becoming a centenarian is a socially recognized achievement and a point of individual pride. It may be one of the few such occasions in the Fourth Age (Smith, in press).

2. Intellectual Functioning Declines Throughout Old Age

Much research has shown that, up to age 80, performance on two broad categories of intellectual abilities, the fluid-like mechanics and crystallized pragmatics of intelligence, exhibit different patterns of maintenance and decline (Baltes et al., 1999). The fluid mechanics, thought to reflect the neurophysiological architecture of the human brain, display instances of decline in middle adulthood (40 to 60 years) and exhibit robust decline in old age, at least with respect to one or more subdimensions. In contrast, the crystallized pragmatics, understood as the culture-based software of the mind, generally show a relatively stable development pattern at least into the eighth decade of life.

Overall, BASE findings suggested general rather than dimension-specific age trends in the mechanics and the pragmatics of intelligence (Lindenberger & Baltes, 1997: see *Figure 3*). Intellectual functioning was assessed in BASE using a computerized battery of 14 subtests covering five abilities. Negative age gradients for three mechanic abilities

(Perceptual Speed, Memory, Reasoning) were found to be significantly higher than those for the two pragmatic abilities (Knowledge and Fluency), but these differences are not large.

Figure 3

As indicated by the scatterplots in Figure 3, individuals differed in their level of cognitive performance at all ages (70 to 100+years). What factors explain this heterogeneity? Lindenberger and Baltes (1997) suggested two:

- individual differences in sensorimotor functioning: All of the age-related variance in intelligence within the BASE sample could be accounted for by differences in vision and hearing acuity or balance.

- individual differences in life history and cultural factors: On average, socially advantaged individuals (i.e., those with higher levels of education, financial resources, and professional experience) showed a significantly higher level of performance in all age groups (about 1 SD), a level that is functionally very important in old age. However, the negative age gradient was equivalent for both the socially advantaged and disadvantaged.

The pattern of these findings is consistent with the lifespan architecture and the dual process model of intelligence (i.e., fluid mechanics and crystallized pragmatics)

outlined by Baltes (1997). When it comes to the "hardware-like" mechanics and the speedy and accurate functioning of basic mechanisms of information processing, old age takes its toll. Constraints and losses associated with the mechanics of intelligence are closely linked to biological and physical indicators of functioning. Conversely, whereas the life-long contributions of social (e.g., work) and cultural factors to the pragmatics of intelligence continue to provide an advantage in terms of absolute level of functioning, they do not appear to protect against the rate of decline and loss of intellectual capacity in old age. The compensatory role of culture and culture-based resources becomes less efficient.

3. Risk of a Less-Desirable Psychological Profile is Greater in the Fourth Age

One of the theoretical orientations of BASE involved a focus on systemic aspects of aging. Smith and Baltes (1997; see also Smith & Baltes, 1998) used cluster analysis as an "unbiased" method to identify subgroups of individuals who were more similar to each other than to the larger sample on 12 measures (including intelligence, self, personality, and social network indicators) and to assign to all individuals, based on their cluster membership, a ranking in terms of profile desirability. Nine subgroups were extracted, four of

which reflected different patterns of desirable functioning or successful aging (47% of the sample) and five less desirable functioning (53%; see *Figure 4*). Individuals in one subgroup with a desirable profile, for example, were characterized by their high levels of cognitive performance, many personal goals, interests and hobbies, but rather small social network. Another subgroup in this category was distinguished by their very large social networks, average cognitive functioning, and disposition to enjoy life. Less-desirable profiles were distinguished by increasing levels of cognitive impairment, loneliness, psychological dependence on others, and lower sense of well-being. These analysis also served to highlight the variety of desirable versus less-desirable profiles and their association to aspects of life history, health, and present life circumstances.

Figure 4

Among the 70-84 year olds in BASE, 70% were included in the high functional status (desirability) groups. Among individuals over 85 years, only 25% were in the desirable groups and 75% in the less desirable groups. The relative risk of membership in the less desirable profile groups was 2.5 times higher for the oldest old than for the 70-84 year olds.

Women were more prevalent in the less functional profile groups. The relative risk for women was 1.25 compared to men. Whereas 53% of the men in BASE were members of desirable profile groups, only 41% of the women were. These risks remained when individuals with diagnoses of dementia were deleted from the analyses.

At the same time, as Figure 4 also shows, there was considerable overlap in age membership among the nine subgroups. No profile subgroup was exclusively associated with one of the age/cohort groups in the BASE study design. Clearly, however, different proportions of each age group were represented in each of the profile subgroups.

These are dramatic age and gender differences in risk ratios. While longitudinal analyses need to be conducted to substantiate this pattern of results, the central outcome is unlikely to change. The oldest old are at a much higher risk for dysfunctionality than the young-old. Psychologically speaking, advanced old age appears to be a situation of great challenge and a period characterized by chronic stress. Advanced old age, the Fourth Age, is a kind of testing-the-limits situation for psychological resilience.

4. Psychological Functioning Predicts Mortality in Very Old Age

The psychological literature includes proposals that in old age, lower levels of psychological functioning, and especially cognitive functioning, are associated with imminent death. Researchers studying large enough samples with appropriate statistical techniques have indeed found that lower intellectual functioning is associated with nearness to death. Findings with respect to personality and indices of subjective well-being are less clear. One goal of our work in BASE has been to compare the predictive power of these separate psychological domains in relation to mortality in very old age and also to examine the extent to which overall psychological profiles predict survival.

Our first set of analyses (Maier & Smith, 1999) suggested that the prediction of mortality in old age may not just be specific to intellectual functioning, but rather extends to self-related evaluations of personal well-being. As a domain, intellectual functioning certainly provided the strongest and most robust set of predictors. Effects associated with predictors from the personality, self-related and social domains were more subtle. In all cases lower functioning was associated to death. However, with one important exception (namely dissatisfaction with aging), personality and social predictors were not significant in analyses that first controlled for associations between age and mortality.

Survival analyses for the desirable and less-desirable profile subgroups described above, have revealed that there are considerable subgroup differences in the likelihood of survival over a six-year period after baseline assessment. Individuals in the desirable clusters lived significantly longer than individuals in the less desirable clusters. The odds of death significantly increased by a factor of 2.3 with membership in a less desirable profile group (Smith & Baltes, 2001). A unique predictive effect for subgroup categorization remained after controls are added to the survival analyses for age, gender, physical health, and functional capacity. The survival differential based on subgroup membership was apparent for people aged 70-84 years as well as over 85 years. Among individuals over 85 years (where fewer than 50% survived longer than 6 years), the finding is highly significant: On average individuals over 85 years with desirable psychological profiles lived about 2 years longer than individuals with less desirable profiles.

Our longitudinal and survival analyses of BASE data are still in progress. In particular, we anticipate that the next series of analyses will provide further insight into the links between psychological trajectories and changes in health status so that we can better understand the mechanisms underlying change in the Fourth Age.

We are currently also beginning to compare the psychological profiles of centenarians examined in BASE with profiles of other participants in the Fourth Age who died before attaining 100 years (Gerstorf, 2001; Smith & Gerstorf, in preparation). In a study design that controls for the distance-from-death reflected in the final assessment (in this case 2 years), we have compared the psychological functional levels of 44 centenarians with subgroups who died at the ages of 95, 90, and 85 years for dimensions of intellectual functioning, personality, loneliness, personal control, and well-being. This comparison indicates that, on average, older age during the Fourth Age is associated with an increasingly negative profile. This finding remains after controls for diagnosed dementia.

To conclude, I will come back to the opening question: Is the psychology of the Fourth Age one of mortality? On average, in our analyses of BASE data, we observe significant psychological decline (dysfunction) after the age of 80 or 85 years. This decline is not necessarily related to the onset of dementia, although it could of course be some aspect of pre-dementia for which we do not have a measurement. We also observe accelerated decline predictive of death in some domains, in particular cognitive and intellectual functioning.

Our findings at the systemic level (profiles of functioning across domains) suggest that a cascade of decline occurs across domains and that this is predictive of death. Heterogeneity of functioning remains a characteristic of very old age: There are large individual differences in terms of levels of functioning and the timing of decline onset. Much more research is needed to determine the risks and protective factors associated with early and delayed onset of functional decline, speed of decline, and the potential to “compress” significant decline to a few final years.

In many respects, questions which are of key interest to lifespan psychologists regarding the relationships between age- and death-related factors during the Fourth Age remain unanswered. In order to answer them we need to determine whether there is age-related change during the Fourth Age that is independent of death-related change. This is a very thought-provoking question at a theoretical level that requires much more careful attention to the design of future longitudinal research into change during the Fourth Age to resolve. Considered together, however, the outcomes that we currently observe serve to illustrate the proposals of Paul Baltes (1997) that functioning in the Fourth Age reflects the incomplete architecture of human ontogeny. Furthermore, our findings suggest that psychological functioning during the Fourth Age

may reflect different aspects of *psychological mortality* at an individual level, with the eventual outcome being biological death.

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