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A lifespan developmental perspective of psychological ageing

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Introduction

In this introductory chapter I will summarize some of the major theoretical and methodological issues in studying normal ageing from a lifespan perspective. I will then review the normative changes that occur in the domains of intelligence, personality, motivation, and emotion and that provide the context for the study, diagnosis, and treatment of emotional disorders in old age. Finally, I raise some cautions regarding the pervasive prevalence of ageism in psychological research and practice.

Theoretical and methodological issues

Before summarizing the substantive literature on normal psychological ageing, it is necessary to indicate some of the theoretical formulations that have informed this literature, describe the paradigm shift introduced by the specification of the age–cohort–period model, and distinguish between successful, normal, and pathological ageing.

Lifespan theories of psychological ageing

There have been few comprehensive theories of psychological development that have fully covered the period of adulthood (Schaie & Willis, 1999). The broadest approaches have been those of Eric Erikson (1982; Erikson *et al.*, 1986) and of Paul Baltes (1993). Baltes' selection, optimization, and compensation (SOC) theory represents a dialectical lifespan approach. Psychological gains and losses occur at every life stage, but in old age losses far exceed the gains. Baltes considers evolutionary development incomplete for the very last stage of life, during which societal supports no longer fully compensate for declines in physiological infrastructure and losses in behavioural functionality

(see Baltes, 1987; Baltes & Smith, 1999; Baltes *et al.*, 1999). Selection, optimization, and compensation, however, can also be seen as strategies of life management, and thus may be indicators of successful ageing (Baltes & Freund, 2003). For a fuller exposition of SOC theory and review of relevant empirical studies, see Riedinger *et al.* (2006). The SOC theory has recently been expanded to a co-constructionist biosocial theory (Baltes & Smith, 2004; Willis & Schaie, 2006; see below). Theoretical models limited to the domain of cognition have also been proposed by Schaie and Willis (Schaie, 1978/79; Schaie and Willis 2000; Willis & Schaie, 2006), and by Sternberg (1985). I will here describe more fully, as examples, the Eriksonian and the Schaie and Willis stage theories, as well as the more recent co-constructive theory.

Erikson's stage model

Traditional psychodynamic treatments of the lifespan have been restricted primarily to the development of both normal and abnormal personality characteristics. With the exception of some ego psychologists (e.g., Loevinger, 1976), however, Erik Erikson remains the primary theorist coming from a psychoanalytic background who has consistently pursued a lifespan approach. Although Erikson's most famous concept, the identity crisis, is placed in adolescence, the turmoil of deciding 'who you are' continues in adulthood, and identity crises often recur throughout life, even in old age (Erikson, 1979). Moreover, Erikson (1982) takes the position that 'human development is dominated by dramatic shifts in emphasis'.

In his latest writing, Erikson (influenced by his wife Joan) redistributes the emphasis on the various life stages more equitably. He argues that the question of greatest priority in the study of ego development is 'how, on the basis of a unique life cycle and a unique complex of psychosocial dynamics, each individual struggles to reconcile earlier themes in order to bring into balance a lifelong sense of trustworthy wholeness and an opposing sense of bleak fragmentation' (Davidson, 1995; Erikson *et al.*, 1986; Goleman, 1988).

The 'intimacy crisis' is the primary psychosocial issue in the young adult's thoughts and feelings about marriage and family. However, recent writers suggest that this crisis must be preceded by 'identity consolidation', which is also thought to occur in young adulthood (cf. Pals, 1999).

The primary issue of middle age, according to Erikson, is 'generativity versus stagnation' (see McAdams & de St. Aubin, 1998; Snarey *et al.*, 1987). Broadly conceived, 'generativity' includes the education of one's children, productivity and creativity in one's work, and a continuing revitalization of one's spirit that allows for fresh and active participation in all facets of life. Manifestations of the generativity crisis in midlife are career problems,

marital difficulties, and widely scattered attempts at 'self-improvement'. Successful resolution of the generativity crisis involves the human virtues of caring, giving, and teaching, in the home, on the job, and in life in general. In Erikson's view of ego development, the final years of life mark the time of the 'integrity versus despair crisis', when individuals look back over their lives (Haight *et al.*, 1994) and decide that they were well-ordered and meaningful (integrated) or unproductive and meaningless (resulting in despair).

Those who despair approach the end of life with the feeling that death will be one more frustration in a series of failures. In contrast, people with integrity accept their lives (including their deaths) as important and on the whole satisfying. In a sense, ego integrity is the end result of the lifelong search for ego identity, a recognition that one has coped reasonably successfully with the demands of both the id and society (Erikson, 1979, 1982; Whitbourne, 1996). Once old age is reached it may be most advantageous for the person to rigidly maintain this identity (Tucker & Desmond, 1998).

The final stage of life includes an exploration of personal grounds for faith. Erikson points out that the aged share with infants what he calls the 'numinous' or the experience of the 'ultimate other'. This experience is provided for the infant by its mother. By contrast, the experience of ultimate confidence is provided for the older person by the confirmation of the distinctiveness of their integrated life and by its impending transcendence (Erikson, 1984).

A formal investigation of the progression through the Eriksonian stages from young adulthood into midlife has been conducted by administering an inventory of psychosocial development to three cohorts of college students, followed up after 11 and 22 years (Whitbourne *et al.*, 1992). This study showed not only inner psychological changes as postulated by Erikson, but also showed effects of exposure to particular historical, cultural, and social realities of the environment. As higher stages were attained there also seemed further resolution of the earlier stages of development, suggesting a process of continuous reorganization beyond the stage-specific issues confronted by the individual. In addition, this study raises the possibility that the sequencing of stages may not be unidirectional, and it further suggests cohort differences that imply less favourable resolution of ego integrity versus despair over the decade of the 1980s (Whitbourne & Connolly, 1999).

Schaie and Willis' stage theory of cognition

This theory uses findings from research on adult intellectual development to formulate eight adult stages (Schaie, 1977/78; Schaie & Willis, 2000). It is argued that that while Piaget's childhood stages describe increasing efficiency in the acquisition of new information, it is quite doubtful that adults progress

beyond the powerful methods of science (formal operations) in their quest for knowledge. Therefore, if one is to propose adult stages, they should not be further stages of acquisition; rather, such stages should reflect different uses of intellect.

In young adulthood, for example, people typically switch their focus from the acquisition to the application of knowledge, as they use what they know to pursue careers and develop their families. This is called the 'achieving stage'. It represents most prominently the application of intelligence in situations that have profound consequences for achieving long-term goals. The kind of intelligence exhibited in such situations is similar to that employed in educational tasks, but it requires careful attention to the possible consequences of the problem-solving process.

Young adults who have mastered the cognitive skills required for monitoring their own behaviour and, as a consequence, have attained a certain degree of personal independence will next move into a stage that requires the application of cognitive skills in situations involving social responsibility. Typically, the 'responsible stage' occurs when a family is established and the needs of a spouse and offspring must be met. Similar extensions of adult cognitive skills are required as responsibilities for others are acquired on the job and in the community.

Some individuals' responsibilities become exceedingly complex. Such individuals—presidents of business firms, deans of academic institutions, officials of churches, and those in a number of other positions—need to understand the structure and the dynamic forces of organizations. They must monitor organizational activities not only on a temporal dimension (past, present, and future), but also up and down the hierarchy that defines the organization. They need to know not only the future plans of the organization, but also whether policy decisions are being adequately translated into action at lower levels of responsibility. Attainment of the 'executive stage', as a variation on the responsibility stage, depends on exposure to opportunities that allow the development and practice of the relevant skills (Avolio, 1991; Smith *et al.*, 1994).

In the later years of life, beyond the age of 60 or 65, the need to acquire knowledge declines even more and executive monitoring is less important because frequently the individual has retired from the position that required such an application of intelligence. This stage ('reintegration') corresponds in its position in the life course to Erikson's stage of ego integrity. The information that elderly people acquire and the knowledge they apply becomes a function of their interests, attitudes, and values. It requires, in fact, the reintegration of all of these. The elderly are less likely to 'waste time' on tasks that are

meaningless to them. They are unlikely to expend much effort to solve a problem unless that problem is one that they face frequently in their lives. This stage frequently includes a selective reduction of interpersonal networks in the interest of reintegrating one's concern in a more self-directed and supportive manner (cf. Carstensen, 1993; Carstensen *et al.*, 1997).

In addition, efforts must be directed towards planning how one's resources will last for the remaining 15 to 30 years of post-retirement life that are now characteristic for most individuals in industrialized societies. These efforts include active planning for that time when dependence upon others may be required to maintain a high quality of life in the face of increasing frailty. Such efforts may involve changes in one's housing arrangements, or even one's place of residence, as well as making certain of the eventual availability of both familial and extra-familial support systems. The activities involved in this context include making or changing one's will, drawing up advanced medical directives and durable powers of attorney, as well as creating trusts or other financial arrangements that will protect resources for use during the final years of life or for the needs of other family members.

Although some of these activities involve the same cognitive characteristics as the responsible stage, the objectives involved are far more centred upon the current and future needs of the individual rather than the needs of their family or of an organizational entity. Efforts must now be initiated to reorganize one's time and resources to substitute a meaningful environment, often found in leisure activities, volunteerism, and involvement with a larger kinship network. Eventually, however, activities are also engaged in to maximize quality of life during the final years, often with the additional objective of not becoming a burden for the next generation. The unique objective of these demands upon the individual represent an almost universal process, at least in industrialized societies, and designation of a separate 'reorganizational stage' is therefore warranted.

The skills required for the reorganizational stage require the maintenance of reasonably high levels of cognitive competence. In addition, maintenance of flexible cognitive styles is needed to be able to restructure the context and content of life after retirement, to relinquish control of resources to others, and to accept the partial surrender of one's independence (Schaie, 1984, 2005).

Many older persons reach advanced old age in relative comfort and often with a clear mind, albeit a frail body. Once the reintegrative efforts described above have been successfully completed, one other stage is frequently observed. This last stage is concerned with cognitive activities by many of the very old that occur in anticipation of the end of their life. This is a 'legacy-creating stage', which is part of the cognitive development of many, if not all,

older persons. This stage often begins with a self- or therapist-induced effort to conduct a life review (Butler *et al.*, 1991). For the highly literate and those successful in public or professional life this will often include writing or revising an autobiography (Birren & Schroots, 2006; Birren *et al.*, 1995).

But there are also many other legacies to be left. Women, in particular, often wish to put their remaining effects in order, and often distribute many of their prized possessions to friends and relatives or create elaborate instructions for distributing them. It is not uncommon for many very old people to make a renewed effort at providing an oral history or to explain family pictures and heirloom to the next generation. Last but not least, directions may be given for funeral arrangements, occasionally including donation of one's body for scientific research, and there may be a final revision of one's will.

The co-constructionist perspective

Both neurobiological and sociocultural influences on development have long been recognized. Co-evolutionary theorists (Dunham, 1991; Tomasello, 1999) suggest that both biological and cultural evolution has occurred and that recent, cohort-related advances in human development in domains such as intelligence can be attributed largely to cumulative cultural evolution. Cultural activities affect the environment, thereby influencing mechanisms such as selection processes, and thus allowing humans to co-direct their own evolution (Cavalli-Sforza & Feldman, 1981; Dunham, 1991). The co-constructionist approach of Baltes (1997) and his colleagues (Li, 2003; Li & Freund, 2005) imposes a lifespan developmental perspective on co-evolutionary theory and provides principles regarding the timing of the varying contributions of neurobiology and culture at different developmental periods and across different domains of functioning. Three principles are proposed regarding the relative contributions of biology and culture influences across the lifespan:

1 Beneficial effects of the evolutionary selection process occur primarily in early life and are less likely to optimize development in the later half of life.

2 Further advances in human development depend on ever-increasing cultural resources. From a historical perspective, increases in cultural resources have occurred via cumulative cultural evolution and have resulted in humans reaching higher levels of functioning. At the individual level, increasing cultural resources are required at older ages for further development to occur or to prevent age-related losses.

3 The efficacy of increasing cultural resources is diminished in old age, due to decline in neurobiological functions.

Li (2003) proposes a triarchic view of culture involving three aspects of culture that are related to the co-constructionist perspective: resource, process, and developmental relevancy. Culture as social resources involves the knowledge, values, and material artifacts accumulated by a society and transmitted to future generations; these resources continue to develop and change through cumulative cultural evolution (Tomasello, 1999). Expanding upon Li's triarchic view of cultural domains, Willis and Schaie (2006) view accumulated cultural resources as being represented by structural variables such as educational level, occupational status, and ability level. These variables reflect the individual's acquisition and accumulation of cultural knowledge and skills primarily during the first half of adulthood.

Culture as an ongoing social process involves the routines, habits, and performances of the individual in daily life that take place in the individual's proximal developmental context and that are shaped by the momentarily shared social reality (Li, 2003). The third component of developmental relevancy suggests that the impact of particular cultural resources and processes on an individual is partially determined by the individual's developmental stage, which has also been termed the 'developmental niche' (Gauvain, 1998; Super & Harkness, 1986).

The co-constructionist perspective is particularly useful in understanding the interplay of risk and protective factors that influence cognitive ageing. These aspects will be discussed later as an introduction to the issues of normal cognitive ageing and intelligence.

The age–cohort–period model

Early students of normal and pathological ageing thought that the comparison of groups of individuals at different ages (cross-sectional data) could be used to predict and understand age changes within the same individuals (longitudinal data). A paradigm shift occurred when it was shown that such inference was not possible except under very unusual circumstances (Ryder, 1965; Schaie, 1965).

The model

The age–cohort–period model specifies that any age-related or time-dependent behaviour can be assigned three temporal characteristics, such that:

$$b\,(\text{Behaviour}) = f(\text{A} + \text{C} + \text{P})$$

where the behaviour b is observed at the chronological age A for individuals over the calendar period P who have entered the environment as members of cohort C. Just as is true for the relation among the physical variables of

volume, pressure, and temperature, here also the third component can always be stated as a function of the other two components. Thus, A = C + P, C = A + P, and P = A + C. However, each of the three components may be of primary interest for some scientific questions in the developmental sciences, and one may therefore want to be able to estimate the specific contribution attributable to each component. In the behavioural sciences, in particular, we typically want to differentiate effects that change across age (intra-individual change) from those effects that differ across cohorts or generations (inter-individual differences).

Data collection strategies

Empirical studies in the developmental sciences involve age and/or cohort comparisons either at one point in time or at successive time intervals. Traditional strategies used for this purpose are represented by cross-sectional, longitudinal, and time-lag designs.

The cross-sectional strategy investigates the hypothesis that there are differences in one or more characteristics for samples drawn from different cohorts but measured at the same point in time. This strategy is most appropriate for the study of inter-individual differences. Age differences in behaviour at a particular point in historical time may be relevant for policy decisions that lead to differential societal responses, regardless of the antecedent conditions responsible for the age differences. Age differences detected in a cross-sectional data set, however, are inextricably confounded with cohort differences. Since cross-sectional subsamples are measured only once, no information is available on intra-individual change. Unless there is independent evidence to suggest that older cohorts performed at the same level as younger cohorts at equivalent ages, it would be most parsimonious to assume, at least in comparisons of adult samples, that cross-sectional age differences represent estimates of cohort differences, which may be either inflated or reduced by maturational changes occurring over a specified age range.

The longitudinal strategy investigates whether age-related changes have occurred within the same population cohort measured on two or more occasions. This strategy is appropriate when the investigator wishes to predict age differentiation in behaviour that occurs over time. But longitudinal data do not always provide unambiguous estimates of intra-individual change. A single-cohort longitudinal study confounds age-related (maturational) change with period effects that are specific to the particular historical period over which the behaviour is monitored. The period effects could either mask or grossly inflate estimates of maturational changes.

The time-lag strategy compares two or more samples of individuals drawn from successive cohorts at successive points in time at the same chronological age.

The hypothesis tested is whether there are differences in a given behaviour for samples of equal age but drawn at different points in time. This strategy is of particular interest to social and educational psychologists. It is particularly appropriate when one wishes to study performance of individuals of similar age in successive cohorts (e.g., comparing baby-boomers with the preceding generation). The simple time-lag design confounds cohort effect with period effects and may provide inflated or reduced cohort estimates depending on whether the temporal interval between the cohorts represents a period of favourable or adverse environmental influences.

Sequential strategies

Several alternative sequential strategies are available that might differentiate effects of maturational characteristic is for a particular developmental stage from the attainment of different levels of functioning that can be attributed to differences in socialization and/or other life experiences for successive generations. This can be done by assessing the behaviour of more than one cohort over a given age range (Schaie, 1977; Schaie & Willis, 2002, Ch. 5; specific implications for the study of emotion are discussed in Schaie, 2001).

The term 'sequential' implies that the sampling strategy used to study generational differences must include the acquisition of a sequence of samples taken across several measurement occasions. Perhaps the most widely used sequential strategy is the cross-sequential design, in which two or more cohorts are followed over an identical time period. This approach permits the direct comparison of longitudinal and cross-sectional data (provided that the calendar time ranges are similar for age and cohort). The advantage of this approach is that only two points in time are needed; hence the early appearance in the literature of studies using this design. For purposes of studying generational differences, however, this approach represents a 'model misspecification' because it does not allow comparison of cohorts over the same age range.

Geropsychologists and other developmental scientists often find the cohort-sequential design of greatest interest because it explicitly differentiates intra-individual age changes (which occur within a generation) from inter-individual differences (which occur between generations). This design also permits a check of the consistency of age functions over successive generations, thereby offering greater external validity than would be provided by a single-cohort longitudinal design. A cohort-sequential study consists of two or more generations (however defined) being followed over two or more similar age levels. The minimum design for such a study involves three measurement points, allowing each of two cohorts to be followed over the same age range.

For clinical purposes, cross-sectional age difference data must generally be interpreted as population differences that reflect secular changes. Such data are not directly relevant for the detection of abnormal changes in individual behaviour. Longitudinal data are therefore needed to evaluate the meaningfulness of intra-individual changes that might herald the onset of pathology.

Successful, normal, and pathological ageing

It is readily apparent that there are vast individual differences in patterns of psychological changes from young adulthood through old age. Scrutiny of a variety of longitudinal studies of psychological ageing (cf. Schaie & Hofer, 2001) suggest that four major patterns will describe most of the observed ageing trajectories, although further subtypes could, of course, be considered (Schaie, 2006). These patterns would classify individuals into those who age successfully (the 'super-normals'), those who age normally, those who develop mild cognitive impairment, and finally those who become clinically diagnosable as suffering from dementia.

The most common pattern is what we could denote as the normal ageing of psychological functions. This pattern is characterized by most individuals reaching an asymptote in early midlife, maintaining a plateau until their late fifties or early sixties, and then showing modest decline on most cognitive abilities through their early eighties, with more marked decline in the years prior to death (cf. Bosworth *et al.*, 1999). They also tend to become more rigid and show some changes on personality traits in undesirable directions (Schaie *et al.*, 2004). Among those whose cognitive ageing can be described as normal, we can distinguish two subgroups. The first includes those individuals who reach a relatively high level of cognitive functioning and who, even if they become physically frail, can remain independent until close to their demise. The second group, on the other hand, who only reach a modest asymptote in cognitive development, may in old age require greater support and be more likely to experience a period of institutional care.

A small subgroup of adults experiences what is often described as 'successful ageing' (Fillit *et al.*, 2002; Rowe & Kahn, 1987). Members of this group are often genetically and socio-economically advantaged; they tend to continue cognitive development later than most and typically reach their cognitive asymptotes in late midlife. While they too show some very modest decline on highly speeded tasks, they are likely to maintain their overall level of cognitive functioning until shortly before their demise. They are also likely to be less neurotic and more open to experience than most of their age peers. These are the fortunate individuals whose active life expectancy comes very close to their actual life expectancy.

The third pattern, that of mild cognitive impairment (MCI; Petersen *et al.*, 1999), includes that group of individuals who, in early old age, experience greater than normative cognitive declines. Various definitions, mostly statistical, have been advanced to assign membership to this group. Some have argued for a criterion of 1 standard deviation of performance compared to the young adult average, while others have proposed a rating of 0.5 on a clinical dementia rating scale, where 0 is normal and 1.0 is probable dementia. Earlier, the identification of MCI required the presence of memory loss in particular. However, more recently the diagnosis has been extended to decline in other cognitive abilities. There has also been controversy on the question of whether individuals with a diagnosis of MCI inevitably progress to dementia, or whether this group of individuals represents a unique entity; perhaps one could denote them as the 'unsuccessful ageing' (cf. Petersen, 2003).

The final pattern includes those individuals who in early or advanced old age are diagnosed as suffering from dementia. Regardless of the specific cause of the dementia, these individuals have in common dramatic impairment in cognitive functioning. However, the pattern of cognitive change, particularly in those whose diagnosis at post-mortem turns out to be Alzheimer's disease, is very different from normal ageing. When followed longitudinally, at least some of these individuals show earlier decline, perhaps starting in midlife.

Normative changes in intelligence

The study of normal age changes in intelligence has long been informed by Cattell's (1963) theory of 'fluid' and 'crystallized' intelligence. Fluid abilities are sometimes also referred to as the mechanics and crystallized abilities as the pragmatics of intelligence (Baltes *et al.*, 1999). It has been proposed that the fluid abilities show a relatively early peak in young adulthood with subsequent linear decline, while crystallized abilities, which depend on acculturation and information maintenance, tend to peak in midlife and maintain a fairly high level until close to death (Bosworth *et al.*, 1999). I will describe first a co-constructionist model that links the differential impact of neurobiological and sociocultural factors to normative changes and cohort differences in cognitive abilities. I will then provide examples of cross-sectional age differences and longitudinal age changes in normal populations, and will offer a possible algorithm approach to determine whether a given individual is ageing at a slower or faster rate than his/her age-cohort peers.

The co-constructionist model

Those studying cognition from a broad co-evolutionary perspective propose that advances in cognition, as represented in cohort and generational effects,

are primarily due to an accumulation of cultural resources and knowledge across time. This perspective has been largely non-developmental. It is concerned primarily with secular trends in *level* of cognitive performance, but with little consideration of how culture affects developmental change. Dickens and Flynn (2001) have proposed that an individual's environment is largely matched to their IQ level. Through a multiplier effect, an individual with a higher IQ either seeks or is selected for a more stimulating environment, leading to further increases in IQ. The impact of small environmental changes could result in significant IQ gain, due to the multiplier effect. By a similar process, a social multiplier effect can occur if intellect increases by a small amount for many persons in a society and leads across time to further reciprocal interactions between ability and environment. Increase in a person's IQ is thus influenced not only by their environment but also by the social multiplier effects occurring for others with whom they have contact. The question remains of what determines the domain of development or cognition that is affected by culture and environment. Drawing upon Darwin's work, Flynn suggests that an 'X factor' may determine those aspects of development that are affected by the environment (Dickens & Flynn, 2001). The 'X factor' need not be inherently related to the developmental domain affected. For example, introduction of specific programming on television (such as the Olympics) might increase public attention and participation in a given sport, which then leads to increased physical fitness. The X factor, or period effect, here is television or specific programming.

In a related co-evolutionary approach, Tomasello and others (Dawkins, 1989; Dunham, 1991; Tomasello, 1999) have proposed mechanisms for social transmission of cultural knowledge. Humans have evolved forms of social cognition unique to themselves, which have enabled them not only to create new knowledge and skills but more importantly to preserve and socially transmit these cultural resources to the next cohort/generation. Cultural learning thus involves both social transmission of cultural knowledge and resources developed by one person, and also sociogenesis or collaborative learning and knowledge creation

Expanding upon Li's triarchic view of cultural domains, accumulated cultural resources can be viewed as structural variables such as educational level, occupational status, and ability level. These variables reflect the individual's prior acquisition and accumulation of cultural knowledge and skills. In contrast, the second component of the triarchic view of culture focuses on the current activities, habits, and beliefs of the individual that are shaped by concurrent social dynamics and processes. The individual's current activities in domains such as health behaviours, cognitive engagement, and the complexity

of work tasks are viewed as aspects of social dynamics that affect cognitive functioning and cohort differences in cognition. The neurobiological influences of particular relevance to intelligence are thought to be the domains of chronic diseases and of biomarkers.

Secular cohort trends in cognition

For several decades, there has been an intensive debate on the nature and directionality of cohort differences in cognition. Cross-sectional data from several Western societies indicate the occurrence of 'massive IQ gains on the order of 5 to 25 points in a single generation' (Flynn, 1987, p. 171; Flynn, 1999). The 'Flynn effect' has been documented primarily for post-World War II cohorts born in the 1950s. This massive cohort gain has been documented most clearly for fluid abilities, rather than crystallized abilities. Relatively little rationale has been offered for why fluid rather than crystallized abilities would show these positive trends for post-World War II cohorts. In contrast, cross-sectional reports on college admission tests indicate negative cohort trends for certain birth cohorts of young adults (Wilson & Gove, 1999). Likewise, Alwin (1991; Alwin & McCammon, 2001) and Glenn (1994) reported negative cohort trends in verbal ability.

In order to examine cohort-related shifts in the domains of intelligence affected by culture, an extensive database of multiple cohorts studied over the same developmental ages is needed, such as is present in the Seattle Longitudinal Study (SLS; Schaie, 2005). Studies such as Flynn's highlight some of the serious limitations in prior cohort studies of cognition: focusing only on level rather than developmental change in cognitive functioning, on a limited number of cohorts, over a single age period, and with no consideration of cohort-related differences in trajectory patterns (cf. Schaie *et al.*, 2005).

Generational differences in cognition

Studies of secular trends in cognition have focused almost exclusively on unrelated cohorts. The study of biologically related generations is important for several reasons. First, comparison of cohort versus generational data permits examination of whether a similar increase in prevalence of positive developmental trajectories hypothesized to occur across cohorts is also found across generations. More importantly, the comparison of the relative impact of neurobiological versus sociocultural influences, in biologically related individuals versus cohorts, would inform the relative potency of cultural and genetic influences on intelligence at various developmental periods. For example, the co-constructionist perspective posits that the influence of neurobiological factors increases in old age and exceeds the impact of cumulative

cultural influences. A more stringent test of the increased impact of neurobiological factors in old age should be the study of successive family generations in contrast to successive unrelated cohorts, given the shared genetic material and environment across generations. The increased influence of neurobiological factors in old age is based in part on the assumption among evolutionary theorists that positive selection effects are most clearly manifest early in the lifespan and that the expression of deleterious genes in old age has been less constrained by the evolutionary process (Finch & Kirkwood, 2000).

Timing of impact of sociocultural and neurobiological influences

Based on co-constructionist and dual intelligence approaches, sociocultural and neurobiological influences vary in the timing of their impact in the early (Figure 1.1) and later half of adulthood (Figure 1.2). Accumulated cultural resources are represented by structural variables such as educational level, occupational status, and ability level, which are acquired and accumulated primarily during the first half of adulthood. Social processes affect the current activities, habits, and beliefs of the individual, represented by activities in domains such as health behaviours, cognitive engagement, and the complexity of work tasks. Neurobiological influences are represented by the two domains of chronic diseases and of biomarkers, shown in the literature to affect cognitive change in adulthood.

Both fluid and crystallized intelligence are affected during the first half of adulthood (Figure 1.1) by cultural resources (e.g., education, occupation) that are accumulated during the early part of adulthood. The accumulated resources influence development of concurrent cultural activities (e.g., cognitive

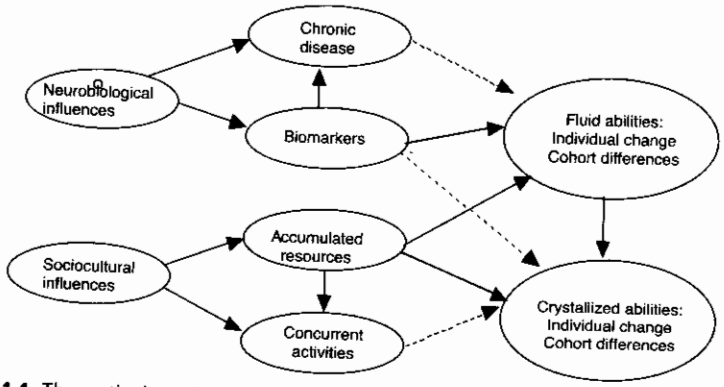

Fig. 1.1 Theoretical models for cognitive changes from young adulthood to midlife. Solid paths represent stronger influences; dotted lines, weaker influences.

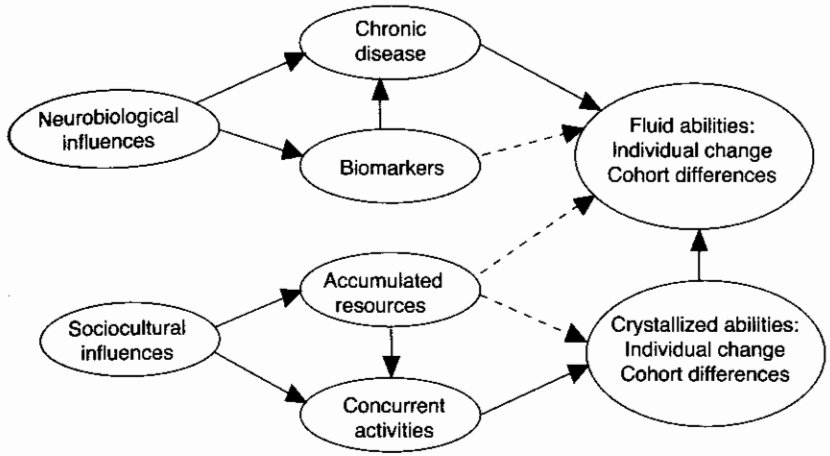

Fig. 1.2 Theoretical model for cognitive changes from midlife to old age.

engagement). Recent research indicates that biomarkers such as Apo-E4 affect fluid ability particularly throughout childhood and adulthood. These biomarkers (e.g., c-reactive protein) also influence the preclinical phase of chronic disease early in adulthood.

According to the Dual Intelligence model, fluid intelligence underlies the development of crystallized intelligence. In the second half of adulthood (Figure 1.2), accumulated resources such as educational level are established and cognitive functioning, particularly crystallized intelligence, is maintained through current culture-based activities (e.g., cognitive engagement). Maintenance of fluid intelligence is affected by the onset of the clinical phase of selected chronic disease (e.g., hypertension, cardiovascular disease) with the major influence on fluid intelligence. Selected biomarkers (e.g., Apo-E, c-reactive protein) mediate the onset and severity of selected chronic diseases. According to this model, crystallized strategies and compensatory mechanisms maintain and compensate for fluid intelligence losses.

Cross-sectional age differences and longitudinal age changes

Although an omnibus IQ measure, derived from intelligence tests such as the Weschler Adult Intelligence Scale (WAIS), might provide a reasonable estimate of overall cognitive functioning, it must be recognized that such an index would not reflect both normal and abnormal changes in the component abilities underlying the overall measure. It is important to note that different mental abilities have different life courses, both with respect to the age at which the average asymptote is reached and the onset

of statistically significant average decline. Similarly, age differences represented by cross-sectional data will be affected by sociocultural and neurobiological influences, which differ for successive cohorts for specific abilities.

I will illustrate these age- and time-related patterns with examples from my cross-sectional and longitudinal data gathered over the past five decades in the context of the Seattle Longitudinal Study (Schaie, 2005). This study has collected data on five cognitive abilities in people aged from their twenties to their eighties, at 7-year intervals, and over seven successive cohorts sampled from the same Health Maintenance Organization (HMO) population of community-dwelling normal adults residing in western Washington State, USA.

Figure 1.3 provides an example of the shift of cross-sectional patterns over time, with part (a) of the figure showing average data collected in 1970 and part (b) showing similar data collected in 1998. It will be noted immediately that over this 28-year period age differences between the youngest and oldest groups have lessened markedly. Performance levels have increased overall for all abilities, except number skills, which have dropped. Also noteworthy are differential peak performance ages. These occur in young adulthood for

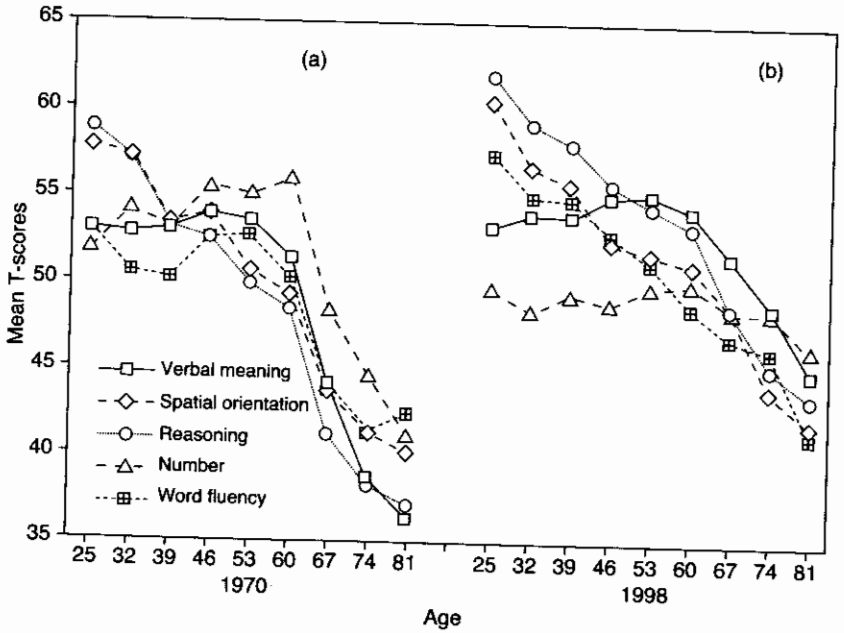

Fig. 1.3 Cross-sectional age differences for five mental abilities in 1970 and 1998 in the SLS.

reasoning, spatial orientation, and word fluency, but only in late midlife for the verbal and number abilities.

Longitudinal patterns are depicted in Figure 1.4. The data underlying this graph are based on cumulative intra-individual change over a 7-year period for all individuals with two-point data over a particular 7-year interval from age 25 to age 88, regardless of cohort membership. They are then centred on the average observed level at age 53, the average age of our study participants when tested. In contrast to the cross-sectional data, asymptotic performance is reached for word fluency at age 39; for number and spatial orientation at age 46; and for inductive reasoning and verbal ability not until age 53. Except for number ability, no statistically significant average decline is observed until the late sixties are reached. Thereafter average decline accelerates into the eighties.

What accounts for the differences between the cross-sectional data? As discussed in the section on the age–cohort–period model, the cross-sectional data confound age and cohort differences. Hence, the steeper age differences hide the fact that there has been marked gain in asymptotic performance level for most abilities over successive cohorts. On the other hand, the apparent stability of number skill until old age in the cross-sectional data hides the fact of negative cohort differences for this ability, probably due to changes in educational practice.

Figure 1.5 shows cumulative cohort differences for the five mental abilities displayed in the previous graphs, as well as a cohort gradient for an omnibus

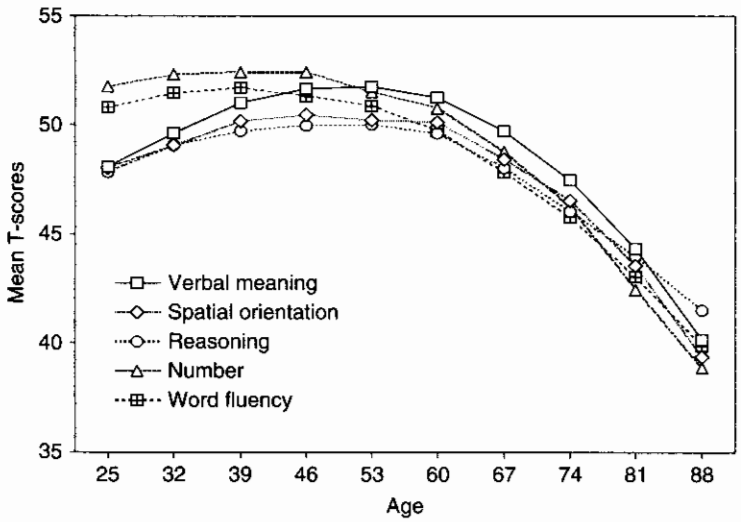

Fig. 1.4 Longitudinal age changes for five mental abilities in the SLS (from Schaie, 2005, p. 116).

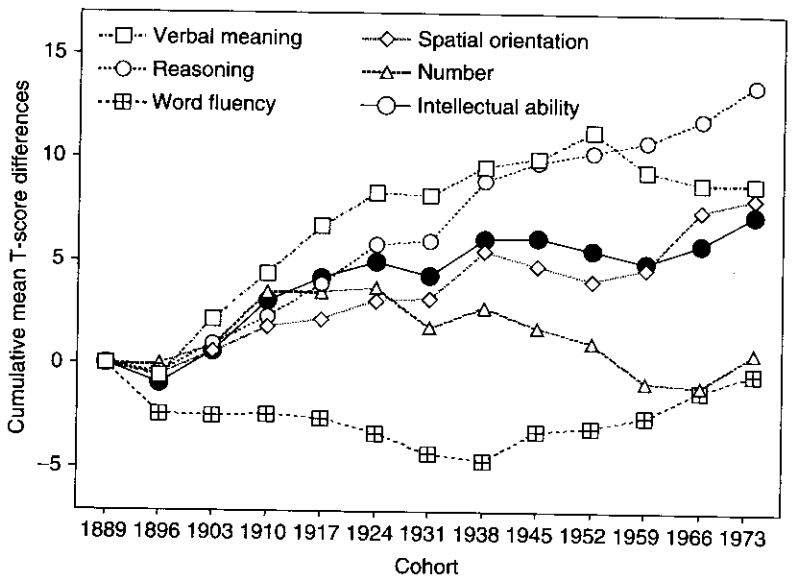

Fig. 1.5 Cumulative cohort differences for five mental abilities and an overall index of intellectual ability in the SLS (from Schaie, 2005, p.137).

index of mental abilities. The latter indicates a generally positive pattern across cohorts born from 1889 to 1973. However, cohort gradients for the separate abilities deviate markedly. Thus, almost linear gains were observed across cohorts for inductive reasoning and spatial orientation. Verbal ability attained a peak for the 1952 cohort and declined slightly thereafter. Number ability attained a peak in 1924 and has declined since then, while word fluency declined until 1938 but has returned to the level of the oldest cohort.

Normative changes in personality

Psychodynamic theories of personality assume that an individual's personality structure is developed early in life and remains largely stable throughout adulthood. Similar conclusions were reached early on by personality trait theorists. More recent research, however, suggests that a more differentiated approach needs to be taken. In this section I will consider the issue of the stability of individual differences in personality across adulthood, give some examples of cross-sectional and longitudinal data that would argue for substantial normative personality development across adulthood, and then address the distinction between normative and non-normative events that may mediate personality changes during adulthood.

Stability of individual differences

From a lifespan perspective, research conducted within a personality trait framework (cf. Starratt & Peterson, 1997) is more informative than psychodynamic approaches (but see the discussion of empirical studies informed by Eriksonian theory above). We need first to make the distinction between the concepts of 'state' and 'trait' in personality. A state reflects a response to a transient situation, while a trait represents the enduring response patterns that are exhibited by a person in many different contexts. The two are not totally unrelated, of course, and systematic responses to many transient situations may well crystallize into trait patterns over time (Kim *et al.*, 1996, Mroczek *et al.*, 2006).

One of the major contributions of longitudinal studies in the context of trait psychology has been to demonstrate substantial stability of personality traits across adulthood. Studies following groups of the same individuals have demonstrated this stability, even though there may be change in some individuals under certain circumstances and there may be considerable differences in average trait scores over different generations and in different cultures (see Costa & McCrae, 1992b, 1994).

Extensive factor analyses of personality descriptors using the English language typically have shown five core dimensions at most life stages (e.g., Costa & McCrae, 1992a; Hofer *et al.*, 1997). These core dimensions have been measured most explicitly by the NEO Personality Inventory (Costa &McCrae, 1992c). The NEO is a 240-item questionnaire that offers measures of the traits of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (the so-called 'big five'). Cross-sectional studies have found fairly comparable adult age differences (e.g., Costa, McCrae, Martin *et al.*, 2000; Yang *et al.*, 1998), including findings of age differences between college age and middle adulthood (Costa, McCrae, de Lima *et al.*, 1999). As is to be expected, despite the structural similarity, correlations with culture-related outcome variables differ in cross-cultural comparisons (Staudinger *et al.*, 1999).

Normative developmental changes

Although there is impressive stability for the NEO factor structure from adolescence across the adult life span, there are both cross-sectional age differences and longitudinal age changes. Cross-sectional differences, as shown in Figure 1.6, suggest negative age differences in neuroticism and extraversion, but also in openness to experience across successive cohorts when compared at the same point in time. Conscientiousness remains fairly flat, but agreeableness (or docility) is largest for the older generations (Schaie, 2005).

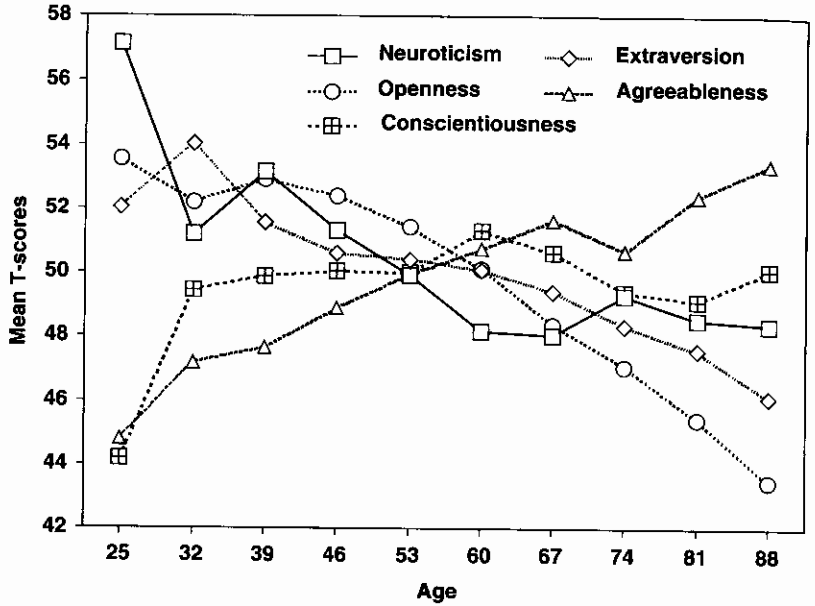

Fig. 1.6 Cross-sectional age differences on the five NEO Personality Inventory factor scales in the SLS (from Schaie, 2005, p. 305).

Longitudinal studies report modest declines in neuroticism and extraversion and an increase in agreeableness between college age and later adulthood. In fact, individual differences show only modest stability in young adulthood, but after the age of 30 both average levels and individual differences in personality traits remain extremely stable, suggesting that full maturity of the adult personality is reached by that age. The earlier changes have been interpreted as important antecedents of establishing the dynamics of social support in midlife (Von Dras & Siegler, 1997). The long-term stability of personality has also been shown in a study that transformed trait ratings of college graduates over a 45-year period to the NEO dimensions (Soldz & Vaillant, 1999). As shown in Figure 1.7, in the Seattle Longitudinal Study both neuroticism and agreeableness increase with age, whereas extraversion and conscientiousness decline with age. Openness to experience peaks in midlife and then declines to young adult levels (Schaie, 2005; Schaie *et al.*, 2004). Differences in findings from previous studies may well be due to the broader population sample included in the SLS.

Non-normative changes

Life experiences have an influence on one's personality. Losing one's job after 30 years can be disillusioning; the individual may become anxious, depressed,

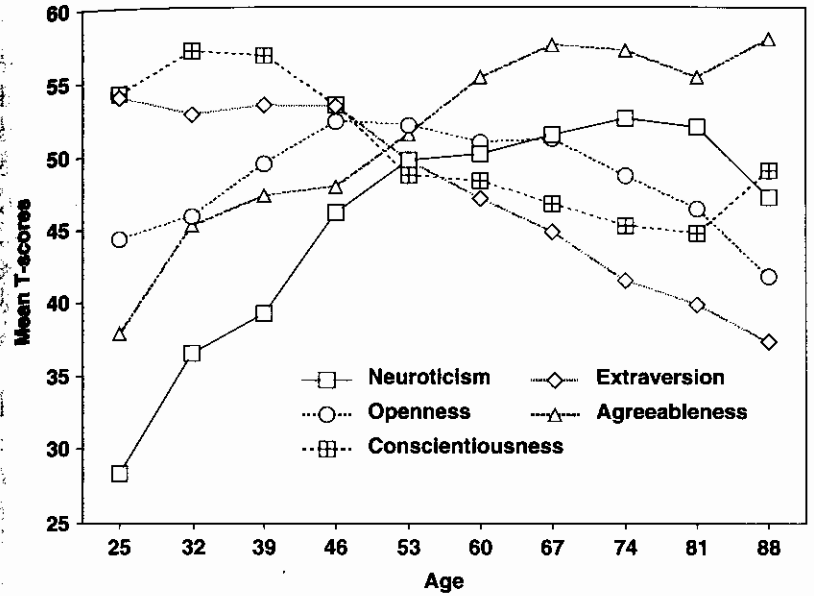

Fig. 1.7 Longitudinal age changes on the five NEO Personality Inventory factor scales in the SLS (from Schaie, 2005, p. 306).

and less confident. A satisfying marriage may provide a solid base in life, turning an anxious personality into a vital, optimistic, and self-assured one. The death of a loved one, an increase in responsibility for others, a religious conversion, drug addiction, medical problems or psychotherapy—all these can change an individual's personality in significant ways. It is characteristic of such life experiences, however, that they are not experienced by everyone or at the same age or life stage.

To learn more about changes occurring in some individuals under specific circumstances, research methods are required that are designed for the collection and analysis of extensive data over time in such selected individuals or in dyads of individuals who affect each other, such as mother–child pairs or spouse pairs. What has become known as the 'P-technique' method is becoming more popular for such analyses (e.g. Shifren *et al.*, 1997).

Normative changes in motivation and emotion

This section will summarize findings on some of the socio-emotional bases for normal age changes and then comment briefly on the topic of emotional intelligence.

Socio-emotional bases for normal age changes

The emotional lives of older persons have been found to be as good as or better than those of younger adults, which, if anything, indicates improved emotional regulation (Carstensen *et al.*, 2003). Many of the basic components of emotion, such as physiological responsivity, expression, and subjective experience of emotions, change little from young adulthood. However, declines have been found in the magnitude of physiological reactions (e.g., Tsai *et al.*, 2000) and in reports of emotional experiences (e.g., Mroczek & Kolarz, 1998). On the other hand, older adults have been found to exercise greater emotional control and to have more complex emotional experiences (Carstensen *et al.*, 2006). Older adults also report positive increases in subjective experiences such as environmental mastery (Ryff & Keyes, 1995), and increasingly positive relationships with their families (Fingerman, 2000). Selective cognitive processing, moreover, allows older persons to devote their attention and memory to those aspects of information input that are most likely to enhance their positive mood state (Mather & Carstensen, 2005).

It may be concluded, then, that age benefits emotional regulation (Carstensen *et al.*, 2003) and that decreases in negative and increases in positive effects tend to enhance emotional experience in the normal elderly.

Emotional intelligence

Many reviews of the literature on emotion and motivation conclude that their normal development needs to be considered in the context of their intersection with cognition (cf. Carstensen *et al.*, 2006; Schaie & Lawton, 1997). As a consequence there have been substantive theoretical efforts to consider the development of emotional intelligence over the lifespan (e.g. Mayer *et al.*, 2000). However, a number of methodological problems remain to be resolved before this construct can find a secure place in developmental science. At the time of writing, the status of emotional intelligence as a distinct construct has not been sufficiently validated, nor have studies been conducted that speak to the developmental differentiation of this construct from other forms of intelligence (cf. Schaie, 2001).

Ageism in the psychology of ageing

From a lifespan perspective, many of the statements made by psychologists about normal development in the last third of life have been clouded by what can only be described as buying into common societal stereotypes that we now call ageism (Hummert, 1999; Schaie, 1988). Such ageism seems to be informed by the assumption of universal declines in cognitive competence

and the development of other undesirable psychological characteristics with advanced age. They also have been informed by clinicians' experiences in encountering primarily older clients with psychological problems, rather than the large number of elderly whom we would describe as ageing successfully. In a rapidly changing society we also continue to confuse differences between old and young that are a function of greater educational and other opportunity structures for the younger cohorts with age-related changes (see above). This confusion leads to language in the scientific literature that interprets age differences reflecting complex population differences as 'ageing decline' (Schaie, 1993).

Assumption of universal decline

Negative stereotypes about the elderly are ubiquitous with respect to many domains of behaviour and perceived attributes (Hess, 2006), even though some exceptions are found in attributed wisdom and altruistic behaviour (cf. Pasupathi & Löckenhoff, 2002). Perhaps one of the most serious assumptions made by many psychologists is that of universal cognitive decline. While it is true that the proportion of individuals who show cognitive decline increases with each decade after the sixties are reached, it is equally true that many individuals do not show such decline until close to their demise, and that some fortunate few in fact show selective ability gains from midlife into old age. Figure 1.8 shows data from the Seattle Longitudinal Study to document this point (Schaie, 2005).

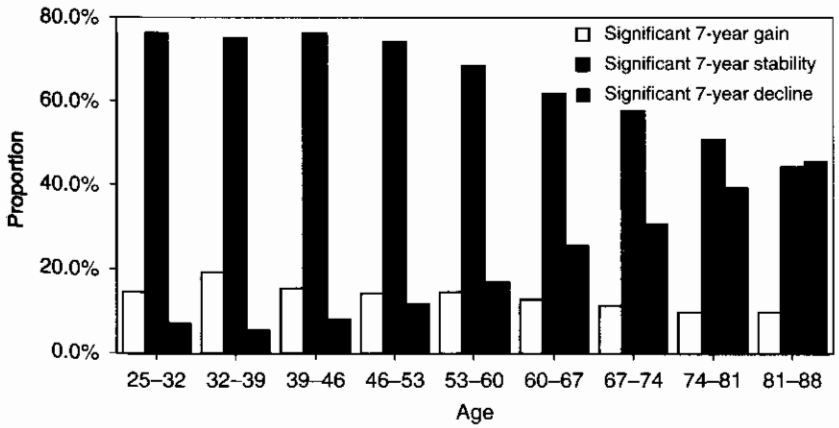

Figure 1.8 Proportions of SLS study participants showing significant gain, loss or stability over 7 years.

Pathology as normative ageing

Another major source of ageism among psychologists and members of the health and health-related professions in general has been the assumption that age-related cognitive losses as well as other behavioural deficits inevitably accompany the ageing process. Although there is some controversy over the possibility of disease-free ageing, it is still important to distinguish between biological changes that occur in many individuals with increasing age and the presence of specific physiological or psychological pathologies that may not be age-related, even though they occur with greater frequency at advanced ages (cf. Solomon, 1999). The fact remains that chronic disease, frequently associated with ageing, often has its origin in genetic predispositions and becomes clinically relevant over a wide age range. While cognitive decline affects significant portions of the elderly population, its symptomatology is often confused with that of metabolic and/or sensory disturbances. Indeed, there is no compelling reason to believe that selective age-related ability declines will inevitably lead to dementia, nor that they cannot be addressed by cognitive training or psychotherapy in many individuals (cf. Willis, 1996).

Summary and conclusions

I have attempted to provide a fairly concise lifespan perspective on what some would call normal psychological ageing. To do so, I began by outlining what seem to be the most useful currently available theoretical frameworks that include statements about psychological development from young adulthood to advanced old age. I then reminded us that psychologists must never confuse age differences that may largely represent cohort differences, associated with rapidly changing environmental circumstances, with age changes that occur within individuals over their life course.

As part of this analysis I continued to emphasize the wide range of individual differences in level of functioning at any adult stage. I distinguished between normal and pathological ageing, as characterized by very different ageing trajectories that distinguish between individuals who follow average trajectories, those who decline early, those who develop neuro- or psychopathologies, and those few favoured 'super-aged' who remain fully functional until shortly before their demise.

Because changes in intellectual competence represent such a central topic in the psychology of ageing, I then presented examples of data for such changes through adulthood. Clearly, there is little cognitive decline not associated with pathological processes prior to the decade of one's sixties, but some genetically and environmentally disadvantaged individuals show decline in their late forties or early fifties, which may be indicators of eventual risk of dementia

occurring in late adulthood. I also presented age difference data and related them to differential cohort paths for different abilities over the past 70 years.

Briefer accounts were provided for normative age changes and age differences in personality, emotion, and motivation. While personality patterns remain fairly stable across adulthood, there are both cohort differences and intra-individual changes for some personality traits. For example, neuroticism and agreeableness both increase with age, extraversion and conscientiousness decline, and openness to experience peaks in midlife. On the other hand, it is clear from cross-sectional data that older generations have higher levels of agreeableness and lower levels of extraversion and openness to experience.

Although there is a dearth of longitudinal studies of emotion and motivation, cross-sectional evidence would suggest that older people, on average, maintain a high level of emotional integration and control. However, older individuals tend to be far more selective of the targets of emotional response, and they tend to engage cognitive mechanisms to maintain and increase positive emotions.

Finally, I reflected on the topic of ageism in the psychology of ageing and suggested that the major influence for much professional stereotyping may be found in the assumption of universal cognitive decline and movement towards negative personality traits with increasing age. I showed data that suggest such decline is not universal, although larger proportions of older persons show decline for each successive decade after their sixties are reached. I also suggested that negative professional stereotypes are formed in part by the fact that health service providers see primarily older people with problems that may or may not be age-related, but have only infrequent contact with the many elderly who age successfully.

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