

THE MANY DIMENSIONS OF AGING

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A Stage Theory Model of Adult Cognitive Development Revisited

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Some 20 years ago, K. Warner Schaie (1977–1978) formulated a stage theory of cognitive development that included three adult stages, based on findings from research on adult intellectual development. In introducing this model, he suggested that his previous empirical work on psychometric intelligence had generally shown that the largest differences in cognitive function between young and old are on the whole not ontogenetic in nature. Instead, the largest age differences were often found when individuals were compared who belonged to generations differing in the asymptotic level of acculturated materials acquired in young or middle adulthood (Schaie, 1974). Nevertheless, even if these changes over age within individuals on measures validated for the young are relatively modest until advanced old age, this does not necessarily mean that the young and the old are cognitively alike. Indeed, simple observation required the admission, if only in terms of face validity, that there ought to be some qualitative age-related changes. Hence, Schaie and colleagues (Willis & Schaie, 1986, 1993) concluded that the processes which have been documented for the acquisition of cognitive structures and functions in childhood and during the early adult phase may not be altogether relevant for the maintenance of functions and reorganization of structures required to meet the demands of middle age and later life.

As will be discussed in this chapter, we now believe that there is indeed continuity from childhood into old age with respect to the basic processes and complex skills measured in the context of psychometric intelligence (Schaie, Willis, Jay, & Chipuer, 1989). But we also believe that these processes, in adulthood, represent only the *necessary* conditions for adequate cognitive functioning. As Schaie surmised in 1977–78, there are thought to be additional processes that would enhance explanations of qualitative and quantitative changes in cognitive function occurring throughout the adult

lifespan. Schaie began to articulate an alternative model for adult cognitive development which might provide a blueprint for the development of new descriptive strategies. He did not elect to posit more complex post-formal stages of thought as have been proposed by writers such as Commons et al. (1990), Labouvie-Vief (1992), or Sinnott (1984, 1996) that imply further changes in cognitive structures per se. Instead, influenced by work of sociologists and anthropologists (e.g., Berry & Irvine, 1986; Kohn & Schooler, 1983; Lowenthal et al., 1975; Riley, 1994) his model explicitly addressed contextual demands that impact adult cognitive functioning. Before proceeding it needs to be made clear that we are talking exclusively about the process of normal cognitive aging. No effort is made to speculate on how the occurrence of dementia might affect the progression of cognitive changes.

In this chapter we will expand the original model by specifying two additional adult stages. We then provide a rationale for the necessity of maintaining performance, at least above minimal threshold levels, on the psychometric abilities so important in youth and young adulthood. We will also consider the importance of certain cognitive styles and personality in the maintenance of adult cognitive functioning. Finally, we will consider the role of cooperative modes of cognitive performance; that is, the role and support of a partner in problem-solving efforts.

THE 1977-78 ADULT STAGE MODEL

The Achievement Stage

Schaie began with the observation that Piaget's childhood stages describe primarily increasing efficiency in the acquisition of new information (cf. Flavell, 1963). He doubted that adults progress beyond the powerful methods of science (formal operations) in their quest for knowledge. Therefore, if one is to posit adult stages, they should not be further stages of acquisition, but instead they should reflect different uses of intellect. For example, in young adulthood, people typically switch their focus from the acquisition to the application of knowledge, as they use what they know to pursue careers and families. This was called the achieving stage. It represents most prominently the application of intellectual skills in situations that have profound consequences for achieving long-term goals (such as those involving decisions about career and marriage).

The situations described above, of course, are not the hypothetical ones posed on educational tests or encountered in classroom studies, nor are they the problems of childhood whose solutions are closely monitored by parents and society. Instead, they are problems adults must solve for themselves, and the solutions must be integrated into a life plan that extends far into the future. The kind of mental abilities exhibited in such situations is similar to that manifested in scholastic tasks, but it requires more careful attention to the possible consequences of the problem-solving process. Attending to the context of problem solving is similar to health-care decision making, where the conse-

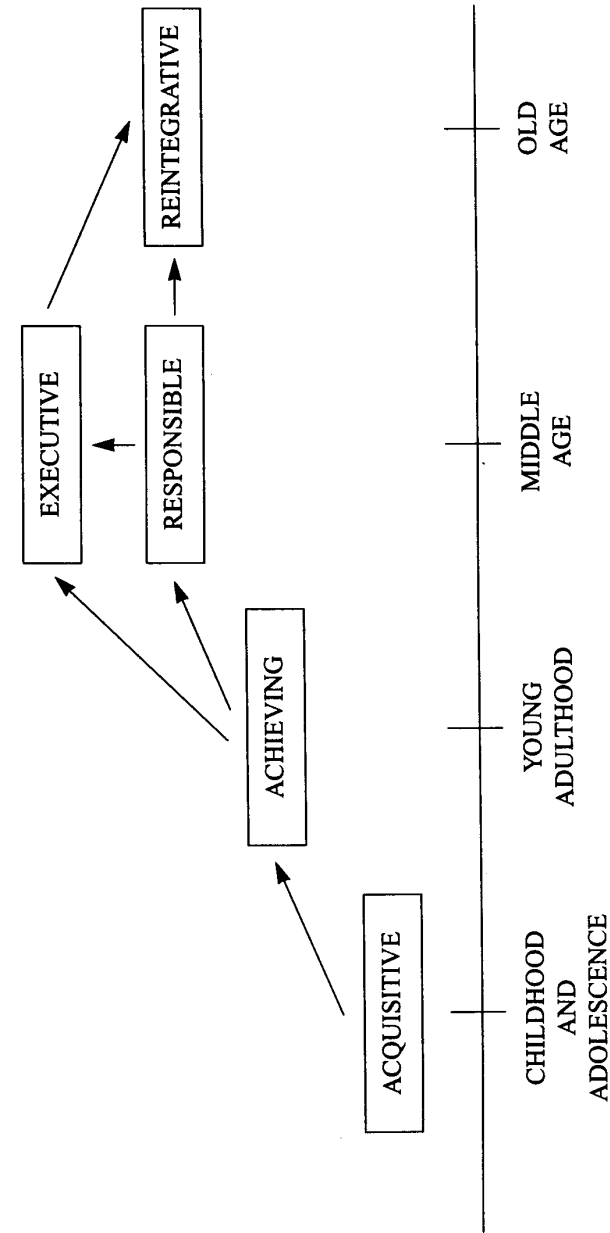


Figure 10.1 Schema depicting the original 1977-79 cognitive stage model.

From K. W. Schaie (1977-1978). Toward a stage theory of adult cognitive development. *Journal of Aging and Human Development*, 8, 133. © 1978 Banwood Publishing Company, Inc. Reproduced with permission.

quences of a particular decision can involve the maintenance or termination of one's life (Lawton, 1997; Smyer, Schaie, & Kapp, 1996). Figure 10.1 provides a schematic depicting the original 1977–78 stage theory model.

The Responsible and Executive Stages

Young adults who have mastered the cognitive skills required for monitoring their own behavior 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 spouse and offspring must be attended to. Similar extensions of adult cognitive skills are required as responsibilities for others are acquired on the job and in the community (Hagestad & Neugarten, 1985).

Some individuals' responsibilities become exceedingly complex. Such individuals—CEOs of business firms, presidents of academic institutions, officials of churches, government officials, and people 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. The number of individuals requiring this level of thinking is larger than might be thought. They are found among the approximately 25% of both men and women in the labor force who are in the professional job category which often involves executive responsibilities (Department of Labor, 1992). Attainment of the executive stage, as a variation on the responsible stage, depends on exposure to opportunities that allow the development and practice of the relevant skills (Avolio, 1991; Avolio & Waldman, 1990; Smith, Staudinger, & Baltes, 1994).

It should be noted that the executive stage is not narrowly age-based. Although it usually begins in late midlife, there are exceptions of persons taking leadership roles in their late 30s and early 40s. By the same token, while for most persons the executive stage will end in their early 60s, there are some who continue on into their 70s and 80s. Noteworthy examples of the extension of the executive stage may be found among Supreme Court justices and church leaders. Indeed, as life expectancy has increased, and in the case of the United States, mandatory retirement by reason of age has been abandoned or delayed, the executive stage may be prolonged into old age for many professionals. It should also be noted that persons with executive experience are being called out of retirement with increasing frequency to serve as professional consultants, or to cover vacant positions on an interim basis in periods of economic expansion or political change.

The Reintegration Stage

In the later years of life, beyond the age of 70 or 75, the need to acquire vast domains of substantive knowledge declines even more. The necessity of monitoring decisions in

terms of long-term consequences also decreases, because the future appears more short-term. Executive monitoring is less important, because frequently the individual has retired from the position that required such an application of intelligence. What, then, is the nature of cognitive functioning in an elderly adult? Schaie (1977–1978) suggested that there is a transition from the childhood question “What should I know?” through the adult question “How should I use what I know?” to the question of later life “Why should I know?” This final stage, reintegration, corresponds in its position in the life course to Erikson's (1963, 1984) stage of ego integrity. The information that elderly people acquire and the knowledge they apply is, to a greater extent than earlier in life, a function of their interests, attitudes, and values (Dittman-Kohli, 1990; Wong, 1989). 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 is frequently faced in their lives, or that involves a one-time decision that is of critical importance to them (see also Berg, Klaczynski, Calderone, & Strough, 1994).

TWO ADDITIONAL STAGES

The Reorganizational Stage

Since the original stages were formulated, we have learned a lot about the differentiation of our older population into distinct life stages. In the research literature, distinctions are now commonly made between the young-old, the old-old, and the oldest old (or very-old; Suzman & Riley, 1985). This differentiation is informed by the fact that today's young old are distinguished from the middle-aged primarily by the fact that the vast majority of persons in this life period are no longer engaged in the world of paid work.

A major effort must now be expanded in reorganizing one's life such that the earlier engagement with family raising and job responsibilities, characteristic of what we call the responsible or executive stages, is replaced by an effort to substitute meaningful pursuits for these activities. In addition, activities are directed towards planning how one's resources will last for the remaining 15 to 30 years of post-retirement life characteristic for most individuals in industrialized societies (Brandstädter & Renner, 1990; Brim, 1992; Smith, 1996). These activities include active planning for that period in life when one may expect dependence upon others in order 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 locality of residence, as well as making sure of the eventual availability of both familial and extrafamilial support systems. In this context it may become increasingly important to make or change one's will, to execute advanced medical directives, or to provide durable powers of attorney, as well as to create 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 (Lawton, 1997; Smyer et al., 1996).

While some of these activities continue to require the cognitive characteristics of the responsible stage, we think that the objectives involved are generally far more centered to current and future needs of the individual rather than the needs of their family or of an organizational entity. Prior to retirement, most persons' time and resources are devoted primarily to the world of work and to raising family. 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 their larger kinship network. Eventually, however, these activities are also engaged in with the finitude of life in clear view, for the purpose of maximizing the quality of life during the final years and often with the objective of not becoming a burden for the next generation (Lawton, 1997). Because of the unique objective of these demands upon the individual, we believe that we can recognize an almost universal process occurring at least in the industrialized societies, and believe designation of a separate stage termed the reorganizational stage is warranted.

The cognitive skills required for the reorganizational stage require the maintenance of high levels of cognitive competence as measured by psychometric intelligence. However, for the successful older individual, cognitive competence is increasingly exercised within the parsimonious principles of optimization and compensation (P. B. Baltes, 1987; Baltes & Baltes, 1990; M. M. Baltes, & Carstensen, 1996; Dittman-Kohli & Baltes, 1990). In addition, we would expect that maintenance of flexible cognitive styles will be important in being able to restructure the context and content of one's life upon retiring from the world of work. This flexibility is also needed in making provisions that require relinquishment of control over one's resources to others and the partial surrender of one's independence (Schaie, 1984, 1996).

Unless a person reaches early old age in poor health and in a dependent condition, the reorganizational stage becomes a necessary intermediate phase before the transition into the reintegrative stage can occur. Once these tasks have been accomplished, the maintenance of cognitive skills may become less critical, although it remains an important prerequisite for retaining support systems and exerting some control over one's life. Nevertheless, feelings of personal efficacy (Lachman & Leff, 1989), locus of control (Bandura & Jourden, 1991), and effective states (Lawton, Kleban, Rajagopal, & Dean, 1992) may now play an increasingly important role and socioemotional concerns may become more prominent (Blanchard-Fields, 1996). That is, perhaps already beginning as part of the reorganizational stage, we now see a selective reduction of interpersonal networks in the interest of reintegrating one's concern in a more self-directed and supportive manner (Carstensen, 1993; Fredrickson & Carstensen, 1990). Such efforts are likely to involve a reduction in information-seeking activities while increasing the importance of emotional regulation involved (Carstensen, Gross, & Fung, 1997).

The Legacy-Leaving Stage

As more and more older persons reach the end of their life in advanced old age in relative comfort and often with a clear mind, albeit a frail body, once the reintegrative efforts

have been successfully completed, and perhaps temporally overlapping with it, there is yet one other stage that might be suggested. We are here concerned with the cognitive activities engaged by many of the very old in anticipation of the end of their life. We would like therefore to postulate a final legacy-leaving stage, which is of importance in the cognitive development of many, if not all, older persons.

This stage may well begin by the self- or therapist-induced effort to conduct a life review (Butler, Lewis, & Sunderland, 1991). For the highly literate and those successful in public or professional life (in fact, for all who think that their life is worth writing about and of potential interest to others) it will often include writing or revising an autobiography (Birren, Kenyon, Ruth, Schroots, & Swenson, 1995).

Obviously maintenance of long-term memory and verbal skills is required to complete such an autobiographical task. But the reflection involved also include judgments that are informed by the socioemotional importance of the events and other actors to be included in the autobiography. But there are other more mundane legacies to be left. Women, in particular, 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. Not uncommon is a renewed effort to provide oral history or explain family pictures and heirlooms for the next generation. Last but not least, directions are given for funeral arrangements, occasionally including donation of one's body for scientific efforts, and there may be a final revision of one's will. All of these activities require cognitive competencies, and all of them involve exercising these competencies within a socioemotional and interpersonal relationship context.

The suggested time-line for the revised stage model is provided in Figure 10.2. It should once again be stressed that what we think is important is the sequential process of these developmental stages; not the precise chronological age at which they occur, which may be quite variable in different societies and for individuals at different levels of intellectual competence and personal engagement.

ROLE OF BASIC ABILITIES IN ADULT COGNITION

One of the themes revisited in this paper is the role in later stages of adult cognition of those basic mental abilities that are particularly salient during the acquisition stage. Some have contended that there is little relationship between the basic abilities traditionally studied in early phases of cognitive development and the cognitively demanding tasks pursued in middle and later adulthood (Berg & Kłaczynski, 1996; Sternberg & Wagner, 1986).

Hierarchical Relationships

We have suggested, however, that a hierarchical relationship exists between these more basic forms of intelligence and the complex cognitive tasks involved in the achieving and responsible stages (Willis, 1991; Willis & Schaie, 1993, 1996). Similar to Berry and

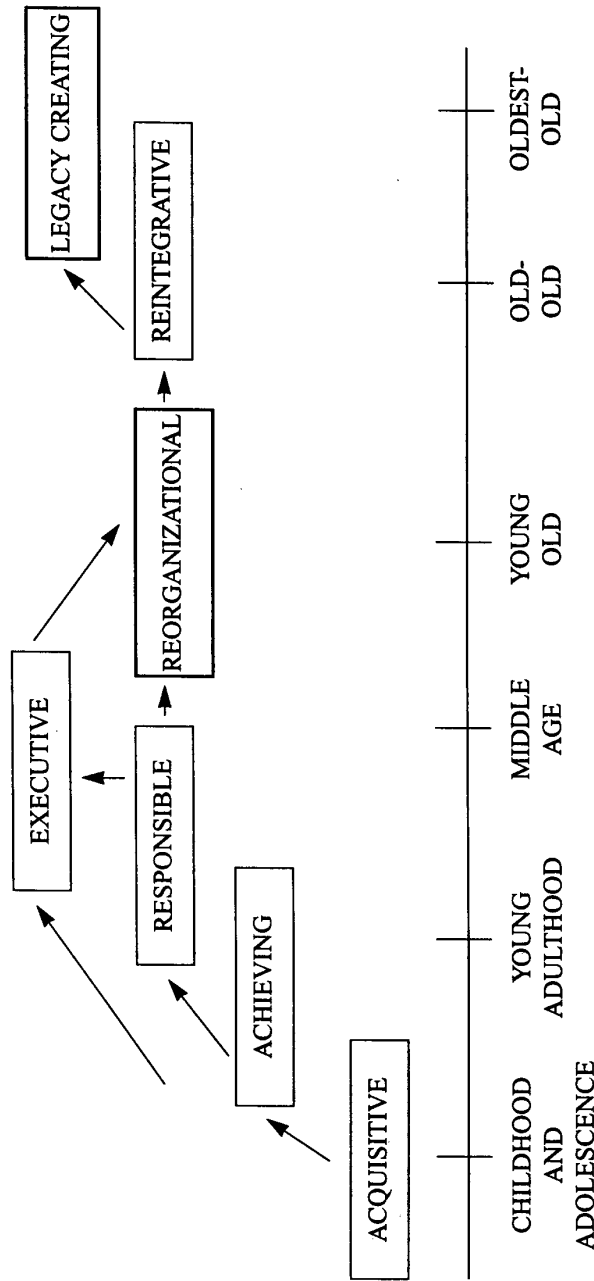


Figure 10.2 Schema depicting the revised cognitive stage model.

Irvine (1986), we propose that the cognitive processes and abilities that seem to dominate the acquisition phases are universal across cultures. When nurtured and directed by a particular society or at a particular stage of life, these processes and abilities develop into cognitive competencies that are manifested in daily life as the bases for cognitive performance in adulthood. In other words, the basic abilities and processes represent genotypic forms of intelligence that are relatively context- or culture-free. On the other hand, everyday competencies, as represented in activities of daily living, are phenotypic expressions of intelligence that are context- and age-specific.

The particular activities and behaviors that serve as phenotypic expressions of intelligence will vary with the age of the individual, that person's social roles, and the environmental context. The relative salience of a particular ability in the performance of everyday tasks is determined in part by the historical and environmental context. For example, as computer-based technologies become more pervasive in all areas of life in Western society, the basic ability of inductive reasoning is becoming increasingly salient in many areas of the adult experience, including work, leisure, social communication, and health care.

Mental Abilities and Instrumental Activities

The relation of basic mental abilities, such as reasoning, memory, and verbal ability, to adult work tasks such as report writing, scheduling, and supervision that occur in the responsible and executive stages seems intuitively plausible. The question arises, however, whether these basic abilities remain relevant to the tasks that older adults perform once they leave the work force, during the reorganizational and reintegrative stages. There are considerable individual differences in what types of activities older adults engage in during these phases, when priorities are shifting. Nevertheless, there are certain domains of tasks that are considered essential for maintenance of independent living. These tasks become increasingly important to almost all adults during later adulthood. Seven task domains have been identified as critical for independent living: Management of finances, transportation, taking medications, telephone usage, meal preparation, shopping for necessities, and housekeeping (Lawton & Brody, 1969).

In our research on the concurrent relationships between the basic mental abilities and performance of cognitively demanding tasks in these activity domains, we have found that over half of the individual differences variance in older adults performance on everyday tasks can be accounted for by mental ability performance (Willis, 1996; Willis & Schaie, 1994). Because different psychometric abilities exhibit different patterns of age-related change in later adulthood (Schaie, 1990), we were particularly interested in the specific abilities that were related to everyday task performance.

Cattell (1971) has differentiated between two broad domains of mental abilities. Crystallized abilities (e.g., verbal, social reasoning) are said to reflect acculturated influences, such as level of schooling. In healthy older adults, crystallized abilities remain stable, on average, showing little or no decline until old-old age or in close proximity to

death (Bosworth, 1997; Schaie, 1996). In contrast, fluid abilities (e.g., inductive reasoning, spatial orientation) are said to be impacted by neurological assaults and to exhibit earlier patterns of decline beginning on average in the mid-60s. Thus, older adults' performance on cognitively demanding everyday activities would be expected to show different patterns of developmental change, depending on whether such activities are more closely related to fluid or crystallized abilities.

In our own research both fluid and crystallized abilities have been found to account for substantial proportions of variance in everyday task performance, although a somewhat greater portion of variance was accounted for by fluid abilities (Diehl, Willis, & Schaie, 1995; Schaie, 1996). In our hierarchical model of ability-everyday competence relationships, basic mental abilities have been hypothesized to be the salient antecedents of performance on cognitively demanding tasks in later stages of cognitive development. Thus, lagged rather than concurrent relationships needed to be examined. Fluid ability at the first occasion of measurement was found to predict everyday task performance 7 years later (Willis, Jay, Diehl, & Marsiske, 1992). Everyday task performance predicted abilities at the second occasion significantly less well. Therefore, our hypothesis that adequate performance on basic abilities represents necessary, although not sufficient, antecedents of subsequent everyday task performance was supported.

An association between basic abilities salient in the acquisitive phase and everyday tasks of concern during later cognitive stages, such as reorganizational stage, has been observed not only when the abilities were represented within the psychometric ability framework, but also when basic cognitive processes were represented within a clinical diagnostic framework. Our recent work indicates that processes such as time, orientation, word fluency, short-term memory, and executive functioning are also associated with performance of tasks of daily living (Willis, Dolan, & Bertrand, 1999).

One of the most notable differences between phenotypes of intellectual functioning as represented during the acquisitive and later stages is the level of complexity of the types of tasks involved. That is, many cognitively demanding tasks in the acquisitive phase focus on or represent a single mental ability or process. For example, traditionally, schooling has involved a series of classes or courses, each focusing largely on a single cognitive domain (e.g., math, reading.) In post-secondary education, as training for the achievement phases becomes foremost, the courses focus on more complex substantive domains and skills (e.g., accounting, personnel management). Our research and that of others indicates that the more complex cognitive tasks more common to the later stages seldom represent a single basic mental ability. The tasks are complex, in part, because they require the application of *multiple basic abilities*. As noted earlier in the chapter, the complexity of cognitive functioning in the later stages is not only due to the fact that multiple cognitive abilities are involved, but also because the individual must determine when and how social and emotional knowledge as well as personal experience needs to be incorporated into the problem solution (Blanchard-Fields & Abeles, 1996; Willis & Schaie, 1993).

Personal Knowledge and Problem Solving

The role of prior experience in problem solving in later adulthood has become a topic of increasing interest (Meyer, Russo, & Talbot, 1995; Leventhal & Cameron, 1987). The rich and vast experiences acquired over a lifetime would seem to serve older adults well in making-decisions and solving problems in the later years. The utility of this vast store of prior experience, however, depends on the older adult's judgment of when and how to apply this knowledge base.

Sinnott (1989) has described age-related modes of problem solving. A youthful style is characterized by a "bottom-up" approach; the young lack relevant knowledge and compensate by gathering large amounts of information and focusing on data rather than on prior experience. In contrast, the old style represents primarily a "top-down" approach. Older adults are seen as applying somewhat indiscriminatory and extensive knowledge acquired through a lifetime of experience. Procedural knowledge or heuristics developed through prior experience are sometime used with little consideration of whether these procedures are relevant to the problem at hand. Sinnott states (1989, p. 96) that the old style is suited for "rapid, low energy-demand solutions done by the experienced solver with many available structures of knowledge. It was top-down in style with little attention to data, probably because of poor memory capacities." The mature style is characterized as the optimal approach and is said to be more evident in midlife. [It suggests a balance of the bottom-up and top-down as most efficacious.]

Support for Sinnott's old style is found in our recent error analyses of older adults' solutions to everyday tasks (Willis et al., 1999). Subjects provided answers based on prior life experiences with seemingly little consideration or awareness of whether solutions relevant to prior problems remained appropriate for the present situation. With regard to the relationship between basic abilities and subsequent cognitive stages, we have found, as Sinnott suggests, that errors based on inappropriate use of prior experience are associated with poorer memory performance among the elderly. Perhaps inappropriate use of prior experience is a compensatory mechanism that is employed when the older adult is faced with a situation that appears superficially similar to past activities, but the older adult lacks the memory resources or psychological energy to determine whether the critical features (procedural knowledge) of the current problem and prior experience are sufficiently relevant.

PERSONAL CONTROL AND COGNITIVE AGING

Personal control is defined as an individual's beliefs or attitudes regarding the extent to which outcomes or performance are due to his or her own doing, as opposed to forces outside the self (Levenson, 1975). Those who believe that their own actions are responsible for outcomes are said to have an internal control orientation. In contrast, those who believe that outside forces such as fate or powerful others are responsible for outcomes

in their life are said to have an external orientation. Of particular concern in this chapter are beliefs about one's own intellectual functioning in the later years.

What does the elder believe about the locus of control over cognitive aging? Longitudinal research conducted by Lachman and Leff (1989) and in our laboratory (Willis et al., 1992) indicate that age-related increments do occur in external control orientations in the elderly. With increasing age, elders ascribe greater control over cognitive aging to circumstances beyond their own efficacy. In particular, there is an increasing belief in the role of powerful others as a source of control. The older adult reports that a significant other in their life (doctor, adult child, minister) is better able to make decisions regarding their affairs than they are. Findings on age-related change in internal control (belief in self-efficacy) are less consistent, with some studies reporting stability while others actually find an increase with age (Lachman & McArthur, 1986).

While in self-efficacy research there has been limited attention to the individual differences perspective, two categories of correlates/predictors of control orientation have been reported. First, Rodin, Timko, and Harris (1985) have reported that with aging health factors, particularly vision and hearing, are significant predictors of internal control beliefs regarding cognition in old age (Willis, Marsiske, & Diehl, 1991). Second, level of performance on psychometric abilities has been found to be a long-term predictor of control beliefs in both Lachman's and our own research. Specifically, psychometric abilities predict subsequent level of control beliefs. In contrast, control beliefs have not been shown to be significant predictors of later intellectual functioning (Lachman & Leff, 1989; Willis et al., 1992).

COOPERATIVE MODES OF COGNITION

A final topic of concern in revisiting the cognitive stage model is the role of shared cognition during the later stages. We hypothesize that cognitive functioning is increasingly likely to involve other individuals, either because of the increasing frailty or limitations of the individual, or because the substantive focus of cognitive tasks takes on a greater social focus in later life (Baltes & Staudinger, 1996; Blanchard-Fields & Abeles, 1996). In the early acquisition phase the focus is on the individual's development of specific mental abilities. Academic performance in Western society focuses largely on individual achievement rather than on group products. Thus, most theories of intellectual development during the early years are concerned with the individual *per se*.

Social Interaction and Problem Solving

As the individual joins social groups in the achievement phase as a part of work or family development, decision making and productivity become more social in nature. The influence of social interactions in carrying out cognitively demanding tasks continues in the responsible and executive phases. When adults aged 19 to 80 years were asked

how they went about solving fundamental life problems, the most frequent reply was that they consulted others (Staudinger & Baltes, 1985). Seeking the advice of others was in fact reported as the most common source mode at all ages. In old age, advice seeking may take the form of locating the locus of control in powerful others (Levenson, 1975). By delegating control to others, proxy control allows the elderly person to maintain earlier goals through the assistance of others (Bandura, 1982).

Research in social psychology on the role of social interaction in relation to cognition has provided some interesting findings (Staudinger, 1996). In general, social interaction is conceived as providing a supportive context for cognitive activities. Studies at younger ages suggest that the mere presence of others may impact cognitive functioning. The individual is more likely to be alert and persistent in cognitive-type tasks when these tasks are performed in the presence of others. Prior social interaction is also likely to influence the subsequent performance of the individual. The group may offer alternative solutions to a problem or require the individual to rethink an approach to a problem. In group problem solving, the strengths of various members of the group can compensate for the particular ability limitations of individual members (Steiner, 1972).

Zajonc (1960) proposed a theoretical formulation called *cognitive tuning*. When the individual is forced to verbalize or communicate certain information to others, this results in a greater differentiation (breadth, number of categories), complexity (depth, subdivisions), unity, and organization of one's own knowledge. However, social interaction *per se* is not sufficient to facilitate or enhance individual cognition significantly. The best approach is a combination of social interaction combined with individual reflection and problem solving. The individual formulates the problem and speculates on alternative solutions, then considers the problem with a group, and finally reflects on the individual and group's ideas regarding problem solutions (Osborne, 1957; Staudinger & Baltes, 1985).

Social Relationships and Life Review

Thus far, we have considered only the effect of social interaction on cognition with respect to problem solving and decision making. However, there are also research findings that social interaction can be facilitative in the reintegration stage when the focus may be on reflection on one's life, achievements, and disappointments. In the early life stages it has been shown that identity formation is mediated through feedback by others. The life review process suggests that interaction with others is important also in the reintegrative stage (Butler et al., 1991; Kenyon, Mader, & Ruth, 1999; Whitborne, 1986). Interaction with others, particularly with those who have known the individual for many years, can help provide different perspectives on the personal past and facilitate insight into the alternative interpretations of one's life experiences and accomplishments (Herzog & Markus, 1999; Markus & Herzog, 1991). Interaction with others, however, can also lead to negative and overly critical appraisals of one's life. Thus, the tendency of older adults to be selective in social contacts may reflect not only a decrease in psychological energy or need for emotional intimacy, but also represent the elder being judicious in whom they select to review the past with them.

SUMMARY

A more fine-grained understanding of the many faces of old age has led us to the conclusion that more than a single stage is required to describe adequately the contextually demanding cognitive development occurring in the last third of life. We therefore added a reorganizational stage which covers the period of transition from the world of work and primary family responsibilities to the more self-centered content and context of early old age. We also added a legacy creating stage to account for the cognitive aspects of end-of-life pursuits designed to pass on one's material and intellectual treasures to one's descendants.

Given two decades of relevant research since the original cognitive stage model was presented, we further felt an obligation to explicate more strongly our feelings about the lasting importance of basic cognitive skills as necessary, albeit not sufficient, bases for effective cognitive functioning at all life stages. Nevertheless, we also felt the need to give recognition to the increasing importance of socioemotional variables, as well as the as yet under-researched aspects of cooperative cognitive functioning in late life, and we attempted to relate these aspects to our model.

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