In C. B. Fisher & R. M. Lerner (Eds.), Applied Developmental Psychology (pp. 339-372). New York: McGraw Hill, 1994

CHAPTER

13

ASSESSING EVERYDAY COMPETENCE IN THE ELDERLY

Sherry L. Willis and K. Warner Schaie
The Pennsylvania State University

ABSTRACT

This chapter focuses upon the *assessment* of competence in the elderly. The concept of competence is reviewed as it has been applied in the study of adult development. Various approaches to the assessment of competence are described which include self-report, ratings by others, and performance-based clinical and psychometric assessment. Some attending methodological and procedural issues are also considered. The existing knowledge base on adult competence is summarized; its limitations and the interrelationship between assessment procedures and the knowledge base generated with these procedures are considered. Suggestions are offered regarding future directions of research on both conceptualization of competence and competency assessment issues.

ISSUES TO CONSIDER

- Why is the assessment of competence of particular importance in later adulthood?
- What are the salient features of everyday competence in later adulthood?
- At what level should everyday competence be assessed?
- What are the major assessment methodologies?
- What are the major differences between the age-comparative and the longitudinal approaches to the study of aging?
- What are the implications of individual differences for the assessment of adult competence

INTRODUCTION

The conceptualization and measurement of competence in older adults are currently two of the most central and critical issues in the field of gerontology. Theories and models of aging in both the basic and applied areas of gerontology are influenced by assumptions and beliefs regarding competence and change in competence in old age (Rowe & Kahn, 1987). Universal decrement models, whose primary theme was the global and linear decline of competence in old age, have been substituted for by more moderate positions. Nevertheless, a major topic of discussion in most areas of basic gerontological research is the timing and pattern of change or decline in the processes that underlie the expression of competence.

The definition and assessment of competence are of critical concern also in the more *applied* areas of gerontology. Indeed, perhaps the primary concern of the elderly themselves is the maintenance of competence into advanced old age. Opinion surveys indicate that many elderly fear loss of competence and the ability to live independently far more than the experience of illness, loss of financial resources, or even death (Clark & Anderson, 1967). Moreover, assessment of the elderly's relative level of competency and the services and interventions needed to maintain competence is a focal point of applied gerontological research relevant to public policy issues (Fillenbaum, 1987). Given the changing demography of our society, the tasks of sustaining competency in old age as well as the care of those whose competence has diminished in old age have become major national concerns.

The major focus of this chapter is upon the *assessment* of competence in the elderly. Nevertheless, methodological and procedural issues that relate to assessment cannot be divorced from the definition of the construct that is being assessed. We will begin, therefore, by discussing how competence has been conceptualized in the study of adult development. Second, we will consider various approaches to the assessment of competence and some attending methodological and procedural issues. Third, we will briefly review the existing knowledge base on adult competence, its limitations, and the interrelationship between assessment procedures and the knowledge base generated with these procedures. Finally, suggestions will be offered regarding future directions of research on both conceptualization of competence and competency assessment issues.

■ Conceptuallzation of Competence in the Elderly

Everyday competence involves the elderly's successful adaptation to environmental demands. It represents the aged's ability or potential to perform adequately those activities considered essential for living independently in our society (Lawton, 1987; Salthouse, 1990; Willis, 1991).

At least three different approaches have been applied to the study of everyday competence. First, *optimal* levels of competence in specific domains have been studied, an approach closely related to the study of expertise. For example, Charness (1989) studied competence among elderly chess masters, and Salthouse (1990) examined processes underlying expertise in highly competent older typists. These studies have found that although older experts may be somewhat deficient in basic cognitive processes, such as response

chunks of information by use of specialized knowledge systems. Baltes and colleagues (Baltes, Dittman-Kohli, & Dixon, 1984) have studied the competence of persons nominated as being exceptionally *wise* to solve complex problems that may be encountered at various stages in the life span. Wisdom is viewed as being positively associated with being old. A limitation of the concern with optimal levels of competence is that it focuses on highly selective samples and assesses competence with respect to *very specialized knowledge bases*, thus limiting the generalizability of findings to the average older adult.

A second approach has conceptualized competence as representing practical intelligence or *everyday problem-solving ability* and has examined the relationship between practical and academic forms of intelligence. Practical intelligence, in contrast to the traditional academic or information processing approaches studied in the laboratory, is said to focus on "real-world" problems that occur in naturalistic settings, is of intrinsic concern to the individual, and may involve multiple or ambiguous solutions (Sinnott, 1989; Sternberg & Wagner, 1986; Willis & Schaie, 1993).

The relationship between academic intelligence and practical intelligence is of particular concern in the study of cognitive aging, since models of academic intelligence have been derived largely from earlier stages in the life span and have been validated against developmental tasks (e.g., education, vocational aptitude) that may not be relevant to late life. It is reasonable to question whether such approaches and the corresponding measures still tap important cognitive processes for older adults facing qualitatively different developmental tasks and everyday problems.

We have suggested that a hierarchical relationship exists between the two forms of intelligence in our previous writing (Willis, 1987; Willis & Marsiske, 1991; Willis & Schaie, 1986). Similar to Berry and Irvine (1986), we propose that the cognitive processes and abilities represented in the traditional approaches to intelligence are considered universal across the life span and across cultures. When nurtured and directed by a favorable environment at a particular life stage, these processes and abilities develop into cognitive competencies that are manifested in daily life as cognitive performance. Everyday competence, as represented in activities of daily living, are *phenotypic* expressions of intelligence that are context- or 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.

A third approach to everyday competence is represented by the *functional assessment* literature (Fillenbaum, 1987; Lawton & Brody, 1969). Several large-scale surveys of noninstitutionalized elderly have been conducted to characterize the elderly population's competence to perform tasks in seven domains of daily living. These domains are known as the "instrumental activities of daily living" (IADL) (Lawton & Brody, 1969). They include: (1) taking one's medication; (2) managing one's finances; (3) using the telephone; (4) shopping for necessities; (5) preparing meals; (6) carrying out basic housekeeping chores; and (7) transporting oneself to locations outside walking distance. Level of competence has usually been assessed by self-report; the older adult is asked to rate his or her level of competence in each of the seven domains on a 3-point scale: Can perform without help, can perform with help, or unable to perform even with assistance. Survey research suggests that 20 to 30 percent of the community-dwelling elderly report having difficulty with one

The relationship between academic intelligence and practical intelligence is of particular concern in the study of cognitive aging.

■ A Developmental Perspective on Everyday Competence

The need to study and assess competence within a developmental context is of particular importance in later adulthood (Lerner, 1986; Schaie, 1990). Several characteristics of development and change in old age need to be considered. First, competence in later adulthood is not a static phenomenon. Quantitative and qualitative changes in competence will occur throughout old age. In contrast to earlier life stages, changes in competence in old age are *multidirectional*. Whereas in childhood and adolescence, unidirectional, positive increases in level of competence are the norm, in old age, there is increasing variability in the patterns of change in competence. For most healthy older adults, *maintenance* (stability) of prior levels of competence is the norm. However, with progressing age and the increasingly likelihood of chronic disease, many older adults will experience a *decline* in competence. Some healthy older adults with engaged proactive lifestyles may even experience an *increase* in level of competence in selected domains.

Second, there are *wide individual differences* in older adults' level of competence and the rate and pattern of change in competence (Schaie, 1990; Willis, 1985). The development of competence in the earlier part of the life span is more closely regulated by biological programming and cultural norms and thus has fairly limited bounds of interindividual variability. Once individuals reach physical maturity and social norms are less well established, variability increases across adulthood. In addition, the older adult's level of competence reflects the cumulation of a lifetime of unique experiences, resulting in increased in-

dividuation. The implication of increasing variability is that age norms become less useful in predicting the competence of the older individual. Hence, competence needs to be assessed at the *individual* level rather than by relying on normative tables that describe age-typical mean performance.

Third, in old age the *interrelationship* among different domains of development often becomes increasingly complex. For example, the older adult's competence in a task such as taking his or her medication may be significantly related to sensory acuity (e.g., vision), a relationship that is less likely to be significant at younger ages, when sensory deficits are uncommon. As a result of the increasing likelihood of interactions among various aspects of development, there is greater need to consider the *total* person in the assessment of competence.

■ Salient Features of Everyday Competence

What, then, are some of the major features that can guide both the conceptualization and assessment of everyday competence in later adulthood? If everyday competence involves the elders' ability to perform adequately those activities considered essential for independent living, then competence must be conceptualized and assessed as a *multidimensional* construct (Schaie, 1978; Willis & Schaie, 1993). The elderly's level of successful adaptation must be assessed along the varying domains of daily life described earlier. Of course, no listing of domains (such as the IADL) is totally comprehensive; some would, for example, question the omission of important domains of competence, such as interpersonal skills or leisure pursuits. It is important to note, also, that there will be wide individual differences in specifying what the critical domains might be. Given the varying lifestyles of the elderly, their differing levels of functioning and of physical and social support systems, one may also question what should be the critical criterion tasks within a domain necessary to assess competence for a specific individual.

Second, it should be noted that competence can be represented as a *hierarchy* of levels. In our own work, we have proposed that a hierarchy from basic to more complex abilities and skills underlies each domain of competence (Willis, 1987; Willis & Schaie, 1993). Much of our research has focused on identifying basic mental abilities and skills that can be characterized as the antecedents of complex problem-solving tasks that are associated with the display of competence. Hierarchies have also been proposed across different domains of competencies. For example, in the functional assessment literature, the hierarchical order in which the elderly are thought to lose competence in various domains (phone usage, meal preparation) has been given some attention (Fillenbaum, 1985). Important assessment issues are associated with procedures for defining the hierarchy and determining at what level within the hierarchy assessment is to be conducted.

Third, it is important that competency be addressed at the level of the *individual*. The competence of 80-year-olds ranges from the carefully reasoned opinions of some of our Supreme Court judges to the near vegetative existence of many nursing home residents. Because of these wide individual differences, normative data, even when broken down by demographic variables such as age, gender, and educational level, are of only limited utility in specifying the competence of a given individual. As will be discussed in more detail later in this chapter, the utility of normative data is limited further by cohort differences

in level of functioning and historical changes in the domains of competency considered essential for independent living in our society. For example, the criterion tasks employed to assess competency in domains such as telephone usage or financial management have changed significantly in the past few decades. Decisions regarding competence of an individual must therefore be based on careful assessment of a given individual, rather than relying upon group norms.

Fourth, we must distinguish between level of competence as *perceived* by the older adult as against competence level based on the measurement of actual *performance* or the appraisal of behavior samples. These approaches differ in the methods of assessment, possible discrepancies in the types of data obtained, and antecedents and outcome variables. The distinction is significant also because the types of services thought to be required by the elderly are often determined by the large-scale surveys of everyday competence that provide national profiles of the elderly. These surveys have been based on the elderly's self-report of their level of competence, rather than on any performance measures (Fillenbaum, 1985).

■ Why Should Competence Be Assessed In the Elderly?

Earlier in the life span, assessment of competence is closely related to socially agreed upon developmental tasks and social roles (Erikson, 1963; Havighurst, 1972). A major developmental task of childhood is the acquisition of cultural knowledge and skills through education, and thus assessment is a major component of the educational process. Likewise in young adulthood, the individual is expected to become established in an occupation and to assume many of the privileges and responsibilities (e.g., driving) of adults in our society. The individual's competence in these domains is often demonstrated by means of some form of assessment. Given the rapid expansion of scientific knowledge and technological change, many middle-aged adults are again required to demonstrate continued competence in their professions by submitting to some form of assessment (Willis & Dubin, 1990). However, in old age, our society has yet to establish well-defined developmental tasks or social roles (Hagestad & Neugarten, 1985; Schaie, 1978).

What, then, are the domains of competence that are of particular concern in old age? Education and work, the two contexts most closely associated with assessment of competence earlier in the life span, become far less salient for most older adults. However, for those choosing to continue in the workplace, demonstration of maintenance of professional competence may be an increasing concern (Stagner, 1985; Waldman & Avolio, 1986). With the elimination of mandatory retirement in virtually every sector of the work force, employers must show just cause for dismissal; thus, there is likely to be an increase in assessment of job-specific competencies.

Competence to live independently is arguably the most important form of competence in old age, both for the older adult and for society. Loss of independence by an older adult has profound implications for the individual, the family, and society. Psychologically, it represents a loss of control—the loss of power to make decisions regarding oneself and one's lifestyle, and the increasing dependence on others to make these decisions

with physical infirmities, resulting in loss of the ability to care for oneself and to transpor oneself when and where one desires. For the family, loss of competence by an older family member often means increased physical, social, and financial responsibilities for other family members with the accompanying strains (Brody, 1985). Finally, the elderly's loss o competence has significant implications for society, given the shifts in the age distributio of the population.

The past and future growth of the older population has been dramatic; the proportio of those over age 65 has grown from 4 percent of the total U.S. population in 1900, to 8 percent in 1950, to a projected 13 percent in the year 2000 (Cutler, 1991). The fastest growing segment of our population is those over the age of 85 years—the age group mos vulnerable to loss of competence. Although elderly Americans represent approximately one-eighth of the population, they account for more than one-third of the total health car expenditures (Department of Health and Human Services, 1990). It is a societal imperative, then, that competence of the elderly to live independently be fostered and enhanced A critical first step is the assessment of the older adult's current level of competence. This assessment of competence provides the database necessary for public policy planning and for the provision of services to sustain competence.

■ At What Level Should Competence Be Assessed?

Competence in a given domain (driving a car, managing finances) can be conceptualized a a hierarchy, with very basic microlevel processes and skills as the base and increasingly complex abilities at advanced levels in the hierarchy. In cognitive aging, primary attentio has been given to very basic cognitive processes (e.g., response speed, memory) that ar said to underlie the acquisition and maintenance of the more complex abilities and compe tencies. In previous writings, we have suggested that the lower levels of the hierarchy rep resent *genotypic* components and that complex problem-solving tasks (upper level of hierar chy) can be viewed as *phenotypic* expressions of that combination of genotypic component that, given minimally acceptable levels of motivation, will permit adaptive behavior in a situation (Schaie, 1978; Willis & Schaie, 1986). Since behavior in real-world contexts is o necessity complex, we assume that no single measure or genotypic component can ade quately predict competence; rather, some *composite* of genotypic components will best pre dict performance with respect to a given competence domain.

On what level within the hierarchy should one focus in order to assess and predic competence? We suggest that it is the complex behaviors and abilities represented at th *higher* levels of the hierarchy that will most efficiently predict competence to live indepen dently in our society. This focus on *products* (complex, previously acquired abilities an skills), rather than *process*, is in contrast to some current trends in the cognitive aging liter ature, which has focused on information processing involved in the acquisition of new in formation (cf. Schaie, 1987). However, competence to live independently likely reflect common everyday types of problem solving that involve the application of previously ac quired skills and abilities, not the development of new forms of thought. Thus, instead o the basic processes, it is the higher-order mental abilities that we have found in previou work to account for significant variance in complex real-world behaviors (Willis, 1991

APPROACHES TO THE STUDY OF COMPETENCE IN THE ELDERLY

As indicated earlier, competence in the elderly must often, but not always, be related to different criteria then those typically applied at other life stages. For some elderly, criteria such as performance in a work setting or proficiency in acquiring new skills in educational settings might be quite appropriate. But more frequently we will be concerned with relating competence in the elderly to issues such as maintaining their independence, including the management of their financial affairs, the management of their health needs, and their ability to effectively control how and where they will spend their remaining years. Thus competence in the elderly is primarily related to skills which are important in maintaining a high quality of life and engaging successfully in those behaviors that are likely to maximize their active life expectancy.(cf. Katz et al., 1983).

It may be quite appropriate to determine the individual's own perception of his or her perceived competence, particularly when one studies community-dwelling individuals who are currently engaged in effective self-maintenance. However, when questions are raised as to the possible need of extensive support and/or institutionalization, then observations by others or performance-based objective assessments would be more appropriate. In this section we will review a number of techniques that either were specifically devised for the assessment of adult competence or where large normative databases exist for this purpose.

■ Self-Reports

Several different approaches to self-report in the elderly may be found in the literature. The most widely used are a number of structured psychiatric interviews, but questionnaires and formal scaling methods have also been employed.

Interviews Perhaps one of the most widely used screening instruments to assess self-reported competence is the Older Adult Rating Survey (OARS) (Duke University Center for the Study of Aging, 1978; Fillenbaum, 1985; Galanos, Fillenbaum, Cohen, & Burchett, 1991). With this structured interview instrument, older adults are asked to report with respect to seven domains whether they can perform a given activity without help, with help, or not at all. The seven domains specifically assessed by this instrument include meal preparation, medication use, telephoning (the most frequently performed activities), shopping, financial management, housekeeping, and transportation. A summary six-point rating is then added by the interviewer across all domains.

Questionnaires Here we are concerned with people's beliefs about their intellectual competence. Responses to questionnaires tend to reflect individuals' appraisals of the relationship between their own behavior and potential outcomes (cf. Baltes & Baltes, 1986; Cavanaugh & Green, 1990). For example, Baltes, Wahl, and Schmidt-Furstoss (1991) found significant positive relationships between self-efficacy beliefs and perceived level of everyday competence. (For a more extensive review of self-efficacy and everyday problem solving, see Berg, 1990.)

A direct measure of perceived self-efficacy with respect to intellectual competence has been developed by Lachman (1983). Her multidimensional Personality in Context (PIC) questionnaire contains "intellectual self-efficacy" and "concern about intellectual aging" scales which have been related to psychometric measures of intellectual performance and to everyday problem solving (Lachman & Leff, 1989; Willis, Jay, Diehl, & Marsiske, 1992).

Similarly, several measures of memory self-efficacy and metamemory have been developed for older adults (Cavanaugh & Green, 1990). The Memory Self-Efficacy Questionnaire (Berry, West, & Dennehey, 1989) consists of ten memory tasks for which individuals assess their memory ability. The Memory Functioning Questionnaire (MFQ) (Gilewski & Zelinski, 1986) assesses seven dimensions of memory perceptions and complaints--general, retrospective functioning, frequency of forgetting, reading, remembering past events, seriousness, and mnemonics). Perhaps the more intensively studied scale is the Metamemory in Adulthood (MIA) instrument (Dixon & Hultsch, 1983), which assesses seven dimensions (strategy, capacity, change, anxiety, activity, achievement, locus).

Self-rating techniques A more objective way of obtaining subject-generated self-reports is to use rating techniques that substitute relative rather than absolute judgments. A Q-sort instrument for this purpose was developed by Scheidt and Schaie (1978) that permits older persons to rate their perceived relative competence in everyday situations. The instrument yields perceived competence scores on four situational attributes: social-nonsocial, active-passive, common-uncommon, and supportive-depriving. Age norms and correlations with psychometric abilities have been reported for this measure (Schaie, Gonda, & Quayhagen, 1981; Willis & Schaie, 1986).

Another Q-sort instrument that is suitable for appraising whether the client was referred to the appropriate treatment site is the Psychiatric Evaluation Index (PEI) (Weiss, Rommel, & Schaie, 1959). This multidimensional Q-sort provides relative values for the referents (e.g., physical health, mental health) and determinants (e.g., somatic, mentational, reality-distortive) of client complaints. The particular utility of this instrument in a clinic setting is to determine whether the presenting problems are such that assessment of competence is indeed a legitimate objective.

■ Ratings by Others

A perhaps more effective manner of using rating instruments (whether questionnaires or Q-sorts) is their employment for obtaining information from health professionals, confidants, spouses, or other family members. All the assessment approaches mentioned in the previous section are suitable for such application. It should be noted that family members often report more reduction in competence than is allowed for by the target subject (cf. Willis, 1991). Of perhaps greater interest is the possibility of studying the convergence or differences in ratings given by members of different health care or human services professions. An example of such use is a study by Schaie, Chatham, and Weiss (1961) in which psychiatrists, psychologists, and social workers engaged in the simultaneous assessment of clients with different presenting pathologies to study potentially different dispositions based on differential perceptions of the client's problem.

■ Performance-based Assessments

The objective assessment of intellectual competence in older adults has typically been conducted by means of standard intelligence tests. However, questions have been raised in recent years whether such tests might not measure primarily "academic" intelligence; that is, basic competencies related to school performance, rather than competencies that relate to the everyday experience of the older person (cf. Berg & Sternberg, 1985; Schaie, 1978). In response to these concerns competence in everyday problem-solving skills has also been investigated with normative data accumulating for some measurement instruments. It now appears that psychometric intelligence and practical intelligence represent hierarchical levels of competence rather than separate domains. That is, a given everyday competence as measured by practical intelligence tasks requires a combination of skills on underlying psychometric abilities (cf. Willis & Schaie, 1986; Willis, 1991).

Clinical assessment of competence The most commonly used instrument for the clinical assessment of adult competence is the Wechsler Adult Intelligence Scale (WAIS) (Matarazzo, 1972; Wechsler, 1981). This test contains eleven factorially complex subtests, from which an overall IQ as well as verbal and performance IQs based on subsets of scales are derived. Age-specific norms (by 10-year intervals) are available up to age 70. Because older clients are often referred for assessment because of suspected memory impairment, the WAIS is often supplemented by the Wechsler Memory Scale (WMS) (Wechsler, 1987). Other neuropsychological tests may also be used to assess memory lost or other specific cognitive dysfunctions that might be associated with dementia or other neuropathology (cf. Kaszniak, 1990; Poon, 1986). Another frequently used screening instrument for the early detection of senile dementia is the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975).

Substantial normative data are available for the WAIS. The clinical tests, however, primarily depend on cutoff scores dividing normals and individuals with pathology; that is, most neuropsychological tests contribute little to our understanding of individual differences in community-dwelling elderly without neuropathology.

Psychometric abilities Although there have been a number of longitudinal studies of older persons conducted with the WAIS (e.g., Siegler, 1983), the factorial complexity of the scales creates some difficulty if one wishes to assess changes and differences in competence that might be related to disuse of specific functions in individuals without neuropathology (Cohen, 1957). Our most comprehensive understanding of age changes in intellectual abilities has been derived in the context of Thurstone's (1938) primary mental ability framework as supplemented by the second-order constructs of *fluid* and *crystallized* abilities (Cattell, 1963; Horn, 1982). The major assessment instruments used have been the SRA Primary Mental Abilities test (PMA) (Thurstone & Thurstone, 1949) and its adult derivative, the Schaie-Thurstone Adult Mental Abilities test (STAMAT) (Schaie, 1985), as well as selected tests from the ETS kit of factor-referenced tests (Ekstrom, French, Harman, & Derman, 1976). Properties of these tests have been examined extensively (cf. Schaie, 1985; Schaie, Willis, Jay, & Chipuer, 1989). Longitudinal studies have [illegible] to the

Everyday competence There have been extensive experimental studies of everyday problem solving (cf. Berg, 1990; Denney, 1989; Sinnott, 1989). However, instruments whose psychometric properties have been carefully examined and for whom older adult norms exist are still relatively sparse (Willis & Marsiske, 1991). One such instrument is the Basic Skills Reading test (Educational Testing Service, 1977), originally designed for high school students. This test contains materials drawn from the everyday environment also faced by older adults (e.g., medicine bottle labels, maps, tax return forms, bus schedules, yellow page ads, and editorials).

A second measurement instrument, the Everyday Problem Solving Test (EPT) (Willis, Marsiske, & Diehl, 1991), is closely tied to the extensive work on defining instrumental activities of daily living (Duke University Center for the Study of Aging, 1978; Fillenbaum, 1985; Lawton & Brody, 1969; Willis, 1991). Specifically, an instrument with parallel multiple-choice and open-ended response forms is provided that assesses individuals' comprehension of written materials required for successful performance in the seven domains of medication use, telephone use, management of financial affairs, meal preparation, transportation, shopping, and housekeeping activities. Performance on this instrument has been validated against observed behaviors in subjects' homes (Diehl, 1991), and extensive data are available on psychometric characteristics and norms for adults from the sixties to the eighties.

Measures of everyday competence are likely to be most useful when information needs to be gained that is relevant to determining whether an older individual can continue to function independently or to determining specific areas of difficulty for which supportive services are required.

THE KNOWLEDGE BASE ON EVERYDAY COMPETENCE

In this section research findings are summarized regarding everyday competence in the elderly. Findings are reported from both age-comparative (cross-sectional) and longitudinal studies on self-report as well as performance-based measures. Given our hierarchical approach to the study of competence, findings will be included on basic mental abilities and performance on complex tasks of daily living.

■ Age-Comparative Research

Self-Report

Interviews Most of the self-report data on everyday competence comes from large-scale surveys of noninstitutionalized elderly, using a measure such as the OARS (Duke University Center for the Study of Aging, 1978). The survey research has benefited from representative sampling, but has been limited due to its cross-sectional design. Survey research suggests that 20 to 30 percent of the community-dwelling elderly report having difficulty with one or more instrumental activities of daily living (Fillenbaum, 1985, 1987;

Measures of everyday competence are most useful when information gained is relevant to whether an older individual can continue to function independently.

old (aged 60 to 74) and old-old (aged 75+) and the proportion of men and women who reported themselves able to perform competently in each domain without assistance. Age comparisons indicate a smaller proportion of old-old report the ability to function independently in each of the domains. Age differences are most evident for the three domains of shopping, transportation, and housekeeping.

Comparisons of men and women indicate no gender differences with respect to telephone usage, taking medications, or financial management (Fillenbaum, 1985). Men report themselves to be somewhat more competent with respect to shopping, housekeeping, and traveling to locations outside walking distance. Fillenbaum (1985) has argued that data on physical competence and mobility do not support the rationale that these gender differences can be attributed to differences between men and women in physical mobility. It has been suggested that men and women may have different standards for housekeeping, thus resulting in more men than women reporting continuing competence in this domain. Lack of adequate explanations for these age and gender differences highlights a limitation of the current self-report procedure for assessing competence in that there is little examination of the reasons (i.e., physical, mental, motivational) for which individuals perceive themselves no longer competent to perform in these domains.

Questionnaires Self-reports of competence using questionnaire data have focused on the construct of *personal control*—the individual's belief that outcomes are due to his or her own control, as opposed to forces outside the self (Baltes & Baltes, 1986; Cavanaugh & Green, 1990; Lachman, 1986). Internal control is associated with self-efficacy beliefs that older adults perceive themselves as competent to perform adequately in various domains of life. Cross-sectional findings appear to differ depending on whether personal control is conceptualized as a *unidimensional* construct (internal and external control as opposite ends of a continuum; Rotter, 1966) or whether control is conceptualized as *multidimensional*,

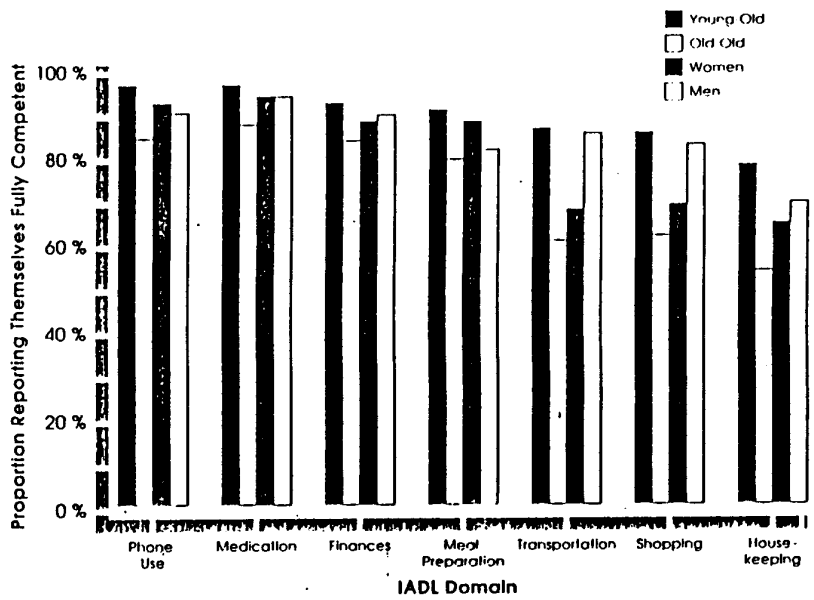

FIGURE 1 Proportion of persons reporting themselves as "fully competent." From "Cognition and Everyday Competence" (p. 97) by S. L. Willis, In K. W. Schale (Ed.), *Annual review of gerontology and geriatrics* (Vol. 11, pp. 80–109), New York: Springer.

with internal and external control as dimensions that can vary independently of each other (Levinson, 1974). Studies based on a unidimensional perspective are more likely to find that children and young adults have lower internal control beliefs than middle-aged and young-old adults; adults over age 70 may have somewhat lower internal control beliefs. In contrast, studies based on a multidimensional perspective have found that the elderly report stronger external control beliefs than young or middle-aged adults, particularly when control within *specific* domains, such as health or intelligence, is assessed (Lachman, 1986). These findings suggest that age differences in control beliefs are more likely to be found when personal control is studied as a multidimensional construct and beliefs regarding control in specific domains of life (health, intellectual competence) are assessed. Moreover, the distinctions between general and global assessment of control (Levinson, 1974) and context- and domain-specific control beliefs (e.g., health, intelligence) have been shown to be important in intervention research in that training effects are found for domain-specific measures (Dittman-Kohli, Lachman, Kliegl, & Baltes, 1991; Lachman, Weaver, Bandura, Elliott, & Lewkowicz, 1992).

The preceding paragraph has focused on *primary control*, where the emphasis is on individuals' beliefs regarding their ability to actively and effectively manipulate the environment or circumstances. *Secondary control* is another form of control that [illegible]

interest with regard to disabled or institutionalized elderly (Rothbaum, Weisz, & Snyder, 1982; Weisz, Rothbaum, & Blackburn, 1984). In secondary control, the individual achieves control by accepting environmental constraints, rather than attempting to alter them. Secondary control may be achieved by several mechanisms, such as being able to predict consequences and thus prepare for their psychological impact, by identifying with the primary controllers (e.g., nurses, caregivers), or by voluntarily turning control over to others (e.g., God's will). The utility of the secondary control concept in research with the institutionalized is illustrated by the Kranz and Schulz (1980) intervention study in which an increase in a belief in predictability of the nursing home environment was related to significant improvement in the psychological status of the treatment group.

Ratings by Others

Age-comparative research on competence based on the ratings of professionals has typically involved experimental studies in which judges evaluated the *same* behavior as being attributed to either a young or older adult. The general finding across these studies has been that products or behaviors attributed to older adults were judged to represent lower levels of competence, particularly when there were stereotypic beliefs regarding age-related decline in competence in the task domain being evaluated. Similar findings have been reported with respect to older workers. Waldman and Avolio (1986) found that objective measures of job performance (productivity) showed no decrease or relatively minor decrease with age; however, supervisors rated older workers somewhat lower than younger workers. Supervisory ratings were particularly likely to be lower for older workers in nonprofessional jobs. Age stereotypes also influence professionals' diagnosis and treatment of *loss of competence* in young versus older adults. One reason for lower rates of psychotherapy among the elderly is therapists' beliefs that older clients are usually senile and do not benefit from therapy (Haug & Ory, 1987).

Performance-based Assessments

Psychometric abilities Cross-sectional studies of the WAIS indicate that the magnitude of age differences varies across scales (Matarazzo, 1972; Salthouse, 1982). Several studies report no age differences among young, middle-aged, and older adults on the verbal scale, including the vocabulary, information, and comprehension subtests; some studies report slight negative age differences for the similarities test for those in their seventies. In contrast, negative age differences are regularly reported for the memory and performance components. Age differences in memory span have been reported with middle-aged adults performing at about 80 percent of the level of young adults [estimate of Salthouse (1982), based on data of Wechsler (1958) and Goldfarb (1941)]. On the more highly speeded performance tests, larger age differences are found. Salthouse (1982) estimated age differences on the order of 5 to 8 percent for each decade from 20 to 70 years, based on the data of Wechsler (1958) and Goldfarb (1941); for the digit symbol substitution test, the most speeded measure, somewhat greater age differences have been observed.

The finding that the magnitude of age differences varies by ability has been shown for more factorially "pure" primary mental abilities (Schaie, 1985; Thurstone, 1938). Although cross-sectional data also show age differences beginning in middle age, longitudinal studies suggest maintenance of functioning until the sixties are reached and selective decline thereafter (Schaie, 1983, 1989a, 1990). Given the slowing of processing speed with age, observed age changes are attenuated drastically when adjustments are made for perceptual and/or response speed (Hertzog, 1989, 1991; Schaie, 1989b). Findings from the Seattle Longitudinal Study (SLS) indicate that the greatest age differences are found for spatial orientation and inductive reasoning, abilities that involve abstract reasoning and speeded responding; the gradient of age differences was flattest for number ability (Schaie, 1983, 1989a).

The sequential design of the SLS permits asking the question whether the pattern of age differences can be replicated at multiple data points. The data indicate that across four successive cross-sectional studies, the age interval at which significant age differences are found has been increasing. For example, significant age differences in verbal ability were found between age 46 and 53 in the 1956 and 1963 cross-sectional studies, whereas the earliest significant age differences occurred between ages 60 and 67 for the 1970 and 1977 cross-sectional studies (Schaie, 1983).

Several cognitive training studies have compared the magnitude of training effects for young versus older adults (cf. Willis, 1987). These studies have typically reported significant training effects for both old and younger adults. In several studies, older adults exhibited as much training gain from pretest to posttest as did younger adults (Beres & Baron, 1981; Coyne, 1981; Erber, 1976; Grant, Storandt, & Botwinick, 1978; Le Breck & Baron, 1987). However, some researchers have argued that older adults should show *greater* training gain than young adults (Salthouse, 1982, 1990). This hypothesis of greater training gain for the elderly is based on several assumptions that longitudinal research findings indicate are not tenable (see following sections of this chapter). It is assumed that the elderly, when young, performed at a level comparable to the performance of young adults today; hence, following training older adults' performance level is expected to be comparable to that of young adults, if training reverses age-related decline. However, due to cohort differences, the elderly's performance as young adults was lower than that of today's young adults. Therefore, in order for training interventions to raise older adults' performance to that of young adults, the intervention would need not only to reverse any age-related decline but also to eliminate the cohort differences in performance. Our research findings indicate that brief training programs are effective in reversing some or all age-related decline, but the training programs do not eliminate cohort differences (Schaie & Willis, 1986; Willis, 1987).

Everyday problems tasks Several age-comparative studies have been conducted in the past decade in conjunction with the recent attention on practical intelligence within the cognitive aging literature (Park, 1991; Sinnott, 1989). In a study examining young versus older adults' ability to comprehend and remember prescription drug information, Morrell, Park, and Poon (1989) found that older adults showed poorer recall of well-organized drug labels developed by the experimenter. However, when real-world drug labels were used, comprehension errors increased for both young (14 percent) and older (21 percent) adults, and the age difference was not significant.

Extensive data on the ETS Basic Skills test, involving comprehension of written materials relevant to tasks of everyday living (e.g., reading a medicine label, interpreting a bus schedule) have been collected within the contexts of the Seattle Longitudinal Study (Schaie, 1990) and the Penn State Adult Development and Enrichment Project (ADEPT) (Baltes & Willis, 1982; Willis & Schaie, 1986). Average cross-sectional age differences on this measure (cf. Schaie & Willis, 1993; Willis, Jay, Diehl, & Marsiske, 1992) have been found. Age differences were examined in 7-year intervals (mean ages 32, 39, 46, 53, 60, 67, 74, 81, 88). Significant age differences were first identified between 67 and 74 years, with a sharp negative age gradient in the old-old and very-old subjects. It is particularly interesting that similar cross-sectional age gradients have been found for basic psychometric abilities involving abstract reasoning and for everyday tasks involving printed materials; significant age differences are not manifested until the late sixties with increasing interindividual variability in performance in old-old age.

■ Age-related (Longitudinal) Change

Self-Report Data

Interviews Change over a 1-year period in older adults' perception of their competence in activities of daily living was examined in an epidemiological study by Blazer (1978). This study compared the proportion of community-dwelling versus institutionalized elderly who reported themselves to have remained stable, to have declined, or to have improved in competence. Of the community-dwelling elderly, 44 percent reported that they remained at the same level of competence after 1 year, 38 percent indicated a decline, and 18 percent reported an improvement. By contrast, 52 percent of institutionalized elderly reported having declined, 31 percent had remained stable, and 17 percent reported improvement. What is of interest is that even among the institutionalized elderly 17 percent reported improvement, suggesting considerable plasticity in perceived level of functioning.

Questionnaires Lachman and Leff (1989) examined longitudinal change over a 5-year period in older adults' perceived control. No significant change was found on Levenson's general measure of control, including internal, chance, and powerful others scales. However, domain-specific beliefs in powerful others' control over health and intellectual functioning increased significantly. This aspect of external control involves the belief that other people are better able to perform tasks than the elderly and that one becomes more dependent on others to solve health or cognitive problems in later life. In addition, there was a significant decline in internal control beliefs with regard to health.

Similar findings regarding age-related change in beliefs regarding powerful others has been found in our own research over a 7-year interval (Willis, Jay, Diehl, & Marsiske, 1992). The reciprocal lagged relationships between control beliefs and performance on everyday tasks were also examined. Performance on everyday tasks was found to significantly predict control beliefs regarding intellectual functioning assessed 7 years later; however, control beliefs did not predict subsequent everyday task performance. Older adults who perform well on tasks of daily living are likely to continue believing themselves to be competent; this finding is important in that it suggests that older adults rely on their everyday task performance as a basis of their perceived level of intellectual competence.

Performance-based Assessment

Clinical measures Given the popularity of the WAIS both in basic research and in clinical applications, there is a serious dearth of data regarding age-related change in old age. Jarvik and Bank (1983) reported 21-year longitudinal change in the WAIS for an elderly twin study. Significant decline was found on the performance measures, which are highly speeded, from the sixties onward. However, no significant age-related decline was found on the verbal measures (nonspeeded) until approximately age 75; the gradient of decline on verbal measures became increasingly steep in the eighties and nineties. Similarly, Field, Schaie, and Leino (1988) reported significant decline, on average, over a 13-year interval for old-old (74 to 84 years) and very-old (85 to 93 years) adults on both verbal and performance WAIS measures. However, even at these advanced ages there were wide individual differences in patterns of decline. Over the 13-year interval, 62 percent of the old-old and 44 percent of the very-old exhibited no reliable decline in the verbal scale; decline was much more likely for the performance scale, with only 15 percent of the old-old and 6 percent of the very-old remaining stable.

Psychometric measures Data from the Seattle Longitudinal Study (SLS) (Schaie, 1985, 1990) indicate that the pattern of age-related change varies across abilities but that for all abilities, decline occurs later, on average, than is indicated by cross-sectional findings. For abilities involving abstract reasoning and speeded responding, which exhibit the earliest decline, reliable change is not shown until the late sixties, whereas cross-sectional gradients indicate age differences in the fifties or early sixties.

Second, there is considerable variability in the rate and pattern of decline with the majority of individuals in young-old and old-old age showing no decline in performance over a 7-year interval, even on those abstract reasoning and speeded abilities that exhibit the earliest *average* patterns of decline. Third, significant cohort differences in the level of ability performance are found when different cohorts are compared at the *same* chronological age; the direction of these cohort differences varies by ability. Figure 2 shows the differences in cohort level in percent of the performance of the earliest cohort for 11 cohorts born from 1889 to 1959 (Schaie, 1990). A positive cohort trend is shown for the reasoning ability. However, the peak in spatial orientation was shown for the 1938 cohort and for verbal meaning with the 1945 cohort. Even more striking is the peak in number skill which occurs for those born between 1910 and 1924, with decline thereafter. The differential data suggest that older cohorts are at a particular disadvantage on abstract reasoning abilities, but may have an advantage with respect to number skills.

Cohort differences in ability level have important implications for everyday competence, assuming our hierarchical model in which basic abilities underlie performance on many everyday tasks. If psychometric abilities, specifically those involving abstract reasoning, are significant predictors of everyday task performance (Willis & Marsiske, 1991), then we should expect to find cohort differences in everyday competence. In particular, current cohorts of older adults will be disadvantaged, since the strongest positive cohort trends have been found for abstract reasoning, a significant predictor of many everyday tasks.

Everyday tasks In our research (Willis, Jay, Diehl, & Marsiske, 1992; Willis & Marsiske, 1991) we have examined 7-year change in older adults' performance on a measure of every-

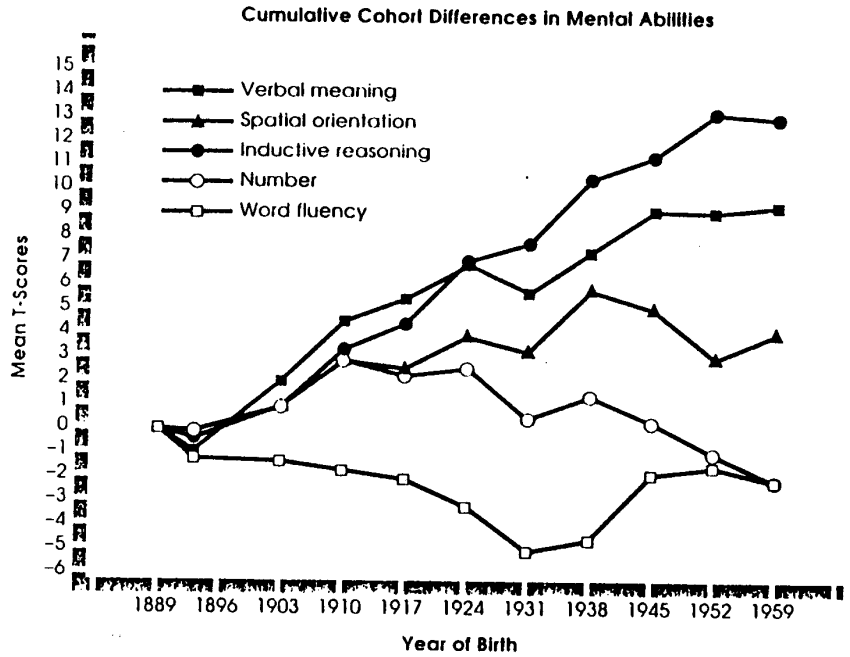

FIGURE 2 Cumulative cohort differences from oldest to youngest cohort for five mental abilities. From "Intellectual Ability Development in Adulthood" (p. 298) by K. W. Schaie, in J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 291–309), New York: Academic Press.

day problem solving involving printed material (prescription drug labels, phone bills, etc.). Figure 3 presents age-related change in performance on everyday tasks. The magnitude of change becomes increasingly steep from young-old to old-old age, with the 63-year-olds showing a decline of less than .2 S.D. compared to a decline of .6 S.D. units for 77-year-olds. Again, there is considerable interindividual variability in performance. The proportion of individuals showing no reliable decline over each age interval amounted to 70 percent from 63 to 70 years, 50 percent from 71 to 77 years, and 36 percent from 77 to 84 years.

■ Limitations of the Knowledge Base

Major limitations of the knowledge base are concerned with the deficiencies of currently available assessment instruments, lack of data on minority and special populations, difficulties with utilization and interpretation of assessment findings, and the relation of as-

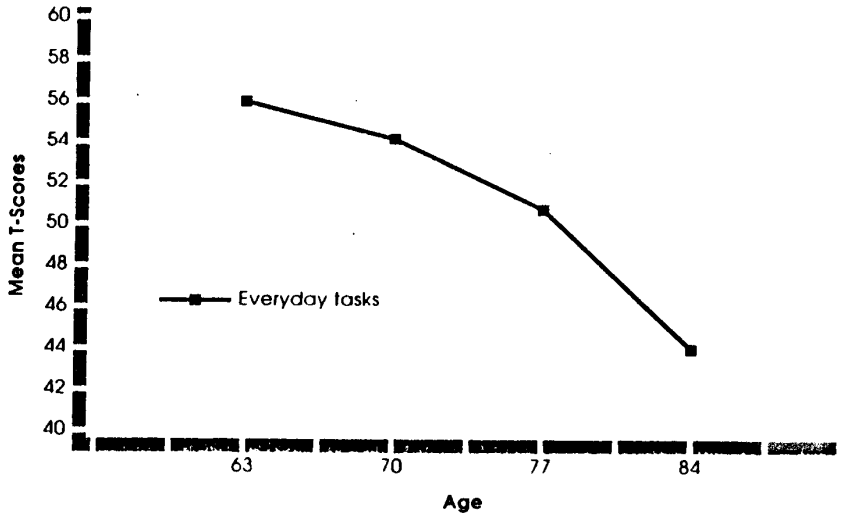

FIGURE 3 Change in performance on everyday tasks. From "Cognition and Everyday Competence" (p. 99) by S. .. Willis, in K. W. Schaie (Ed.), *Annual review of gerontology and geriatrics* (Vol. 11, pp. 80–;09), New York: Springer.

Limitations of Current Assessment Instruments

A major limitation in the assessment of competence is the paucity of developmental theories or models of competence in later adulthood (Sinnott, 1989; Sternberg & Wagner, 1986). Ideally, instruments are developed to measure constructs derived from carefully articulated developmental theories. An adequate developmental theory should include a description of the defining characteristics or dimensions of the phenomenon and postulates regarding the factors associated with development and change in the phenomenon. Currently there is little agreement on the dimensions or domains of competence; hence criterion tasks to assess competence are lacking in many domains.

Psychometric characteristics of instruments Many instruments currently in use have had insufficient research on their psychometric characteristics in older populations (Schaie & Stone, 1982; Zarit, Eiler, & Hassinger, 1985). The need for psychometrically well characterized instruments is particularly important in later adulthood, since much of assessment focuses on *changes* in competence associated with aging or with intervention efforts. Adequate *reliability* and *stability* are essential in order to detect relatively small changes in functioning and to sensitively evaluate the effectiveness of intervention procedures.

It is essential that an instrument measure the phenomenon it purports to measure (i.e., *construct validity*). However, findings from studies of the construct validity of self-report data have been problematic. Professionals' evaluations, based on clinical interviews or

self-report data have been compared. Older adults have tended to overestimate their level of competence when compared to ratings by professionals or to actual performance. Significant differences were found between ratings based on clinical interviews and self-report data on instrumental activities of daily living (Fillenbaum, 1987; Ford et al., 1988). Furthermore, it is essential not only that construct validity be demonstrated at a single data point, but also that measurement equivalence be demonstrated across age and time. That is, does the instrument assess the same construct across the entire adult life span? For example, changes in the factor structure of the WAIS, the most widely used clinical measure of competence, have been reported (Berger, Bernstein, Klein, Cohen, & Lucas, 1964; Cohen, 1957). The typical factor structure includes verbal, performance, and memory factors. However, Cohen found the memory factor to load on other factors in older adults, suggesting a "change in intellectual organization in the elderly with memory playing a far more important role in determining individual differences in test performance" (p. 289).

In addition to demonstrating the maintenance of construct validity with increasing age, it is also important to examine whether a measure assesses the same phenomenon in different subgroups of elderly or for different cohorts. For example, although ability to prepare a meal is considered to be an everyday competence in all cultures, the specific activities and tasks associated with meal preparation vary by culture; the British version of the OARS includes the ability to make a cup of tea and to carry a tray. Likewise, rapid mechanical and technological change will influence criterion tasks; for prior cohorts of elderly manipulating a stick shift was essential to driving; in contrast, for future cohorts, computer literacy will be required in tasks such as accessing an automatic teller machine or programming one's phone for call forwarding.

Given the wide individual differences among the elderly and the significant intraindividual changes in competence that can occur in old age, the range over which competence can be assessed with a particular measure must be considered. For example, a major limitation of many of the clinical and neuropsychological measures frequently employed in the assessment of cognitive impairment is the limited range of cognitive functioning that can be assessed (Ashford, Kolm, Colliver, Bekian, & Hsu, 1989; Loewenstein et al., 1989). Many of these measures are of limited use with normal elderly due to ceiling effects, and floor effects limit utility of the instrument in advanced stages of dementia. Moreover, scale properties of many clinical and functional assessment instruments limit the sensitivity with which competence level can be assessed. Scales that are *ordinal* in nature are often treated as if they were *interval* scales.

Inadequate normative and longitudinal data Many assessment instruments currently used with the elderly were developed for young and middle-aged adult populations, and there is inadequate normative data for older adults, particularly the old-old and very-old. For example, norms are reported through age 70 for the revised WAIS (Wechsler, 1981); however, the fastest-growing segment of the U.S. population is adults over the age of 85 years, an age group whose cognitive competence is becoming of increasing concern. Given the significant cohort differences in level of cognitive performance on most basic abilities, it is important that individual assessment of older adults be interpreted with respect to cohort-specific norms (Schaie & Stone, 1982; Zarit, Eiler, & Hassinger, 1985). If the competence of the older adult is being questioned, then a single measurement of competence

may not suffice. Hence, longitudinal studies of key assessment instruments are necessar to provide normative data on the *rate* and *pattern* of change in level of functioning as a sessed by a given instrument.

Minority and Special Populations

Normative data Just as adequate normative data are unavailable for the very old, norn for assessment of competence in minority and special populations are also lacking. This a particular concern, since the number and proportion of minority aged in the Unite States is expected to increase significantly during the next decades (Jackson, Antonucci, Gibson, 1990). In establishing normative data for special populations, it will be importar to examine the *construct validity* of the instrument as well as to consider group differenc in *level* of performance on an instrument. For example, ethnic differences in diet may r quire that different criterion tasks be employed to assess competence in meal preparatio Furthermore, prior research has shown that although an assessment instrument may me sure the same construct, the relative efficiency of the various instruments in assessing t construct may vary from young adulthood to old age (Schaie, Willis, Jay, & Chipue 1989). Likewise, the relative efficiency of several instruments assessing the same constru may vary across different minority or special populations.

Adaptive assessment procedures Of particular concern in work with the developmental disabled aged is the need for special assessment procedures. Sensory and motor defici may seriously limit the disabled's ability to demonstrate their true level of competen when traditional assessment procedures are used, such as paper-and-pencil measures or r sponse latencies as the dependent variable. Recently, testing corporations have moved a gressively into use of computer-interactive testing procedures. However, these new tec nologies may lead to serious underestimation of the competence of the developmental disabled or of elderly with sensory or motor limitations. Given the low level of comput literacy among current aged cohorts, computer-interactive assessment may disadvanta even normally functioning elderly (Office of Technology Assessment, 1985).

Interpretation and Utilization of Assessment Findings

Cohort differences and intraindividual variability Even when well-developed asse ment instruments are available, the issue of interpreting findings based on these instr ments remains. Our previous concern with increasing individual variability and t salience of cohort effects in old age must be extended also to the interpretation of asse ment findings. Most serious is the danger of overinterpreting findings when assessment competence is based on one observation, using a single measure. A particular danger is i terpreting a low level of functioning (based on a single observation) as representing decli in the individual. Repeated longitudinal observations on the same individual are requir to differentiate individuals who have experienced reliable decline from those individu who have probably functioned marginally for most of their adult lives. Interpretation o single observation is also problematic in the assessment of dementia, because of wide in vidual differences in rate and pattern of disease progression. Longitudinal data are need

to distinguish between stages and subtypes of Alzheimer's disease (Yesavage & Brooks, 1991). For example, if aphasia develops late in the course of the disease, comparing early and late cases within a cross-sectional study may give rise to the erroneous inference of the existence of aphasic and nonaphasic subtypes. Instead what is observed may well represent preaphasic and aphasic stages of the same disease. Hence, it is the rate at which abilities deteriorate and the point at which deterioration begins that allow subtypes to be defined.

Thresholds Assessment findings must also be interpreted in relation to threshold values and the practical meaning of the magnitude of change (Zarit, Eiler, & Hassinger, 1985). Although the absolute magnitude of change may be identical, a decline from a level of 2 standard deviations *above* the mean to 1 standard deviation above the mean will differ qualitatively from a decline from 1 standard deviation *below* the mean to 2 standard deviations below the mean. Assessment findings must be interpreted not only in terms of statistical significance but in terms of threshold values that provide information on the practical significance or meaningfulness of the findings in terms of the elderly person's lifestyle and ability to cope with the demands of daily living.

Researchers studying cognitive functioning in the elderly have focused on interval scales, such that change is viewed as occurring along a *continuum*. However, in interpreting assessment findings for a given individual, it is essential to consider clinically meaningful cutoffs or *thresholds* of competence. Whereas deficits in vision, for example, can be measured along a continuum, threshold values are required to determine when impairment is sufficiently severe to revoke the older person's driving privilege. The relevance of thresholds is also supported by research comparing *aggregate* and *individual* change data. While data aggregated across numerous individuals often suggest that change progresses in a smooth linear fashion, examination of individual data reveals instead that most change occurs in a stair-step manner (Schaie, 1989b). Moreover, individual change may not be unidirectional; change even in old age may include short-term reversals of prior decline, as a result of planned interventions (e.g., cataract surgery) or serendipitous events.

Relation of Assessment Findings and Outcome Variables

Assessment of competence rarely occurs without the occurrence of a significant precipitating event. Thus the relationship between reported assessment findings and their *outcomes* must be considered (Applebaum & Grisso, 1988; Grisso & Applebaum, 1991). A major concern of competency assessments for many older adults is that the outcome will involve a reduction of independence. Outcomes are largely based on societal expectations and perceptions. An individual must function at a certain level or in a certain manner in order for society to sanction the individual's right to live independently, to drive a car, or to hold a certain job. The same assessment finding may, of course, result in different outcomes within different social contexts or at different historical periods.

Who determines the outcomes associated with assessment findings? The professional making the assessment will often be in a position to make recommendations regarding appropriate outcomes. However, whether the professional recommendations are followed will frequently be left to the discretion of the older adult or of concerned family members. If assessment findings are thought to be likely to have deleterious outcomes for the individual or society, then decisions regarding outcomes may be delegated to professionals or regulatory agencies (Wetle, Levkoff, Cwikel, & Rosen, 1988).

The important point to be made here is that assessment findings will be linked to some form of outcomes. As a result it is essential that those who develop assessment instruments and those who employ assessment instruments carefully consider society's expectations regarding acceptable levels of functioning in the domain being assessed, the outcomes that are likely to occur given certain assessment findings, and who in our society is likely to be delegated as the arbitrator of alternative outcomes (cf. Schaie, 1988)

FUTURE DIRECTIONS

■ Need for Performance-based Assessment

Our review of the literature on everyday competence indicates that traditional assessment procedures, such as those employed in functional assessment, have relied too heavily on self-reports of the elderly and upon single-item measures. This approach is time-efficient, but the quality of the resulting data must be questioned. There is the problem of accuracy, since elderly are known to overestimate their level of competence when compared to either clinical ratings or performance data. Second, single-item measures do not adequately assess the complex constructs of competence in various domains. Such measures lack the psychometric characteristics necessary to assess reliably and validly age-related change in competence and the wide individual differences in levels of functioning.

Measurement development is therefore a critical concern for future research on everyday competence. A performance-based approach is essential. Everyday competence needs to be assessed through performance or direct observation rather than through self-report. In addition, summary measures of competence must be supplemented with scales assessing competence in specific domains of daily living. Multiple-item scales are needed to assess different aspects of competence in each domain.

■ Assessment within Context

It is important that the competence of the individual be assessed within the physical and social context. Individuals function within both physical and social environments that moderate the level of competence demonstrated. Data on absolute levels of competence should be supplemented with information on the extent to which the physical and social environment supports or limits the level of competence displayed by the individual in daily life. Models by Lawton (1989) and others (Kahana, 1982; Scheidt & Windley, 1985) view successful adaptation in terms of the interaction between the competence of the individual and the level of environmental challenge or support. This interaction is dynamic as both the competence of the elderly and the level of environmental support or stress are continually changing.

Both physical and social aspects of the environment have been associated with outcomes, such as well-being, morbidity, institutionalization, and mortality. Research on social support has examined two broad dimensions of support (Antonucci, 1990). First, there

are the *structural* characteristics of the elderly's support network, including the number of individuals in the network, their relationship, frequency of contact, and geographical proximity to the target person. Second, *functional* dimensions focus on the types of support provided, including emotional, informational, and resource support; in addition, there is consideration of whether support is reciprocal between network members and whether negativity or criticism is associated with the giving or receiving of support. The moderating effects of both structural and functional aspects of social support may need to be examined in determining the aged's functional competence.

Likewise, dimensions of the physical environment that may moderate the elderly's well-being and ability to perform necessary everyday tasks have been considered. Windley and Scheidt (1980) identified 11 attributes of the physical environment: sensory stimulation, spatial organization and orientation, comfort, privacy, adaptability, control, sociality, accessibility, density, meaning, and aesthetics.

■ Focus on Variability and Diversity

Greater attention must be given to the wide range of individual differences and diversity within the aged population in the development of assessment instruments and the interpretation of findings. The life stage labeled "old age" by our society encompasses two or three decades of life in which significant changes in competence are likely to occur. Qualitatively different instruments and procedures may be needed for assessing competence in the young-old (60 to 70 years) versus the very-old (85 years); development of assessment procedures appropriate for the very old is particularly important given the significant increase of this age group within our population.

Social roles and societal expectations of the meaning of competence may vary across old age; different criterion tasks may be required to assess the changing meaning of what it is to be competent at 60 versus at 90 years of age. In addition, the elderly population is becoming increasingly ethnically and culturally diverse. Assessment procedures that take into account linguistic and lifestyle diversity will become increasingly important in order to assess the competence of this diverse older population and to engage in public policy planning for the diverse needs of the elderly.

■ Ethical Considerations

Greater attention needs to be given to ethical issues associated with the assessment of competence in old age (Clark, 1987; High, 1988; Schaie, 1993). The most critical concern of older adults is to live independently in the community; often the major focus of assessment procedures is to determine whether this right and desire is to be continued or limited. Careful consideration needs to be given to appropriate procedures for securing informed consent from the elderly, who may be increasingly frail in mind and body. Two recent legislative initiatives highlight this concern. The Omnibus Budget Reconciliation Act of 1987 (OBRA 87), called the Nursing Home Reform Act, stipulates that each nursing home resident has the right to be fully informed in advance about care and treatment, to participate in the planning of care, and to self-administer drugs unless the interdisciplinary team has determined that this practice is unsafe. Moreover, the Omnibus Budget Reconciliation Act of 1990 requires every health care facility receiving Medicare or Medicaid funds to inform its patients about their rights to specify advance directives. The current lack of valid and reliable measures to assess the patient's competence to make such judgments seriously jeopardizes the effective execution of these mandates.

Since assessment is often initiated and sought by family members or society, rather than the elderly themselves, the issue of who is the client and whose needs and desires are to be met by the assessment must be considered. Recent discussions of alternatives to traditional informed consent procedures that involve negotiated or shared decision-making procedures need further research (High, 1988; Moody, 1988).

Assessment findings are often difficult to interpret in ways that are meaningful and useful to the client and family; greater attention needs to be given to the manner in which findings are reported to the older adult and significant others. For example, the numerical cutoff scores often used in decisions regarding possible or probable dementia have little meaning to the patient or family. The functional skills and abilities associated with a given test score range need to be explicated (Lowenstein et al., 1989). Moreover, since many diagnoses of dementia or mental disorders are often at best based on measures with imperfect sensitivity or hit rates, it becomes important that the probabilistic nature of the diagnosis be communicated to the patient and family. The ethics of who determines the outcomes of assessment findings require serious debate.

The study and assessment of everyday competence are of crucial concern to the older adult and to our society. For the older adult assessment of competence is closely linked to self-esteem and personal control. For society the study and assessment of competence of its oldest members are of vital concern for the continued functioning of the society as a whole. They deserve our best research efforts.

■ Implications for Training

An important aspect of the planning and implementation of developmental interventions with older adults is the need for careful assessment. Hence, skills required for successful applied intervention research and for the determination of individual interventions must include a thorough grounding in test and measurement skills. However, the basic courses offered in most psychology programs need to be supplemented by instructions in the principles of measuring change and in the special problems of assessing individuals who may have sensory and motor impairments. Some familiarity with instrumentation used in neuropsychological assessment for the determination of the dementias would also be useful. Since broad-scale interventions often involve group-screening procedures, familiarity is needed not only with the administration and interpretation of individual assessment tools but also with the type of group assessment often used in educational settings.

Field experiences are needed that will expose the student to older adults at different levels of functionality. Placements in lifetime care facilities would be ideal because they present the entire spectrum of well-functioning and independently living older adults, from those requiring limited assistance to completely dependent persons confined to skilled nursing care. Practicum experiences in senior citizen centers or congregate meal facilities would expose students to a broad spectrum of community-dwelling older persons; and finally ex-

postures to settings such as Elderhostel or Mensa would offer students glimpses as to the high levels of functioning exhibited by well-educated successful older persons.

It is very rare that applied developmental problems in older persons are neatly addressable within a specific discipline. Behavioral difficulties need to be understood within the context of successively failing physical infrastructures and the progressively lessened adequacy of normal environmental support systems for the aging organisms. Students of adult development therefore need as a minimum some exposure to the biology, sociology, and psychology of aging. Participation in collaborative efforts in interdisciplinary settings such as geriatric assessment centers would therefore be of great help in expanding the student's understanding of the complex issues facing aging adults.

SUMMARY

- Everyday competence in the elderly represents the aged's ability or potential to perform adequately activities considered essential for living independently in our society.
- In contrast to earlier life stages, changes in competence in the elderly are multidirectional. Maintenance is the norm, but with progressive age many older adults experience a decline in competence. Some healthy older adults may experience an increase in selected domains.
- Salient features of everyday competence include: everyday competence must be assessed multidimensionally; it can be represented as a hierarchy of levels; competency must be addressed at the level of the individual; we must distinguish between competence as perceived by the older adult versus competence measured by actual performance.
- Methodologies of assessing competence may be based on self-report, including interviews, questionnaires, and self-rating techniques. They may involve ratings by others and, most important, should be based on performance assessment, including clinical assessment, the assessment of psychometric abilities, and assessment of everyday competence.
- Age-comparative studies suggest that adult competence peaks in young adulthood. Age-comparative approaches are limited by differential prior experiences of different generations.
- Longitudinal studies, in contrast to age-comparative studies, show competence peaking in late middle age, with declines becoming significant only in the late sixties and early seventies.
- Limitations of current assessment instruments include: insufficient norms for older populations; limited research on the instruments' psychometric properties; a paucity of longitudinal data; and inadequate information on minorities and special populations.
- The interpretation of assessment findings must be conducted with [illegible] context of cohort differences and our knowledge of intraindividual variability. Attention must

- Future directions include: The need for further development of performance-based assessment; assessments within specific contexts; and a focus on variability and diversity.
- Ethical issues in assessment of the elderly include: appropriate procedures for obtaining informed consent; consideration of conflicting needs of older persons, their families, and institutions providing care; interpretation of assessment findings devoid of ageist stereotypes and in a manner meaningful to laypersons.

ANNOTATED READINGS

Berg, C. A. (1990). What is intellectual efficiency over the life course?: Using adults' conceptions to address the question. In J. Rodin, C. Schooler, & K. W. Schaie (Eds.), *Self-directedness: Cause and effects throughout the life course* (pp. 155–182). Hillsdale, NJ: Erlbaum. An overview chapter discussing issues related to locus of control and self-efficacy in the elderly.

Denney, N. W. (1989). Everyday problem solving: Methodological issues, research findings, and a model. In L. W. Poon, D. C. Rubin, & B. A. Wilson (Eds.), *Everyday cognition in adulthood and late life* (pp. 330–351). Cambridge: Cambridge University Press. Chapter reviewing literature on the assessment of older adults' ability to solve everyday problems.

High, D. M. (1988). All in the family: Extended autonomy and expectations in surrogate health care decision-making. *Gerontologist, 28* (Suppl.), 46–51. Discussion of issues of informed consent and negotiated or shared decision making as they relate to health care and the elderly.

Rowe, J. W., & Kahn, R. L. (1987). Human aging: Usual and successful. *Science, 237*, 143–149. Discussion of implications for taking a normative versus optimal view of human aging.

Schaie, K. W. (1990). Intellectual development in adulthood. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 291–309). New York: Academic Press. Review of the literature on normal intellectual aging, stressing individual differences and cohort effects.

Willis, S. L. (1991). Cognition and everyday competence. In K. W. Schaie (Ed.), *Annual review of gerontology and geriatrics* (Vol. 11, pp. 80–109). New York: Springer. Presents a model for the study of everyday competence in old age and reviews literature related to components of the model.

REFERENCES

Antonucci, T. C. (1990). Social supports and social relationships. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (3rd ed.). New York: Academic Press.

Applebaum, P. S., & Grisso, T. (1988). Assessing patients' capacities to consent to treatment. *New England Journal of Medicine, 319*, 1635–1638.

Ashford, J. W., Kolm, P., Colliver, J. A., Bekian, C., & Hsu, L. (1989). Alzheimer patient evaluation and the Mini-mental State: Item characteristics curve analysis. *Journal of Gerontology:*

Baltes, M. M., & Baltes, P. B. (1986). *The psychology of control and aging.* Hillsdale, NJ: Erlbaum.

Baltes, M. M., Wahl, H. W., & Schmidt-Furstoss, U. (1991). The daily life of elderly humans: Activity pattern, personal controls, and fundamental health. *Journal of Gerontology: Psychological Sciences, 45,* P173–P179.

Baltes, P. B., Dittman-Kohli, F., & Dixon, R. (1984). New perspective on the development of intelligence in adulthood: Toward a dual-process conception and a model of selective optimization with compensation. In P. B. Baltes & O. G. Brim (Eds.), *Life-span development and behavior* (Vol. 6, pp. 33–76). New York: Academic Press.

Baltes, P. B., & Willis, S. L. (1982). Enhancement (plasticity) of intellectual functioning in old age: Penn State's Adult Development and Enrichment Project (ADEPT). In F. I. M. Craik & S. Trehub (Eds.), *Aging and cognitive processes* (pp. 353–389). New York: Plenum.

Beres, C., & Baron, A. (1981). Improved digit substitution by older women as a result of extended practice. *Journal of Gerontology, 36,* 591–597.

Berg, C. A. (1990). What is intellectual efficiency over the life course?: Using adults' conceptions to address the question. In J. Rodin, C. Schooler, & K. W. Schaie (Eds.), *Self-directedness: Cause and effects throughout the life course* (pp. 155–182). Hillsdale, NJ: Erlbaum.

Berg, C. A., & Sternberg, R. J. (1985). A triarchic theory of intellectual development during adulthood. *Developmental Review, 5,* 334–370.

Berger, L., Bernstein, A, Klein, E., Cohen, J., & Lucas, G. (1964). Effects of aging and pathology on the factorial structure of intelligence. *Journal of Consulting Psychology, 28,* 199–207.

Berry, J., & Irvine, S. (1986). Bricolage: Savages do it daily. In R. Sternberg & R. Wagner (Eds.), *Practical intelligence* (pp. 271–306). New York: Cambridge University Press.

Berry, J. M., West, R. L., & Dennehey, D. M. (1989). Reliability and validity of the Memory Self-Efficacy Questionnaire. *Developmental Psychology, 25,* 701–713.

Blazer, D. (1978). The OARS Durham survey: Description and application. In Duke University Center for the Study of Aging (Eds.), *Multidimensional functional assessment: The OARS methodology.* Durham, NC: Duke University

Brody, E. (1985). Parent care as a normative family stress. *Gerontologist, 25,* 19–29.

Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology, 54,* 1–22.

Cavanaugh, J. C., & Green, E. E. (1990). I believe, therefore, I can: Self-efficacy beliefs in memory aging. In E. A. Lovelace (Ed.), *Aging and cognition: Mental processes, self-awareness, and interventions.* Amsterdam: North Holland.

Charness, N. (1989). Age and expertise: Responding to Talland's challenge. In L. W. Poon, D. C. Rubin, & B. A. Wilson (Eds.), *Everyday cognition in adulthood and late life* (pp. 437–456). Cambridge: Cambridge University Press.

Clark, M., & Anderson, B. (1967). *Culture and aging.* Springfield, IL: Charles C. Thomas.

Clark, P. G. (1987). Individual autonomy, cooperative empowerment and planning for long-term decision making. *Journal of Aging Studies, 1,* 65–76.

Cohen, J. (1957). The factorial structure of the WAIS between early adulthood and old age. *Journal*

Coyne, A. C. (1981). Age differences and practice in forward visual masking. *Journal of Gerontology, 36,* 730–732.

Cutler, N. (1991). Financial services and the middle-aging of America. *Journal of the American Society of CLU & ChFC, 45,* 16–19.

Denney, N. W. (1989). Everyday problem solving: Methodological issues, research findings, and a model. In L. W. Poon, D. C. Rubin, & B. A. Wilson (Eds.), *Everyday cognition in adulthood and late life* (pp. 330–351). Cambridge: Cambridge University Press.

Department of Health and Human Services (1990). *Health, United States, 1989.* DHHS Publication 90-1232. Washington, DC: U.S. Government Printing Office.

Diehl, M. (1991). *Everyday problem solving in older adults: Performance-based assessment and cognitive correlates.* Unpublished doctoral dissertation, The Pennsylvania State University, University Park, PA.

Dittmann-Kohli, F., Lachman, M. E., Kliegl, R., & Baltes, P. B. (1991). Effects of cognitive training and testing on intellectual efficacy beliefs in elderly adults. *Journal of Gerontology: Psychological Sciences, 46,* P162–P164.

Dixon, R. A., & Hultsch, D. F. (1984). Structure and development of metamemory in adulthood. *Journal of Gerontology, 38,* 682–688.

Duke University Center for the Study of Aging (1978). *Multidimensional functional assessment: The OARS methodology* (2nd ed.). Durham, NC: Duke University.

Educational Testing Service (1977). *Basic Skills Assessment Test: Reading.* Princeton, NJ: Educational Testing Service.

Ekstrom, R. B., French, J. W., Harman, H., & Derman, D. (1976). *Kit of factor-referenced cognitive tests* (rev. ed.). Princeton, NJ: Educational Testing Service.

Erber, J. (1976). Age differences in learning and memory on a digit-symbol substitution task. *Experimental Aging Research, 2,* 45–53.

Erikson, E. (1963). *Childhood and society.* New York: Norton.

Field, D., Schaie, K. W., & Leino, E. V. (1988). Continuity in intellectual functioning: The role of self-reported health. *Psychology and Aging, 3,* 385–392.

Fillenbaum, G. G. (1985). Screening the elderly: A brief instrumental activities of daily living measure. *Journal of the American Geriatrics Society, 33,* 698–706.

Fillenbaum, G. G. (1987). Activities of daily living. In G. L. Maddox (Ed.), *The encyclopedia of aging* (pp. 3–4). New York: Springer.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12,* 189–198.

Ford, A. B., Bolmar, S. J., Salmon, R. B., Medalie, J. H., Roy, A. W., & Galazka, S. S. (1988). Health and function in the old and very old. *Journal of the American Geriatrics Society, 36,* 187–197.

Galanos, A., Fillenbaum, G. G., Cohen, H. J., & Burchett, B. (1991). *Limitations of functional health status in the comprehensive assessment of community dwelling elderly.* Unpublished manuscript, Duke University, Durham, NC.

Gilewski, M. J., & Zelinski, E. M. (1986). Questionnaire assessment of memory complaints. In L. W. Poon (Ed.), *Handbook for clinical memory assessment of older adults* (pp. 93–107). Washington, DC: American Psychological Association.

Goldfarb, W. (1941). An investigation of reaction time in older adults. *Contributions to education* (Report No. 831). New York: Teachers College, Columbia University.

Grant, E., Storandt, M., & Botwinick, J. (1978). Incentive and practice in the psychomotor performance of the elderly. *Journal of Gerontology, 33*, 413–415.

Grisso, T., & Applebaum, P. S. (1991). Mentally ill and non-mentally ill patients' ability to understand informed consent disclosures for medication: Preliminary data. *Law and Human Behavior, 15*, 377–388.

Hagestad, G. O., & Neugarten, B. (1985). Age and life course. In R. Binstock & E. Shanas (Eds.), *Handbook of the social sciences* (2nd ed., pp. 35–81). New York: Van Nostrand Reinhold.

Haug, M., & Ory, M. (1987). Issues in elderly patient-provider interaction. *Research on Aging, 9*, 3–11.

Havighurst, R. J. (1972). *Developmental tasks and education* (3rd ed.). New York: McKay.

Hertzog, C. (1989). The influence of cognitive slowing on age differences in intelligence. *Developmental Psychology, 25*, 636–651.

Hertzog, C. (1991). Aging, information processing speed, and intelligence. In K. W. Schaie (Ed.), *Annual review of gerontology and geriatrics* (Vol. 7, pp. 55–79). New York: Springer.

High, D. M. (1988). All in the family: Extended autonomy and expectations in surrogate health care decision-making. *Gerontologist, 28* (Suppl.), 46–51.

Horn, J. L. (1982). The theory of fluid and crystallized intelligence in relation to concepts of cognitive psychology and aging in adulthood. In F. J. M. Craik & S. Trehub (Eds.), *Aging and cognitive processes* (pp. 237–278). New York: Plenum.

Jackson, J., Antonucci, T., & Gibson, R. (1990). Cultural, racial, and ethnic minority influences on aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 103–123). New York: Academic Press.

Jarvik, L., & Bank, L. (1983). Aging twins: Longitudinal aging data. In K. W. Schaie (Ed.), *Longitudinal studies of adult psychological development* (pp. 40–63). New York: Guilford.

Kahana, E. (1982). A congruence model of person-environment interaction. In M. P. Lawton, P. G. Windley, & T. O. Byerts (Eds.), *Aging and the environment: Theoretical approaches* (pp. 97–121). New York: Springer.

Kaszniak, A. W. (1990). Psychological assessment of the aging individual. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 427–445). New York: Academic Press.

Katz, S., Branch, L. G., Branson, M. H., Papsidero, J. A., Beck, J. C., & Greer, D. S. (1983). Active life expectancy. *New England Journal of Medicine, 309*, 1218–1223.

Kranz, D., & Schulz, R. (1980). A model of life crisis, control and health outcomes: Cardiac rehabilitation and relocation of the elderly. In A. Baum & J. Singer (Eds.), *Advances in environmental psychology* (Vol. 2, pp. 25–59). Hillsdale, NJ: Erlbaum.

Lachman, M. E. (1983). Perceptions of intellectual aging: Antecedent or consequence of intellectual functioning. *Developmental Psychology, 19*, 482–498.

Lachman, M. E. (1986). Personal control in later life: Stability, change and cognitive correlates. In M. M. Baltes & P. B. Baltes (Eds.), *The psychology of control and aging* (pp. 207–236). Hillsdale, NJ: Erlbaum.

Lachman, M. E., & Leff, R. (1989). Perceived control and intellectual functioning in the elderly: A 5-year longitudinal study. *Developmental Psychology, 25*, 722–728.

Lachman, M. E., Weaver, S. L., Bandura, M., Elliott, E., & Lewkowicz, C. J. (1992). Improving memory and control beliefs through cognitive restructuring and self-generated strategies. *Journal of Gerontology: Psychological Sciences, 47*, P293–P299.

Lawton, M. P. (1987). Contextual perspectives: Psychosocial influences. In L. W. Poon (Ed.), *Handbook for clinical memory assessment of older adults* (pp. 22–42). Washington, DC: American Psychological Association.

Lawton, M. P. (1989). Behavior-relevant ecological factors. In K. W. Schaie & C. Schooler (Eds.), *Social structure and aging: Psychological processes* (pp. 37–78). Hillsdale, NJ: Erlbaum.

Lawton, M. P., & Brody, E. M. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *Gerontologist, 9*, 179–185.

Le Breck, D., & Baron, A. (1987). Age and practice effects in continuous recognition memory. *Journal of Gerontology, 42*, 89–91.

Lerner, R. (1986). *Concepts and theories of human development* (2nd ed.). New York: Random House.

Levinson, H. (1974). Activism and powerful others: Distinctions within the concept of internal-external control. *Journal of Personality Assessment, 38*, 377–383.

Loewenstein, D. A., Amigo, E., Duara, R., Guterman, A., Hurwitz, D., Berkowitz, N., Wilkie, F., Weinber, G., Black, B., Gittelman, B., & Eisdorfer, C. (1989). A new scale for the assessment of functional status in Alzheimer's disease and related disorders. *Journal of Gerontology: Psychological Sciences, 44*, P114–P121.

Matarazzo, J. D. (1972). *Wechsler's measurement and appraisal of adult intelligence* (5th ed.). Baltimore: Williams & Wilkins.

Moody, H. R. (1988). From informed consent to negotiated consent. *Gerontologist, 28* (Suppl.), 64–70.

Morrell, R. W., Park, D. C., & Poon, L. W. (1989). Effects of the quality of instructions on memory and comprehension of prescription information in young and old adults. *Gerontologist, 29*, 345–353.

Office of Technology Assessment (1985). *Technology and aging in America.* (OTA-VA-264). U.S. Congress, Office of Technology Assessment, Washington, DC.

Park, D. (1991). Applied cognitive aging research. In F. I. M. Craik & T. A. Salthouse (Eds.), *Handbook of aging and cognition.* New York: Erlbaum.

Poon, L. W. (Ed.) (1986). *Handbook for clinical memory assessment of older adults.* Washington, DC: American Psychological Association.

Rothbaum, F., Weisz, J., & Snyder, S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology, 42*, 5–37.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80* (No. 609).

Rowe, J. W., & Kahn, R. L. (1987). Human aging: Usual and successful. *Science, 237,* 143–149.

Salthouse, T. A. (1982). *Adult cognition: An experimental psychology of human aging.* New York: Springer-Verlag.

Salthouse, T. A. (1990). Cognitive competence and expertise in aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 310–319). San Diego: Academic.

Schaie, K. W. (1978). External validity in the assessment of intellectual development in adulthood. *Journal of Gerontology, 33,* 695–701.

Schaie, K. W. (1983). The Seattle Longitudinal Study: A twenty-one year exploration of psychometric intelligence in adulthood. In K. W. Schaie (Ed.), *Longitudinal studies of adult psychological development* (pp. 64–135). New York: Guilford Press.

Schaie, K. W. (1985). *Manual for the Schaie-Thurstone adult mental abilities test (STAMAT).* Palo Alto, CA: Consulting Psychologists Press.

Schaie, K. W. (1987). Applications of psychometric intelligence to the prediction of everyday competence in the elderly. In C. Schooler & K. W. Schaie (Eds.), *Cognitive functioning and social structure over the life course* (pp. 50–59). New York: Ablex.

Schaie, K. W. (1988). Ageism in psychological research. *American Psychologist, 43,* 179–183.

Schaie, K. W. (1989a). The hazards of cognitive aging. *Gerontologist, 29,* 484–493.

Schaie, K. W. (1989b). Perceptual speed in adulthood: Cross-sectional and longitudinal studies. *Psychology and Aging, 4,* 443–453.

Schaie, K. W. (1990). Intellectual development in adulthood. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 291–309). New York: Academic Press.

Schaie, K. W. (1993). Ageist language in psychological research. *American Psychologist, 48,* 49–51.

Schaie, K. W., Chatham, L. R., & Weiss, J. M. A. (1961). The multiprofessional intake assessment of older psychiatric patients. *Journal of Psychiatric Research, 1,* 92–100.

Schaie, K. W., Gonda, J. N., & Quayhagen, M. (1981). The relationship between intellectual performance and perception of everyday competence in middle-age, young-old, and old-old adults. *Proceedings of the XXIInd International Congress of Psychology* (pp. 233–242). Leipzig: International Union of Psychology.

Schaie, K. W., & Stone, V. (1982). Psychological assessment. In C. Eisdorfer (Ed.), *Annual review of gerontology and geriatrics* (Vol. 3, pp. 329–360). New York: Springer.

Schaie, K. W., & Willis, S. L. (1986). Can decline in adult intellectual functioning be reversed? *Developmental Psychology, 22,* 223–232.

Schaie, K. W., & Willis, S. L. (1989, July). *Generalizing psychometric age difference patterns within and across ability domains.* Paper presented at the meeting of the International Society for the Study of Behavioral Development, Jyauyvask;auyla, Finland.

Schaie, K. W., Willis, S. L., Jay, G., & Chipuer, H. (1989). Structural invariance of cognitive abilities across the adult life span: A cross-sectional study. *Developmental Psychology, 25,* 652–662.

Scheidt, R. J., & Schaie, K. W. (1978). A taxonomy of situations for the elderly population: Generating situational criteria. *Journal of Gerontology, 33,* 848–857.

Scheidt, R. J., & Windley, P. G. (1985) The ecology of aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2nd ed., pp. 245–260). New York: Van Nostrand.

Siegler, I. C. (1983). Psychological aspects of the Duke Longitudinal Studies. In K. W. Schaie (Ed.), *Longitudinal studies of adult psychological development* (pp. 136–190). New York: Guilford.

Sinnott, J. (Ed.). (1989). *Everyday problem solving: Theory and applications.* New York: Praeger.

Stagner, R. (1985). Aging in industry. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2nd ed., pp. 789–817). New York: Van Nostrand-Reinhold.

Sternberg, R., & Wagner, R. (Eds.). (1986). *Practical intelligence: Nature and origins of competence in the everyday world.* Cambridge: Cambridge University Press.

Thurstone, L. L. (1938). *Primary mental abilities.* Chicago: University of Chicago Press

Thurstone, L. L., & Thurstone, T. G. (1949). *Examiner manual for the SRA Primary Mental Abilities Test.* Chicago: Science Research Associates.

Waldman, D. A., & Avolio, B. J. (1986). A meta-analysis of age differences in job performance. *Journal of Applied Psychology, 7,* 33–38.

Wechsler, D. (1958). *Measurement of adult intelligence.* Baltimore, MD: Williams and Wilkins.

Wechsler, D. (1981). *Wechsler Adult Intelligence Scale-Revised manual.* New York: Psychological Corporation.

Wechsler, D. (1987). *Wechsler Memory Scale-Revised manual.* New York: Psychological Corporation.

Weiss, J. M. A., Rommel, L. A., & Schaie, K. W. (1959). The presenting problems of older patients referred to a psychiatric clinic. *Journal of Gerontology, 14,* 477–481.

Weisz, J., Rothbaum, F., & Blackburn, T. (1984). Standing out and standing in: The psychology of control in America and Japan. *American psychologist, 39,* 955–969.

Wetle, T., Levkoff, S., Cwikel, J., & Rosen, A. (1988). Nursing home resident participation in medical decisions: Perceptions and preferences. *The gerontologist, 28,* (Suppl.), 32–38.

Willis, S. L. (1985). Toward an educational psychology of the older adult learner: Intellectual and cognitive bases. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2nd ed., pp. 818–847). New York: Van Nostrand-Reinhold.

Willis, S. L. (1987). Cognitive training and everyday competence. In K. W. Schaie (Ed.), *Annual review of gerontology and geriatrics* (Vol. 6, pp. 159–188). New York: Springer.

Willis, S. L. (1991). Cognition and everyday competence. In K. W. Schaie (Ed.), *Annual review of gerontology and geriatrics* (Vol. 11, pp. 80–109). New York: Springer.

Willis, S. L., & Dubin, S. (Eds.). (1990). *Maintaining professional competence.* San Francisco: Jossey-Bass.

Willis, S. L., Jay, G. M., Diehl, M., & Marsiske, M. (1992). Longitudinal change and prediction of everyday task competence in the elderly. *Research on Aging, 14,* 68–91.

Willis, S. L., & Marsiske, M. (1991). Life span perspective on practical intelligence. In D. E. Tupper & K. D. Cicerone (Eds.), *The neuropsychology of everyday life: Issues in development and rehabilitation* (pp. 183–198). Boston: Kluwer.

Willis, S. L., Marsiske, M., & Diehl, M. (1991, November). *The Everyday Problem Solving Test.* Paper presented at the annual meeting of the Gerontological Society of America, San Francisco, CA.

Willis, S. L., & Schaie, K. W. (1986). Practical intelligence in later adulthood. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in the everyday world* (pp. 236–268). Cambridge: Cambridge University Press.

Willis, S. L., & Schaie, K. W. (1993). Everyday cognition: Taxonomic and methodological considerations. In J. M. Puckett & H. W. Reese (Eds.), *Lifespan developmental psychology: Mechanisms of everyday cognition.* Hillsdale, NJ: Lawrence Erlbaum.

Windley, P. G., & Scheidt, R. J. (1980). Person-environment dialectics: Implications for competent functioning in old age. In L. W. Poon (Ed.), *Aging in the 1980s.* Washington, DC: American Psychological Association.

Yesavage, J. A., & Brooks, J. O. (1991). On the importance of longitudinal research in Alzheimer's disease. *Journal of the American Geriatrics Society, 39,* 942–944.

Zarit, S. H., Eiler, J., & Hassinger, M. (1985). Clinical assessment. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2nd ed., pp. 725–754). New York: Van Nostrand Reinhold.