Conceptual Issues and Analytic Strategies for Studying Cognition in Older African Americans

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Introduction

In the last decade, there has been a growing appreciation of ethnic and cultural diversity in aged populations as the nations demography evolves. For example, as we move toward the 21st century, African American elders represent one of the fastest growing groups of elderly individuals (see Angel & Hogan 1992; Himes 1992). Scientists have responded to the growing number of ethnic elders by increasing the number of ethnic minorities included as subjects in their research. The addition of ethnic minorities to the sampling of older adults adds significant complexity to the variables of interest. To date, there have been very few studies that have hypotheses driving the inclusion of African Americans to their samples.

Much of the past cross-cultural research to date has focused primarily on social and health-related domains of ethnicity, culture, and aging. In contrast, relatively few studies have examined aspects of cognition among minority elderly. It is the diversity of personal experiences and external forces across the life-course (e.g., family values, work experiences, social policies, educational opportunities, etc.) that contribute to variation in adult cognition between and within ethnic groups. One of the primary challenges to scientists is to disentangle important factors due to aging, culture, and cohort, and to understand the interaction among them.

This paper briefly discusses the current state of conceptual knowledge and empirical work pertaining to the study of cognition in older African-Americans. Suggestions for future research will also be discussed. We will address five major topics: 1) previous research on race differences, 2) some of the conceptual issues that should be considered for the inclusion of African-Americans in cognitive aging research, 3) some analytic strategies to maximize the usefulness of multi-ethnic samples, 4) issues in sampling older African-Americans, and 5) some proposed instruments and scoring issues.

Race Differences and Group Comparisons

Analysis of multi-ethnic samples typically involve using race differences as a proxy for understanding differences in psychological variables between ethnic groups and ignoring the interactions between other factors (i.e., health, social, cultural, economic, etc.) and race. Collapsing samples of minority subjects with Whites and only viewing race as a source of variation in the larger population disregards the diversity within groups. The within group variation may be important in understanding how trajectories of cognitive aging for minorities may be influenced by past and present unequal educational opportunities or other social and health care polices which disproportionately affect minorities. There is evidence, for example, that African-Americans may experience events and circumstances which have sociocultural origins that significantly influence development and aging (Jackson, 1985; Jackson, 1989; Levine, 1982; McLoyd & Randolph, 1985; Spencer, Brookens, & Allen, 1985). These sociocultural influences in late life contribute to differences between racial groups as well as individual differences within groups (Jackson, 1989; Krauss, 1980; Levine, 1982). It is important to note that sociocultural influences are not uniform for every member of any group of minorities living in the United States. These influences are also particularly important because they can play a significant role in molding and shaping how people are different in the aging process.

Careful consideration in the development of hypotheses, the selection of instruments, and the use of analytic strategies is required when performing racial comparisons of cognitive data. Unfortunately, there is an abundance of evidence of abuse of racial difference research that has been used to justify discriminatory social policies and practices (For reviews see, Thomas & Sillen, 1972; Guthrie, 1976).

Conceptual Issues

Most conceptual models of cognitive aging were developed using only Caucasian elderly samples. Caution needs to be used in attempting to extend these models to African-Americans because there is an amalgamation of biological and behavioral sources of variation reflected in differences in health, social, and demographic differences between whites and blacks. These differences come from a myriad of influences across the life-course. For example, the multiple jeopardy hypothesis holds that negative environmental, social, and economic conditions during the early years of life for African-Americans have detrimental effects on social, psychological, and biological conditions in late life (Jackson, 1988). These endogenous factors (physical health, social and psychological factors, and mental health) should be accounted for in attempting to understand cognitive aging for African-Americans as compared to Whites and in the study of within group heterogeneity among African-Americans. For purposes of discussion, two examples of how these endogenous factors are re-

lated to cognitive aging and differences that exist between ethnic groups (African-Americans and Whites) are presented.

Physical Health

The identification of links between cognition and physical health is a necessary step in characterizing cognitive aging in African-Americans. An argument for a link between cognition and physical health in older African-Americans can be made from several sources of past research. One source is the past literature that shows a link between physical health and cognition in Whites. Past as well as recent research has demonstrated links between declines in health and reduced cognitive functioning (e.g., Elias, Elias, & Elias, 1990; Perlmutter, Adams, Berry, Kaplan, Persons, & Verdonik, 1988; Perlmutter & Nyquist, 1990; Salthouse, Kausler & Saults, 1990; Whitfield & Miles, 1994) as well as mortality and cognitive functioning (e.g., Swan, Carmelli, & LaRue, 1995).

Another source is the literature on differences in rates of chronic illnesses between African-Americans and Whites (see, Miles & Bernard, 1992). For example, given the connection with neuropsychological functioning (e.g., Elias & Streeten, 1980; Elias, Shultz, & Robbins, 1987; Elias, Robbins, Schultz, & Pierce, 1990; Wilkie & Eisdorfer, 1971) and hypertension, and the high rates of hypertension among African-Americans (see, Miles & Bernard, 1992), hypertension may be an important factor in the relative risk of impairment in African-Americans.

A less well understood health and cognition connection has been the relationship between cognition and activities of daily living. Some research suggests that in the progression of some disease processes, cognitive decline appear just prior to IADL impairment (Wolinsky & Johnson, 1991). There is also support for a relationship between measures of cognitive impairment and IADL functioning (Fillenbaum, Hughes, Heyman, George, & Blazer, 1988). African-Americans disproportionately suffer from chronic illness and disabilities and frequently report or describe their illnesses in relation to their ability to perform activities of daily living (Harper & Alexander, 1990). In addition, Clark & Maddox (1992) found that in comparisons of African-American and non-African-American elders, trajectories of functional impairment differed. Thus, there may be differences in trajectories of cognitive decline between African-Americans and Whites related to differences in levels of functional impairment observed between the two groups (Whitfield et al., 1997).

Educational Influences

Educational attainment is a variable of importance for the study of cognition among African Americans. There is considerable support for the existence of the relationship between cognitive abilities and education (e.g., Birren & Morrison, 1961; Blum & Jarvik,

1974; Denny, 1979; Denny & Palmer, 1981; Green, 1969; Kesler, Denny, & Whitney, 1976; Ripple & Jaquish, 1981; Schaie & Strother, 1968; Selzer & Denny, 1980). Summarizing the findings of these studies, we find that as education increases so does performance on most cognitive tasks in samples of Caucasian elderly. It is well documented that African-American elderly are more likely to have less formal education than elderly Whites (for discussion see, Harper & Alexander, 1990). In addition to the cohort differences that exist in educational achievement (Adams-Price, 1993), the variability in the quality of education that African-American elders received as children is also an important factor that has not been an inherent element in discussions of racial differences in cognitive abilities. The qualitative and quantitative differences that exist in education between Blacks and Whites requires analytic strategies that can address both typical sources of between group differences and unique sources within group variation.

Analytic Strategies

Most of the past multi-ethnic investigations typically beg the question: Are there mean differences between majority and minority elderly groups? Thus, past studies have focused on whether whites and blacks perform equally well on behavioral assessments. Seldom do the statistical analyses focus on the sources of variability within the minority group unless it is in light of the variability observed in the majority group. The most important point to make here is that *factors that account for between group variability do not necessarily account for within group variability*. This simple point is frequently overlooked in most multi-ethnic studies. The results of previous studies typically cite race as a between subjects factor that accounts for significant variability. This point is important but by itself does not fully provide an understanding of the variance in the population of interest. It may be more advantageous not to examine mean level differences but correlational/variance patterns. Perhaps there are different factor patterns among variables when one examines variability within one race. At the very least there may be differences in factor loadings between ethnic groups.

Understanding distinctive patterns in aging that exist within groups has important implications for multi-ethnic research. By identifying significant factors for minority population(s) which may or may not be significant when simply viewed in light of their importance in comparison to majority populations, a more accurate assessment of differences between groups is attained. A potentially useful strategy is to perform separate analyses on each of the ethnic groups to see what factors account for the variability within the groups. This is of course in addition to doing between group analyses.

Instruments

One of the most important concerns and areas for potential improvement in studying cognition in minority elderly is the use of and development of instruments that are

valid and reliable. There are at least three issues that need to be attended to in studying minority populations that concern assessment tools: 1) use of culturally sensitive instruments, 2) development or modification of instruments to encompass the knowledge base of minority subjects, and 3) modification of scoring procedures to account for educational differences.

Everyday Problems Task

Measures of everyday problem solving are designed, in part, to assess the processes and strategies individuals employ to answer the challenges of everyday life (Willis, 1991; Willis, Jay, Diehl & Marsiske, 1992). There are several measures of everyday problem solving that have been used with Whites (for examples see, Cornelius & Caspi, 1987; Poon, Rubin, & Wilson, 1989; Sinnott, 1989; Sternberg & Wagner, 1986; Willis, 1991). Within the general framework that these tests are designed, competence is commonly conceptualized as the effective response of an individual to specific life situations (Cornelius & Caspi, 1987; Goldfried & D'Zurilla, 1969).

Most tests of intellectual ability were not designed to predict adaptation to challenges posed by novel situations in adult life (Cornelius & Caspi, 1987). Thus, the scope of traditional tests of intellectual ability may be too limited to assess dimensions that are important for everyday functioning (Cornelius & Caspi, 1987). This perspective of assessing practical problem solving rather than traditional tests of intellectual ability has lead some to hypothesize that optimally exercised abilities may not decline with age and unexercised abilities may decline through disuse and lack of practice (e.g., Denny & Palmer, 1982; Cornelius & Caspi, 1987).

Another conceptual strength of research on everyday problem solving is that performance on these types of tasks has been found to be comparable to measures of fluid ability (Schaie, 1990). The variables involved in everyday competence may be universal at the latent construct level, but they are culturally and contextually constrained at the phenotypic level (Willis, 1991), suggesting that these measures in their current forms may not be suited for use with minority populations without modifications (Whitfield, 1996).

Crystallized/Fluid Measures

One of the guiding differentiations between the original theory of fluid and crystallized abilities is that crystallized abilities are those influenced by educational, cultural, and experiential factors. In light of the educational and other differences in life experiences that exist between African-Americans and Whites (as groups), crystallized abilities are likely to show group differences in performance. More interesting may be what factors contribute to within group variation on crystallized measures. Fluid measures, theoretically, should show greater similarity between African-Americans and Caucasian elderly.

In addition, separating cognitive functioning into these two domains allows for specific assessment of stability or declines in the different domains of cognition of older African-Americans. However, the construct validity of these theoretical differentiations and similarities has yet to be tested using an African-American sample.

Race Sensitive Impairment Indices

The assessment instruments used in the majority of previous research on cognitive functioning in elderly African-Americans typically take the form of neuropsychological tests. Yet there are few standardized norms for these tests. Neuropsychological instruments are critical to the study of cognitive aging because they differentiate individuals with low performance on the cognitive measures who display signs of dementia from those whose low performance is due to primary aging. Measures like the MMSE and the SPMSQ are typically used as measures of general impairment. The SPMSQ is a 10-item screening instrument for cognitive impairment with scoring that takes race and education into account with more errors allowed for African-Americans and those with less education (see, Fillenbaum, Heyman, Williams, Prosnipz, & Burchett, 1990). In Whites with 9-12 years of education, subjects who make 3 or more errors are considered impaired. The measure permits one more error for less education and less error for more education. At each level, African-Americans are permitted 1 additional error before being considered impaired (e.g., for African-Americans with 9 to 12 years of education, subjects who make 4 errors would be considered impaired) (Pfeiffer, 1975). The SPMSQ, however, does not possess the same level of sensitivity of measurement for varying degrees of cognitive impairment as the MMSE. Fillenbaum, et al, (1988) found that those with less education, higher age, and minority status (African-American) tended to make more errors on the MMSE. Perhaps the development of a scoring procedure that allowed subjects who have less education and are a member of ethnic minority group more errors on the MMSE would allow for greater accuracy in assessment of impairment. Such an adjustment for race has been suggested for Hispanic elderly by Escobar, et al. (1986). Such an adjustment assumes that the rate of cognitive impairment is the same for minority as for non-minority elderly.

Weschler Memory Scale—Logical Memory

One measure of potential usefulness in the study of African American elderly is the Logical Memory subtest from the Weschler Memory Scale. This measure involves repeating short stories which contain specific characters and events. One of the results of African-Americans being restricted in their access to formal education is that the spoken word is relied on more than written language. Story telling is a major component of African-American culture for purposes of obtaining general knowledge as well as passing on family histories and legacies. Future studies of African American populations should consider using the logical memory task as an attempt to assess cultural abilities.

Summary

The use of multiple analytic strategies and attention to conceptual issues is essential for properly incorporating ethnic minorities in cognitive aging research. Thus, the identification of sources of individual differences will provide an important basis for understanding the etiology of successful cognitive aging in older African-Americans. Individual differences in behavioral and biological dimensions of life among African-Americans has implications for the quality as well as quantity of late life. Identifying sources of individual variation for risk factors for decline in cognitive functioning and covariates of successful aspects of cognitive aging will provide important guides for social and health policies.

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