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PREVIEW

**DIFFERENCES BETWEEN THE OLD-OLD AND THE YOUNG-OLD ON MEASURES  
OF INTELLIGENCE AND CAPABILITY**

**by  
Kimberley Ann Wands**

**A DISSERTATION**

**Presented to the Faculty of  
The Graduate College of the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Doctor of Philosophy**

**Major: Psychology**

**Under the Supervision of Professor Theo B. Sonderegger**

**Lincoln, Nebraska**

**December, 1996**

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Differences Between the Old-Old and the Young-Old on Measures

of Intelligence and Capability

BY

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GRADUATE COLLEGE  
UNIVERSITY OF NEBRASKA

# DIFFERENCES BETWEEN THE OLD-OLD AND THE YOUNG-OLD ON MEASURES OF INTELLIGENCE AND CAPABILITY

Kimberley Ann Wands, Ph.D.  
University of Nebraska, 1996

Adviser: Theo B. Sonderegger

This current research project focused on the differences between the old-old and the young-old in term of levels of intelligence and capability. "Intelligence" was operationally defined as measures taken from a short version of the Wechsler Adult Intelligence Scale-Revised, the Satz-Mogul WAIS-R. Capability for the purpose of this study, was operationally defined as measures taken from the Cognitive Competency Test (CCT) and the Direct Assessment of Functional Status (DAFS).

The purpose of this research was to study how measures of capability and intelligence are affected by factors such as age, institutionalization and gender. Individuals of both genders comprising two age groups (55-74, 75-97) and two residential options ( community-dwelling and institutionalized) were subjects. The intellectual and capability functioning of subjects was assessed by three measures (i.e. CCT, DAFS, WAIS-R). Regression analyses, which partialled out the effects of extraneous factors (e.g.

health, education) were used to study the effects of age, level of institution, and gender.

Results of the study revealed highly significant differences between age groups on measures of capability and intelligence. Older adults performed worse on capability and intelligence measures than younger adults even when the effects of health, and education were controlled. Institutionalized individuals performed worse on measures of capability and intelligence than non-institutionalized individuals. Gender did not have a significant effect on test performance on intelligence measures but men scored slightly worse than women on one capability measure (DAFS). Results are discussed with an emphasis on the relationship of hospitalization, age and gender to intelligence and capability. The limitations of the current study are identified and possibilities for future research are explored.

## DEDICATION

I dedicate this work to my loving family who have always supported my dreams and taken pride in my accomplishments: To my mother who taught me tenacity and the value of hard work; To my brother, George for providing a model of achievement and integrity; To my brother, Fred, for believing in my abilities and showing me the true meaning of commitment; and To my husband, John, whose love, constant encouragement, and high expectations made this work possible. Finally, I dedicate this work to the memory of my father, George H. Wands, who taught me the importance of human dignity.

PREVIEW



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# **Differences Between the Old-old and the Young-old on Measures of Intelligence and Capability**

1

## **INTRODUCTION**

### **Changing Demographics**

Today, twelve percent of the population of the United States of America is over the age of 65. By the year 2030 the U.S. Census Bureau estimates that 17% of Americans will be 65 or older (US Census, 1995). This is a profound demographic shift which will have far reaching implications throughout the society of the twenty-first century.

Thus it is of paramount importance that the nature of changes in psychological functioning with age is understood, in the hope that understanding these changes will increase the quality of life of older adults. For, although older individuals are living longer, concern has been raised that their quality of life in later years has deteriorated.

The independence of older adults is threatened by health concerns. Twenty to twenty-five percent of older adults over the age of 84, for example, live in chronic-care facilities (Hulicka, 1991) and forty-five percent of community-dwelling old-old adults need assistance with activities of daily



living. Overall, the risks of disability, and loss of physical capabilities increase dramatically for individuals over the age of 75 (Altergott, 1988).

### Human Capital Initiative

In 1990, the psychological community began the development of a national research agenda, the "Human Capital Initiative", which identified the most important research questions of the next decade. This agenda was developed by prominent figures in the field of aging and included the participation of seventy psychological organizations and several federal agencies. One of the four areas recommended for extensive research and funding was the psychological functioning of the very old (those 75 or older) in order to optimize functioning and maintain independent behaviors (the other three areas were: i) understanding health behavior to promote successful aging, ii) understanding how to maximize and maintain productive work behaviors, and iii) developing assessment and treatment of mental disorders in older adults).

The team of experts concluded that very little was known about the basic changes in mental abilities of the very old. They stated that little research had been done on psychological factors involving everyday life in very old individuals and that most research had focused on differentiating young adults (e.g. 20 years old) from old adults (e.g. 60 years old).

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Specifically, they encouraged individuals working in the field of aging to conduct basic research to quantify and understand changes that occur in late adulthood. They stated that basic research is urgently needed to examine changes that occur in intelligence and activities of daily living during late adulthood with specific comparisons between the young-old (terms defined below) and the old-old (A.P.S. Observer, 1993). They posit that by understanding changes that occur with aging, optimal performance of the old-old can be achieved by enhancing the skills and abilities which are most preserved in advanced years (A.P.S. Observer, 1993).

#### The Old-old and the Young-old

Neugarten, 1974, began the study of older adults as a heterogeneous group. She categorized the population 75 and older as "old-old" and individuals aged 55 to 74 as "young-old". These are the fundamental characterizations which will be used in this study.

The study will compare measures of intelligence and capability between individuals within these two groups. Attention will be paid to the important factors of gender, health, and institutionalization. The remainder of this introduction will be devoted to a survey of current literature on the effects of age on intelligence and capability. In each of these sections particular attention will be given to research which investigates the effects of these three factors.

### **Psychometric Intelligence**

Intelligence can be looked at from a variety of perspectives including both theoretical and practical perspectives (for a survey of theoretical approaches please see Appendix A). This study concentrates on the practical or psychometric definition of intelligence. Specifically intelligence is operationalized as the scaled score obtained from the measures on the Wechsler Adult Intelligence Scale (WAIS-R). The WAIS-R is the most commonly used instrument for measuring intelligence and is often used in human services for decision making about placements. The WAIS-R is composed of six verbal and five nonverbal tests which measure a person's potential to engage in intelligent or meaningful behavior. Three intelligence scores are reported: the verbal intelligence scaled scores, the performance intelligence scaled scores and the full scale intelligence scaled scores. It was important to use all three of these measures in this study because verbal and nonverbal abilities may decline disproportionately with age (Schaie, 1994; review article).

### **Age and Intelligence**

Numerous studies have examined the effect of age on intelligence. Wechsler (1958) summarized the research by stating that the majority of studies had found that intelligence peaked between the ages of 18 and 25 and deteriorated thereafter. Botwinick (1977) declared that intellectual decline is an inevitable consequence of aging.

Nevertheless many researchers (Baltes and Schaie ,1974; Schaie 1989a, 1989b, 1990, inter alia) argue against age-related intellectual deterioration. Thus, the belief that intelligence declines with age is not universally accepted.

Schaie (1990) has carried out extensive longitudinal and cross-sectional research on the effects of aging on intellectual factors. Cross-sectional studies have tended to over-estimate age-related declines; however, smaller age-related longitudinal declines across five mental abilities were reliably demonstrated. The five mental abilities measured in Schaie's Seattle Longitudinal Study were verbal meaning (the ability to understand words), spatial orientation (the ability to manipulate objects in three-dimensional space), inductive reasoning (the ability to discover systems of underlying rules), number ability (the ability to do simple numerical and arithmetic functions) and word fluency (the ability to generate words based on a lexical rule) (Schaie, 1990).

Although Schaie demonstrated overall deterioration of groups of individuals with age, the pattern of individual differences in intellectual decline remains unclear (Hertzog, 1985; Schaie, 1989a). Schaie's (1989b) study showed that intellectual deterioration is quite limited until the age of sixty, affects less than a third of subjects in the sample before the age of 74, and by the age of 81 cognitive decline is seen in only 30-40% of the participants. In addition, 75%

of sixty-year-old participants showed no deterioration in 80% or more of their intellectual functioning over a seven year period. Schaie posits that this lack of global deterioration, which extends into the eighties, reflects optimization and selective maintenance of primary mental abilities necessary for functioning. Despite this somewhat optimistic forecast, Schaie goes on to say that impairment of intellectual skills necessary for capable behavior occurs in most individuals in their eighties and nineties. It is important to note, however, that only 9% of the variance in scores of intellectual ability in this study was accounted for by age; thus, a number of other factors have contributed to this pattern of observed decline (Horn, 1982). Stressful, complex or challenging environments, for example, contribute to intellectual losses in the old-old (Kliegl & Baltes, 1987).

The old-old on average have less education than the young-old and differences on intellectual measures between the two groups are significantly reduced when the effects of education are controlled for (Granick & Friedman, 1973). The old-old and young-old differ in terms of occupational status such that the old-old are more likely to have been employed in manual work with few cognitive demands, whereas the young-old are more likely to have worked in technical or managerial jobs (Halpert & Zimmerman, 1986; Labouvie-Vief, 1981).

Age-related declines in fluid intelligence (i.e. the ability to solve novel problems creatively) have been demonstrated (Kliegl & Baltes, 1987). Decreases in fluid intelligence are linked to problems of organizing material, difficulties in focusing attention or paying attention to multiple demands, and inability to manipulate information in working memory (Horn, Donaldson & Engstrom, 1981).

Crystallized intelligence, the ability to utilize knowledge, has not been found to decline with age and may continue to increase as an individual learns new information and gains new skills (Horn, 1982; Horn & Donaldson, 1980).

#### **Institutionalization and Intelligence**

Intelligence tests are frequently part of flexible batteries used in legal decisions regarding a person's ability to live safely within their own home. However, systematic information is not available which relates measures of intelligence to age and the ability to live outside an institution because this question has largely been ignored in previous research. In fact, the Human Capital Initiative specifically targeted institutionalization's effect on intelligence as a critical research area.

The relationship of institutionalization to intelligence is further complicated because advanced age and economic hardship due to low occupational status increase the likelihood of institutionalization (Gatz & Smyer, 1992).

Advanced age and low social economic status are associated with lower scores on intelligence measures (Botwinick, 1977).

For example, Ryan & Paola, (1993) selected 130 old-old individuals with demographic characteristics that matched the current population over the age of 75. They found little difference in the intellectual performance of healthy male and female older adults (without current or past psychiatric, neuralgic or systemic disease) to individuals under the age of 75. However, they found marked differences in intelligence based on an individual's level of educational and occupational status. individuals with 12 or more years of education scored 16 points higher on WAIS-R scores than individuals with eleven years or less of schooling. Managers, moreover, scored an average of 16 points higher than individuals who were general laborers (Ryan & Paola, 1993).

### Gender and Intelligence

Research which relates measures of intelligence to both age and gender is scarce. Poor health often negatively affects intellectual performance and, in general, women are healthier and live longer than men (Elias & Elias, 1990). Increased education and higher occupational status is associated with higher scores on intelligence tests. Older women often have low socio-economic status because 1) they are more likely to outlive benefits than men and 2) they generally had less educational and occupational opportunity

than males in their cohort. Thus, one would conclude that when these factors are considered together that men and women should perform equally well on intelligence measures.

This conclusion is confirmed by two research studies which concluded that men and women did not differ systematically in terms of age-related cognitive decline (Schaie & Hertzog, 1986; Huyck, 1990).

### **Health and Intelligence**

Health status is an important variable to consider when examining cognitive and functional changes associated with age because several conditions common to older adults have been found to impact intelligence scores (Elias & Elias, 1990).

Severe forms of vascular disease, cerebrovascular disease and arteriosclerosis are associated with impaired cognitive performance (Abrahams, 1976; Light, 1978). However, the relationship between hypertension and cognitive performance is unclear. Farmer et al (Farmer, White, Abbott, Kittner, Kaplan, Wolz, Brody & Wolf, 1987) found no relationship between hypertension and cognitive performance while Busse & Maddox (1985) found that hypertension, atherosclerosis, and decreased cerebral blood flow caused significant intellectual decline over a ten year span (Busse & Maddox, 1985). Hachinski (1980; Horn, 1982) postulated that hypertension's effects on the hippocampus may result in losses of fluid intelligence. Hertzog, Schaie & Gribbin