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PHYSICIAN RANKING OF ACTIVITIES
OF INSTRUMENTAL ACTIVITIES OF DAILY
LIVING DOMAINS

by
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A Thesis

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□ Chapter 1

Introduction

Independent Aged in the Community: The Importance of Individual Instrumental Activities of Daily Living Skills

Although there is no agreement on the causes of heterogeneity of function among the aged, there is agreement among scholars that there is much variation in the way humans age (Heikkinen et al., 1983; Crews, 1990; Rowe and Kahn, 1987; Manton et al., 1987, Vaupel, 1997). Demographers, gerontologists, anthropologists and epidemiologists generally agree that if aging is defined as the time-related changes in a biological organism over its life span, then these universal processes are reflected in the function and the survival of this organism. Although scholars from these four disciplines study the function of the aged, their theoretical orientations and the methods (measures of independence) they use to extract and interpret these data may be as varied as the heterogeneity of the aging process itself.

Measuring Independence Using the Instrumental Activities of Daily Living Skills

The Instrumental Activities of Daily Living (IADL) are a set of skills used by health care professionals and researchers to determine whether an individual is able to function independently in a community. These skills include the ability to

feed oneself, maintain one's hygiene, dress oneself, toilet oneself, perform indoor mobility tasks such as transfer from bed to chair and bed to commode, use a telephone, handle one's finances, do one's laundry, perform outside mobility tasks, perform one's shopping, medicate oneself, perform housekeeping, and use some form of transportation (Kane and Kane, 1981, 2000; Appendix, III).

The independence of an older individual is most often based on the judgement of physicians, as representatives of the biomedical system. Although other health care professionals assess independence in the aged, in most health care systems, it is the physicians who are the gatekeepers who prescribe assistive services if independence is compromised.

Researchers most often assess independence at an international level. Many populations have growing numbers of aged individuals. The literature in all four disciplines that study aging deals with concerns over the assessment and care of these individuals. Anthropologists are interested in the dynamics of ethnic groups or distinct populations.

The objective of this study is to determine whether physicians grouped by geographical area rank the importance of the IADL skills differently (see Appendix IV). This anthropological investigation is complicated by the diverging theoretical agendas of the other disciplines listed above that also study the aged. However, within anthropology, a small number of scholars provide both the richest data on aging in other cultural groups, and a theoretical framework within which to interpret those data (Counts and Counts, 1991; Glascock and Fineman,

1980, 1981; Glascock, 1983, 1990; Simmons, 1945a, 1945b, 1946, 1960; Myerhoff, 1979; Kertzer and Keith, 1984; Glascock, 1983; Maxwell, 1970).

The contributions of two anthropologists (Beall and Weitz, 1989; Barker, 1990; Barker, 1994) figure prominently in the study of IADL skills in other areas of the world¹. These authors argue that the effects of environment, socio-economic status, level of technological development, and societal interpretation of immediate geographical area required for independence must be relative or sensitive to the people being studied: skills must be adapted for different areas of the world because people simply do things differently (see Appendix IV).

The debate over whether the specific skills comprising the IADL provide sufficient flexibility to adequately assess a variety of cultural groups continues within both anthropology and other disciplines that study aging. Contributing to the resolution of this issue using a specifically developed simplified version of the IADL instrument as a proxy would seem to have considerable importance, both theoretically and practically.

This study provides evidence that there is significant overall agreement on the relative importance of the 12 IADL domains (one word descriptors of IADLs) and there was no significant effect of geographic area of training or practice on

¹ Although there are many methods or review papers on this issue only two studies actually provide pertinent evidence for this study. Researchers from anthropology and other disciplines who support the use of culturally sensitive instruments are Jette et al., 1996; Avlund, 1997; Beall 1984 ; Beall and Eckert, 1986; Beall and Weitz, 1989; Rubinstein and Kramer, 1994; Becker, 1994 and Johnson and Wolinsky, 1994.

the ranking. The IADL Domain or one word descriptors can be used cross-culturally.

The evidence was obtained by examining the relevance and importance of the IADL skills as ranked by 236 physicians from 11 geographical areas around the world. Based on a response sample of 348 physicians from 35 different geographical areas, two hundred and thirty-six physicians from Africa, Australia, Egypt, India, Ireland, Philippines, Poland, South Africa, Scotland, Singapore, and Sri Lanka met the criteria for inclusion in the main sample. The criteria were: (1) having another geographical affiliation; (2) having completed the study questionnaires; and (3) being from a geographical area in which more than 10 physicians completed the study questionnaires.

The final survey package sent to the physician sample included a page that consisted of an introduction from the researcher, a list of the 12 Instrumental Activities of Daily Living, and instructions asking the physician to rank the 12 skills in order of importance for a senior to live independently in the community.

Survey responses were coded for physician gender, age, and medical specialty. In addition a code for technologically advanced (Western Areas) and non-technologically advanced (non-Western areas) was devised.

Universal Instrument, Universal Effect or Universal Values?

Basic questions such as: a) are some skills judged to be more important for independence than others; b) how do physicians rank the importance of each skill for remaining independent; and c) can complex series of tasks be condensed into 12 domains were answered in this study. Physicians might have differed in their responses to these questions due to four influences: a) the way they have been trained in medical school, b) the way their individual ethnic or cultural practices have shaped them, c) the way a blunt and simple instrument affects them, and, d) a combination of all three of these.

It is likely that medical training and practice world-wide has experienced considerable homogenization, reducing differences in medical practice across widely separated geographical areas. For example, the medical literature is dominated by North American/Western biomedicine, and is widely available². It would not be unreasonable (at the very least) to assume that physicians around the world have access to such publications as the New England Journal of Medicine and the Journal of the American Medical Association. In addition, the internet has made numerous articles on biomedical treatment available without cost via Medline.

² After World War II anthropologists began to take a closer look at the cultural construction of illness, illness experience, the body and medical knowledge. Their curiosity has led to examination of how medical knowledge is produced in the clinic, laboratory and medical school. Biomedicine is observed as a combination of science and medicine that exists as an autonomous culture producing 'authoritative knowledge'. This unexamined authority associated with biomedical or authoritative knowledge is studied by anthropologists interested both in how the ritual and process are generated and the effect on worldviews.

Shaping of Physicians Responses by Individual Customs and Traditions:

It was hypothesized that this homogenization of medical training and practice would not have entirely supplanted a rich context of customs and local knowledge in various geographical areas. However, there was as much variability in ranking between physicians within a geographical area as there between geographical areas. This study provides evidence that the IADL acts as a 'culturally sensitive' instrument as advocated by Beall (1984), Barker (1992) and Becker (1994; Maxwell, 1970; Avlund, 1997; Avlund et al., 1994).

Cultural relativism is a crucial issue that has been addressed in this study. Getting caught up in cultural differences and paying less attention to human universals may lead cross-cultural studies down a slippery slope and degenerate into pure relativism (Good, 1990). There is a balance to be struck between understanding local knowledge involving 'universal values' and 'culturally sensitive' or distinct local knowledge.

Another 'universal value'- independence - has been previously established from evidence provided by anthropological literature dating back to the 1920s (Simmons, 1945a, 1960; Glascock, 1990; Maxwell, 1970). Individuals from various cultural backgrounds (extracted from the Human Relations Area Files) referred to a local translation of independence or being able to function in the community.

The IADL Domain Screen: The 'Blunt Instrument' Effect:

It is conceivable that the use of a cursory scaled down version of the IADL or screen (hereinafter referred to as the 'IADL Domain Screen') when used to rank individual skills in different geographical areas has a profound effect. "An underlying goal of clinicians and population researchers alike is to render the complex simple". An instrument that "summarizes physical functioning status into a simple page and can be summarized further into a single score, will be useful in just about all health contexts". (Branch and Meyers, 1987:47). Evidence from this thesis supports this statement. Subsequent chapters provide evidence that support the IADL Domain Screen.

Chapter 2 contains a review of the pertinent theoretical and methodological issues regarding the assessment of aging from the gerontological, epidemiological, demographical, and anthropological perspectives. In Chapter 3 the design, administration, materials, and methods used to address the question of how the relative importance of individual IADL skills or function is perceived across geographical areas are described. The results of the study are presented in chapter four. The key analyses employ tests of variance.

Chapter 5 moves beyond the data and integrates the effects of being trained in medical school, individual ethnic or cultural practices, the use of the IADL Domains Screen and the combination of all of these results with current evidence on the ranking of IADL. Future avenues of research that have been illuminated by this evidence are also be addressed.

□Chapter 2: Literature Review

Physical Function, Assessment and Instruments

The questions integral to this study of the importance to physicians of individual skills of the IADL probably would not have concerned researchers four decades ago. Changing theoretical constructs, demographic trends, and government resource initiatives, however, have stimulated new research directions in the assessment of physical function and independence among the aged.

This chapter critically surveys the literature on physical function (or what purports to be physical function), independence, and the use of IADL skills to measure both phenomena. In addition, the literature is further categorized by theoretical focus and methodology, with special consideration given to comparative studies that address cross-cultural, socio-economic, and political issues. A further grouping of studies by area of focus within anthropology organizes the literature for the purposes of critical comparison.

The second half of this chapter compares studies dealing with problems in the use of the IADL. Issues that have initiated this study (e.g., administering, scaling, and scoring the IADL; gender and ethnic biases) are synthesized with

respect to the question 'Is there a measure of physical function that provides a cross-culturally valid assessment of the level of independence in the community?'

Finally, the use of the IADL by physicians to draw inferences about the relative importance of individual skills in various geographical areas is situated in the successful aging literature.

Assessing Physical Function

Much of the early research on health and physical function originated in medicine and epidemiology, and focused on the pathology of aging (Estes, 1979; Estes and Swan, 1984, 1993; Kaufman, 1994).³ Influenced by the prevailing view of aging as a continuous process of progressive decline and inevitable loss of function, researchers focused primarily on understanding the etiology and nosology of specific age-related diseases. Measures of physical function were administered to the aged mainly to record symptoms of these disease states (Rowe and Kahn, 1987; Beall, 1984; Estes, 1984).

According to McDowell and Newell (1996) there 'was a proliferation of hastily constructed measures that typified the 1970s'. To guide treatment and

³ "The process of geriatric assessment is shown to extend medicine's gaze to all aspects of bodily, mental, and social existence, thereby contributing to a widespread cultural confusion about the equation of old age with disease. Geriatric medicine's representation of old age and disease is embedded in a risk discourse permeating contemporary society. An analysis of geriatric assessment conferences suggest that the old become the field on which the imperative to reduce risk by behaviour modification and supervision competes with the deeply held value of autonomy"(Kaufman 1994:430).

better understand the 'diseases of aging', researchers collected data from both clinical patients and population samples.

Kaufman (1994:430) takes issue with clinical biomedical assessment⁴, which she claims reduces the "deeply held value of autonomy" of the older individual (see footnote 1). Kaufman (1994) also argues that 'constant surveillance' or assessment on institutionalized individuals is much like doing inventory in a warehouse.

Kaufman's (1994) condemnation of the extent or degree of assessments is cogent and persuasive. However, 'constant surveillance' or charting are part of biomedical ritual, whether it be chronic care or acute care. Lack of continuity in charting of measures across levels of care (home care, acute care, chronic care, and mental health care) can lead to diagnostic complications and missed acute condition symptomatology. On the other hand, there is a greater chance that health care professionals from other levels of care may chart different outcomes measures taken from the same individual.⁵

Williams (2000) speaks about the 'growth industry' in developing measurement scales, as indicated by edited volume collections of just the

⁴ While a variety of clinical assessments are needed for measuring rehabilitation, population level measures should be uniform in nature in order to make cross-cultural comparisons.

⁵ The medical chart and the IADL instrument together form a simple and neutral nexus for base-level evaluation of health and independence. Kaufman's claim of the reduction of the "deeply held value of autonomy" is central to this thesis. This study is about the importance of individual skills that measure independence not the 'diseases of aging' or the chronological age of older individuals.

general scales (Spilker, 1996; Mc Dowell and Newell, 1996; Bowling, 1996, 1997; Kane et al., 1990; Demeter et al., 1996). Other, more specialized, geriatric measurement scales of health and function can be found in volumes by Mangen and Peterson (1984); Israël, Kozarevic and Sartorius (1984); Kane and Kane (1981); Kane and Kane (2000); and Kane, Ouslander and Abrass (1999). The growth in the production of such instruments has been supported by their commercialization and marketing (Williams, 2000).

As for the design, length, and complexity of these assessments, even authors who work on the same project (WHOQOL-100) may have different perspectives on these issues. For example Williams (2000) and Orley (2000) disagree on the number of facets per IADL skill domain. Williams and Orley even differ on the same domain - sleep. Williams (2000:13) supports the psychometric approach that covers the entire rubric of sleep by asking:

How well do you sleep?
Do you have any difficulties sleeping?
How satisfied are you with your sleep?
How much do any sleep problems worry you?

On the other hand this complication of a domain often avoids direct questions about one function of a domain such as "do you sleep or not?" (Feinstein, 2000:159).

The work of Ferrucci et al. (1998) offers a more effective use of health domains that applies directly to physical function and the use of IADL skills assessment. These authors ranked upper and lower body skills separately and

in order of difficulty of performance. However, this separation simply focused on the areas of the body anatomy needed to perform these skills.

Like the instrument created by Virginia Apgar to assess the clinical condition of a new-born baby, the IADL is a 'sensible' measure with excellent face validity (Feinstein, 2000) in that it directly asks about what it is supposed to measure: physical function (Kane and Kane, 1981; Kane and Kane, 2000). Similarly, the Older Americans Resources and Services Multidimensional Functional Assessment (OARS) version of the IADL uses three possible rating scores per variable with a maximum cumulative score of 14.

Many instruments (similar to the IADL) used to test physical function in clinical patients were fine-tuned to fit the specific needs of rehabilitative studies, which required instruments sensitive to the small, incremental improvements expected in individuals recovering from acute conditions such as stroke and cardiac problems (Branch and Meyers, 1987; Katz et al., 1963; Streiner and Norman, 1996; Kane and Kane, 2000; Streiner, 2000). In contrast, instruments designed to measure physical function in large national population studies assessed physical function in much more general terms (Kane and Kane, 1981; Branch and Meyers, 1987). One of these general terms is independence. At a population level prevalence studies of disability were needed to provide service for dependent or older individuals who could not live in the community.

The Genesis of Interdisciplinary Function Research

Three decades ago, scant attention was paid to the aged segment of the population as developmental research focused attention on the young. Early demographic studies were encouraged by government incentives to study the fertility and mortality patterns of the large baby boom generation, and were therefore driven by theories of childhood development and adaptation (Manton, 1993; Estes, 1984; Rowe and Kahn, 1998; Rowe, 1997).

Just a decade ago, demographers who had concerned themselves primarily with the substantial improvement in population health began to notice that mortality patterns were shifting, and that the aged were living longer (Fry, 1990; Manton and Suzman, 1992; Rowe, 1997). Demographers who had forecast and followed the development of the baby boom population were investigating increased life expectancy, and exploring the potential implications of a society burdened with a high proportion of disabled aged (Manton and Suzman, 1992; Manton and Soldo, 1992; Rowe, 1997).

Epidemiologists who had studied childhood diseases of the baby boomers, and the nosology of chronic diseases of the aged, began to take an interest in the environmental factors (e.g., improved health care, community hygiene, better living standards, and quality of life) that may have led to this increase in life expectancy (Schipper et al., 1996; Wallace, 1992; Fried and Wallace, 1992; Murray and Lopez, 1999; Barrett, 2000).

Anthropologists who had compiled developmental norms and retested them on scores of baby boom youngsters, became interested in long-lived individuals from exotic regions such as the Arctic and the Himalayas (Beall et al., 1985; Crews, 1994; Rubinstein and Kramer, 1994; Barker, 1989).

Gerontologists began to question biological theories of limited life span and to explore the implications of longer life expectancy (Fries and Crapo, 1981; Strawbridge et al., 1992; Hogan, et al., 1999; Johnson and Wolinsky, 1994; Robine and Mathers, 1992).

As epidemiologists, gerontologists, and anthropologists began to explore the increase in life expectancy, their research ultimately revealed an increase in morbidity among the aged. Throughout the decade of the 1980s, many theories about the etiology of late life morbidity were articulated (for example Wear and Tear Theory, Hayflick, 1965; Autoimmunity Theory, Walford, 1962; Cross-linked or Collagen Theory, Bjorksten and Tenhu, 1990; Free Radical Theory, Harman, 1992, de Gray, 1997; Error Hypothesis, Altered Proteins, Somatic Mutation, Dysdifferentiation or DNA Damage and Repair Theory, Wood et al., 1992; Compression of Morbidity, Fries, 1980; Expansion of Morbidity, Nusselder et al., 1996, Olshansky, et al., 1998; Equilibrium of Morbidity and Mortality Theory, Manton and Suzman, 1992).

Impact of Theories of Late Life Morbidity on the Collection of Data on Physical Function

The most popular theory revealed that, with life expectancy nearing a biological limit, late life morbidity would increase -- but at a later age than expected (Fries, 1980). Studies revealed that the aged were living longer, but supposedly and unexpectedly delaying possible symptoms of old age⁶. This is referred to as the 'compression of morbidity' theory (Fries, 1980). Studies of this phenomenon sometimes yielded supporting, and sometimes disconfirmatory, results.

On the other hand, the 'expansion of morbidity' hypothesis postulates that with increased hygiene and medical care, diseases and chronic illnesses were not fatal but led to a longer period of morbidity (Olshansky et al., 1998). The third hypothesis, suggested by Manton and Soldo (1992:203) posits that the decline in mortality and morbidity may be approaching 'an equilibrium of morbidity and mortality'. All three hypotheses require investigation of quality of life and non-fatal chronic diseases of the aged.

The aged population, especially the oldest old segment (75-100 years of age), is heterogeneous. Given that there are so many influences on health,

⁶ Allowing for the continual nature of the aging process, there is no intrinsic time at which old age begins. However like other segments of the life cycle there are some agreed upon biological changes in the human body. For example: decreasing functional capacities of organ and organ systems with increased age (lung, heart, kidney decline) are common. Decreasing changes in the musculoskeletal system include a decrease in muscle mass, rigidity of the spine, and joints such as the hip. The senses such as hearing, vision, and touch along with vestibular changes affect can affect lifestyle (Moore et al., 1980).

such as gender, socio-economic status, ethnic group affiliation, 'social conditions', and early childhood health, the research on health and function of seniors can be ambiguous (Hayward et al., 2000). Hence, the debate on expansion versus compression of morbidity continues.

Recently, Belanger and Martel (2000) have used data from Canadian Health surveys to support both the expansion of morbidity hypothesis and the compression of morbidity theory. Using the Sullivan method and data from both the Health and Activities Limitations Survey (1986 - 1991) and the National Population Health Survey (1991-1996), disability-free life expectancy and health adjusted life expectancy were calculated. Data used during the first period (1986-1991) supported the expansion of morbidity theory, while the second period data (1991-1996) supported the compression of morbidity theory.

Using the Sullivan method to calculate disability-free life expectancy from data from the Dutch National Survey of General Practice, Nusselder et al. (1996) suggest that if we eliminate fatal disease there will be an increase in disability-free life expectancy, but eliminating nonfatal disabling diseases leads to absolute compression of morbidity.

The notion of compression of morbidity was not supported by the evidence provided in the Manton and Soldo study (1992). The authors extrapolated data from the National Center for Health Statistics, the National Medicare Expenditure Health Survey, the Duke Longitudinal Survey, the Republic of Korea, Philippines and Fiji Disability Study, the 1982 and 1984 National Long-term Care Surveys, Socio-demographic and Functional Limitation Response Profiles. The study did

show, however, that even though women did live longer, they spent more of their mid to senior life in a morbid state than did their male counterparts (Manton, 1989; Manton and Suzman, 1992). Moreover, Manton, and Soldo (1992) found that a wave of individuals who had been morbid prior to age sixty-five died before reaching the category of oldest old (75-100 years of age). Significantly, a group of survivors (primarily from ethnic groups) lived into the eighth, ninth, and tenth decades of life fully able and functional.

Confirming the work of Manton (1992), Hayward et al. (1999) and Colsher (1992) found that women do live longer than men, but spend more of these years in a state of morbidity. Using primary longitudinal data from Upper Normandy, Ile-de-France and Lille, Brouard and Robine (1986) modeled the entrance into disability for a select population of aged individuals. Using data from the French mortality database (1900 to 1990) combined with the 1982 Health Survey, Robine and Mathers (1993) investigated not only Manton's concept of health equilibrium, but attempted to differentiate between absolute compression, relative compression, relative expansion, and absolute expansion of morbidity. The methodology used was a combination of the Sullivan method (cross-sectional) and multi-state life tables⁷. Robine and Mathers (1993) found little difference in

⁷ Though the multistate life tables were extracted from longitudinal data for four sample years, the rest of the sample was estimated in tables adjusted for change in disability over time. The *n* value for the actual longitudinal sample was not given. Given that this (Robine and Mathers, 1993) was a pioneering study, there is potential for tests of reliability. The extrapolated sample size was one hundred thousand. However, cross-sectional extrapolation samples cannot replace actual cohort and secular trends of longitudinal study of populations, though, longitudinal studies are expensive and labour intensive.

the multistate and Sullivan methods of following and predicting expansion and compression trends. By authenticating the use of the Sullivan method for cross-national comparisons of populations, evidence can continue to be gathered to support either the compression or expansion of morbidity theories.

While demographic studies have revealed an increased life expectancy, there is no agreement on theoretical integration. Ultimately, this does not affect this study. However, whether morbidity is compressed into the last years of life is an issue that directly affects older men and women. Studies that measure function in late life will contribute to assessing the three theories discussed above. Further, research phenomena such as mortality cross-over, select survival, and gender differences in function directly affect morbidity data.

National and International Organizational Mandates for Research

In 1995 the World Health Organization introduced a 'challenge' for research on cross-national studies of health and function of the aged (WHO, 1998). The demand for health research mandates to respond to increasing life expectancy of both present and future cohorts of older individuals had to be addressed (WHO, 1998:1). Research programs also focused on those who were already disabled, and on the life course, cohort, health promotion, cultural, inter-generational, ethical, and gender perspectives. These mandates were supported by the National Institute of Aging and the National Institute of Health (Schneider, 1999). Earlier mandates in the 1980s included measurement of physical function of

ethnic minorities (Fillenbaum, 1990). A very similar mandate was issued in the fall of 2000 (NIA, 2000).

The ensuing research has included an abundance of studies on 'healthy' life expectancy, 'disability free' expectancy, and 'quality of life' expectancy⁸ (Belanger, and Martel, 2000 ; Brouard and Robine 1986; Jette, et al., 1996; Rogers, 1992 ; Williams, 2000; The WHOQOL Group, 1998). A review of a number of these studies, which were dedicated to the development of a global measure of these expectancy concepts, revealed both exemplary and questionable methodology⁹. However, very few of these studies actually provided any preliminary data on the perception of ethnic minority groups, or results from cross-national applications, possibly because these studies were in the early stages of testing their instrument for cultural relevancy, validity, and reliability (Belanger, and Martel, 2000; Brouard and Robine 1986; Jette, et al., 1996; Rogers, 1992).

Established in the last decade, The World Health Organization Quality of Life -100 study (WHOQOL-100) has been developing QOL questionnaires in 14 countries. The WHOQOL has focused less on detail and the study of symptoms of disease and disease itself, and more on the importance of social life, independence, and the life course of the individual in society. Much like

⁸ 'Healthy life expectancy' and 'disability-free life expectancy' are concepts used to measure prevalence of disability and morbidity. 'Quality of life' studies tend to include social and behavioural variables that describe the subjective context of an individual life. This perspective is much more in concordance with anthropological holistic methods of studying the individual in their environment.

⁹ Most studies did not sample ethnic aged.

anthropological studies that look at the whole person and how she adapts to her environment, WHOQOL has also chosen to take a broad perspective. Moreover, this work is being done in widely varying geographic areas such as India, Thailand, Zimbabwe and Panama (Orley, 2000)¹⁰.

Smaller Population Studies

In Canada, researchers employed a comparison of health status of aged individuals in Manitoba, Canada in 1971 and 1983 samples (Roos, Havens and Black, 1993). In 1971, a stratified sample was taken from the provincial insurance system (total $n=3851$; over age 80 $n=818$). In 1983, a second sample was extracted from the health insurance database ($n=21,330$). Individuals who were aged eighty and over were interviewed. Roos et al. (1993) were looking for evidence of compression of morbidity and found none. However, the questionnaire had been translated into 17 languages to include ethnic variation within the province.

The authors used Statistics Canada Census ethnic division categories to determine whether ethnicity, gender, and age had a negative effect on individuals. After collapsing all categories into North American, British, French, other European, and Polish, Russian, and Ukrainian, the authors reported no

¹⁰According to John Orley (2000) WHOQOL is an instrument with a broader sweep to its inquiry than most QOL measures and reflects more appropriately the concerns of most people around the world. QOL is an alternative dimension of health outcome assessment, differing from others by its subjective approach. It does not invalidate relatively objective measures e.g. life expectancy or physical health parameters, but must not be confused with such objective measures.

significant differences in perception of health or physical functioning as a function of ethnic group (Havens and Chappell, 1983).

In contrast, research carried out on sub-populations by demographers and anthropologists (using proven scales such as IADL) indicated that 'select individuals' from ethnic minority populations were living longer than their mainstream counterparts. These 'select survivors' who were faced with socio-economic hardship throughout their lives were living longer (without functional loss and inevitable late-life morbidity) than mainstream white males of higher socio-economic status (Manton and Soldo, 1992; Bastida and Gonzalez, 1993; Yu et al., 1993; Manton et al., 1993; Dowd and Manton, 1996; Arber and Ginn, 1993; Gibson and Jackson, 1992; Hayward et al., 2000).¹¹ The mortality (racial) cross-over phenomenon accentuates the discrepancy between the chronological and biological age of select survivors.

A number of researchers have noted that the prevalence of disability or loss of function decreases among the oldest old in sub populations (ethnically, culturally or geographically distinct)¹², as a higher number of morbid young-old

¹¹ Sub-populations can refer to ethnic or cultural groups in Canada (for example Native-Canadians). Geographically distinct populations are defined as those individuals who share characteristics of adaptation to a particular area of the world (for example South Africans (WHO, 1992; Aspinall, 1997).

¹² 'Ethnic Group' is always a conundrum in health research. According to Aspinall (1997:696), "While an effective strategy for monitoring ethnic differences in health and disease is essential, the components of that strategy, particularly terminology and classifications, need to be clearly identified. A myriad of small categories that would result from a completely open response is of no practical use [sic]. Moreover, collapsing a large number of freely coded responses into researcher-defined categories would compromise self-definition and jeopardize the comparison of results among data sets.

die, leaving a more vigorous group of survivors (Rubinstein and Kramer, 1994; Gibson and Jackson, 1992; Crews, 1994; Manton et al., 1987; Colsher, 1992; Mendes de Leon et al., 1997; Hayward et al., 2000). Select survivors have also been reported in other geographic areas, such as the former Soviet Union, Turkey and Ecuador (Arber and Ginn, 1994; Gibson and Jackson, 1992).

'Mortality-cross-over' is another term used in the literature to describe select survival. While young-old African-American elders have higher rates of mobility and mortality than mainstream or white elders, African-Americans who survive live longer fully functional lives than mainstream white elders (Hayward et al., 2000). Mortality cross-over has also been observed in white and African Americans of both sexes, Hispanic men, and in Turkish, Ecuadorian, and Russian men and women (Arber and Ginn, 1993; Gibson and Jackson, 1992; Harris and Kovar, 1992).

Successful Aging: How Do We Measure It?

The recent literature reveals an ongoing search for a generally accepted definition of 'successful aging', and its theoretical integration into the aging literature in general. However, the absence of any general theory of aging or aging processes into which successful aging could be integrated has been a common complaint from theorists in a range of disciplines.

At a conference on collaborative research at the Andrus Gerontology Center at University of California (1996), Vern Bengtson and James E. Birren articulated

Some aggregation is clearly required."

a need for more adequate theories, models, and explanations reflecting the processes and outcomes of aging (NIA, 1999; see also Ferarro, 1990). They claim that this need grows with every publication in gerontological journals that contains data about some phenomenon of aging. They note that many publications provide data without any attempt to place the findings in the context of theoretical models.

Rowe and Kahn (1998) agree that the field of gerontology is 'data-rich and theory-poor'. They point, as an example, to the plethora of data generated in the early 1980s by the many centers (supported by the MacArthur Foundation) that had been set up to investigate 'aging through the life course', the Duke University's Duke Center for the Study of Aging and Human Development, and the Claude Pepper Older Americans Independence Center being the first centers to emerge (Rowe and Kahn, 1998; Rubinstein and Kramer, 1994).

These research projects took several forms, including studies of more than one thousand high-functioning (independent) older people for eight years, to determine the factors that predict successful physical and mental aging; detailed studies of hundreds of pairs of Swedish twins to determine the genetic and lifestyle contributions to aging; laboratory-based studies of the response of older persons to stress; and nearly a dozen studies of brain aging in humans and animals. For ten years, the MacArthur group met at approximately 2-3 month intervals to continue ongoing conceptual and methodological discussions, receive updates on individual research projects, and analyze research data (Rowe and Kahn, 1998).

Frustrated by the absence of an integrative theory of aging, Rowe and Kahn (1998) began asking more general questions about the concepts involved in the process of aging: How can we integrate theories of human development into an understanding of aging? Why is successful aging considered to be no more than the absence of explicit failure, as though health were nothing more than the absence of disease? Moving beyond the idea that successful aging is merely aging as little as possible, what are the positive aspects of aging, and the possible gains in old age? What is the place of values in defining what is good or bad, successful or unsuccessful in aging?

In attempting to answer these questions, they proposed “a research-based model of successful aging, going beyond absence of disease and disability, and describing the ways in which personal relationships and productive behavior change as people move through the life course.” As they noted, “successful aging means just what it says-aging which is very different from not aging at all.” (Rowe and Kahn, 1998:52).

Rowe and Kahn (1992) go on to define - not aging itself - but successful aging as having three characteristics:

- low risk of disease and disease-related disability;
- high mental and physical function; and
- active engagement with life. (Rowe and Kahn, 1998:38).

The concept of successful aging was something of an epiphany to gerontological researchers mindful of Ferarro's (1990) charge that gerontology had many theories about aging but no reasonable concept of aging, nor even a

comprehensive definition that would unite researchers across disciplines. Early attempts at definitions had failed due to narrow concepts developed within specific disciplines and exported to others (Rowe and Kahn, 1987;1998; Beall, 1994).

Though many studies on autonomy and control have been done, a fair number of these have sampled only institutionalized aged (Rowe and Kahn, 1987). This tells us little about community autonomy or independence, as most institutionalized aged are not proficient at self-care skills, much less the skills needed to be independent in the community.

According to Rowe and Kahn (1987), the evidence demonstrated that the more control an individual had over her life, the better her adaptation to the environment and her sense of well-being. Rowe and Kahn (1987, 1998) reviewed many studies from several disciplines where data corroborated the existence of such a phenomenon: Change in carbohydrate metabolism indicating a higher risk of diabetes in the general aged population was contrasted with evidence that showed exercise or activity improved glucose and insulin resistance of older people (Glass et al., 1999). Evidence of rapid decline of bone density in both males and females was contrasted with evidence of highly variable bone density subject to extrinsic preventable risk factors such as smoking, excessive alcohol intake, and inadequate ingestion of calcium. Evidence was found to suggest that loss of bone density (leading to osteoporosis) can be arrested in aged individuals by conservative exercise programs (Rowe and Kahn, 1987; Rowe and Kahn,1998). The authors recognize the importance of psycho-social

factors on patterns of aging. Rowe and Kahn (1987) argued for the importance of further research on the effects of autonomy and social connectedness on the aged.

Demographers who had alerted legislators to the negative implications of a possible largely morbid group of aging baby boomers argued for the value of studying trends in 'successful aging' (Manton et al., 1979; Manton and Stallard, 1984; Manton, et al., 1987; Manton, 1989; Manton, and Suzman, 1992; Manton and Soldo, 1985; Manton and Soldo, 1992).

Epidemiologists began to encourage the life-course study of development, to better understand increases in survivorship. This required the study of lifetime risk factors that may or may not have had an impact on diseases of old age (Beall and Eckert, 1986; Rubinstein and Kramer, 1994; Manton and Suzman, 1992; Maddox et al., 1994; Glass et al., 1999; Seeman, et al., 1993).

Similarly, anthropologists who had studied the impact of both social and environmental factors on child development began to promote studies of post-reproductive adaptation (Beall, 1994; Wood et al., 1992; Crews, 1994; Rowe and Kahn, 1987; 1998). The United States government began to subsidize limited research programs to investigate the prevalence of disability and morbidity in hopes of providing future evidence on the possibilities of reducing morbidity in the aged and increasing fiscal accountability (Cawthorn, 1997; Manton and Stallard, 1993; NIA Pilot Research Program Press Release, 1999).

To facilitate research in this burgeoning field, instruments were developed to assess the health and physical function of the aged. Many were designed with the goal of meeting the needs of both small clinical studies and large-scale population research (Kane and Kane, 1981). One instrument, the Activities of Daily Living Scale (ADL), proved especially popular. Developed in 1963 by Katz et al. to assess the rate of convalescence from acute disease (in hospital), the ADL was promoted by its developers as a culturally universal instrument to measure self-care of individuals residing in acute-care institutions. However, as many governments (including both Canada and the United States) decentralized long-term care, those older individuals who could stay at home or could be moved from an institution were provided with home care services (Tarman, 1990). With a growing population of chronically impaired aged living outside institutions, more elaborate instruments were needed to assess functional ability or independence, beyond basic self-care skills. The Instrumental Activities of Daily Living Index (IADL, Lawton and Brody, 1969; Duke University, OARS, 1978), developed for this purpose, included more advanced skills such as the ability to do housework, shop, use transportation, use the telephone, and manage one's own finances -- skills required of an individual living independently (and aging successfully) in the community (Kane and Kane, 1981; Havens and Chappell, 1983).

With the onset of decentralization of long-term care and the gradual move to in-home professional services or family to provide care for aging individuals, seniors from technologically advanced societies (Western societies) were often likened (favorably) to aged seniors from other cultures, cared for in the bosom of

their families (Tarman, 1990; Estes and Swan, 1993). While state and provincial governments in both the United States and Canada justified decentralization on the grounds of fiscal restraint, and promoted a shift in concentration from acute (cure) to chronic (maintenance) care of seniors, the move was interpreted as a transition from institutional care to homecare (Tate, 2000). This shift of older individuals from nursing homes and hospitals to their own homes (where care was provided) was touted as a victory for aged who would remain members of a familiar and organic community. As most of these de-institutionalized seniors were not high functioning, it also meant a growth in the nursing and home-making industry to provide in home help for these seniors and their families (Rowe and Kahn, 1987; 1998; Estes et al., 1984; 1993; MacNeill and Lichtenberg, 1998).

Decentralization allowed seniors to remain in their own homes, with social and medical services provided by national and local government as well as by private homecare services (Tarman, 1990). Accurately projecting the number of seniors who would require such services became a concern for policy analysts and bureaucrats.¹³ The graying of the baby boom generation magnified this

¹³ It is not clear whether this interest in future disability costs was a transient phenomenon. According to Peterson (1999) after perfunctory studies were done to satisfy a rather large group of voting seniors, more attention was paid to keeping these aging voters happy with transfer payments and 'senior perks'. Peterson claims that politicians and bureaucrats were not even willing to take a look at the dreaded baby boom generation projections. Ultimately, these figures would be frightening and little could be done once social security funds were no longer subsidized by the working baby boom population. This would create deficits that would carry over into the retirement years of the boomers, because the relatively minute population of working young would not be able to support the boomer retirees. In Canada, it is argued that the growth of an older population will have a lower fiscal impact and be manageable at provincial/federal level (Denton et al., 1999).

concern for demographers, epidemiologists, and gerontologists: In a growing population of elderly, who and how many would be disabled and need these services? What universal measure would be used to qualify these seniors for these services?

The IADL instrument has been used extensively not only to satisfy the demographic, epidemiological and gerontological needs of those who measure and forecast future disabled and their ensuing services needs, but also by researchers who continue to measure small groups to better understand the phenomenon of 'successful aging' (Gibson and Jackson, 1992; Gibson, 1994; Beall, 1994; Keith, 1994; Manton and Suzman, 1992; Johnson and Wolinsky, 1994).

The potential uses of the IADL are vast (Kane and Kane, 2000; Branch and Myers, 1987). With increasing evidence of the 'successful aging' concept, researchers are interested in identifying successful agers and measuring differences across populations. With new evidence on recovery from disabled states there is a need to investigate factors that affect both the maintenance of high function (independence) and that may reverse states of disability (Manton et al., 1987; Mendes de Leon, 1997; Colsher, 1992; Crews, 1994; Wood et al., 1992; Hayward and Liu, 1992; Crimmins, 1993; Crimmins et al., 1994; Crimmins and Hayward, 1996; Shea et al., 1996; Hayward, 1996; Crimmins and Hayward, 1996).

Anthropology and Measurement of Independence

Research to date suggests that successful agers are more likely to be found in 'ethnic or culturally distinct communities' (Manton and Soldo, 1992; Gibson and Jackson, 1992; Hayward and Liu, 1992; Crimmins, 1993; Crimmins et al., 1994; Crimmins and Hayward, 1996; Shea et al. 1996; Willis et al., 1997).¹⁴ Studying the process of successful aging, and making meaningful cross-cultural comparisons of successful aging, therefore, requires an instrument that is universal -- or culturally neutral¹⁵. The current literature provides no clear indication as to whether the IADL meets this important criterion (Badley, personal communication November 10, 2001).

Large scale national and community demographic studies of physical functionality among the aged have focused on the oldest population of the aged (75 to 100 years of age). The results of these studies overlap with the gerontological literature, and will not be discussed here. More interesting from

¹⁴ Arranging individuals from different 'ethnic', 'cultural' and 'geographical groups' have always been a conundrum for those who do comparative cross-cultural research. According to Wiley (1992), "Groups of individuals are the focal point of biocultural research. Individuals arrange themselves in myriad ways for their own purposes, and the goals of the research determine the aggregation of interest. The unit of analysis for bioculturalists is the population, located in a particular geographical space, the individuals of which have in common some loosely defined 'culture' and similar goals, constraints, or opportunities. Group size is unimportant; large or small, all groups have external contacts and internal differentiation. Groups of interest have been termed 'adaptive units' and can take the form of organisms and associations of organisms including households, clans, communities, and states"(Wiley, 1992:222)

¹⁵ The translation of the instrument into various languages does not mean it is 'culturally neutral' (Heikkinen, 1983; Fillenbaum, 1992). Language is but one part of a different societal milieu.

an anthropological perspective are smaller group studies which (like those from the gerontological perspective) have investigated aging issues connected with gender, race and socioeconomic status. These smaller group studies include: a) secondary analyses of large data sets (Manton and Soldo, 1992), b) examination of select sub-populations (Bastida and Gonzalez, 1993; Yu et al., 1993; Manton et al., 1987; Dowd and Manton, 1996; Heikkinen et al., 1983; Goto et al., 1996; Shanas and Maddox, 1976; Shanas, 1974; Shanas, 1971; Shanas et al., 1968; Ferucci et al., 1998; Manton, 1989; WHO, 1984; Lee and Tan, 1997; al-Mahadi and Elzubier, 1997; Gibson and Jackson, 1992), and c) secondary analyses and comparisons of data sets from many sources (Arbor and Ginn, 1993; Gibson and Jackson, 1992).

Can we use the IADL instrument with confidence to assess successful aging patterns across cultures or even within subcultures (Beall, 1984; Beall and Eckert 1986). Moreover, can we confidently compare IADL measures within the general population when that population -- as in Canada -- is made up of a number of culturally diverse communities? Obviously, we cannot describe IADL data from broad national studies as 'representative' if those studies exclude individuals because of minority or ethnic affiliation (for example: many citizens are homeless, do not speak English or are not enumerated). On the other hand, can we confidently view IADL studies as valid if those cultures whose members are included do not perceive IADL skills as relevant to personal independence in the same way as do members of the dominant culture? It is therefore important to the study of successful aging that we determine whether the IADL instrument

provides a reliable assessment of the individual's ability to live independently in his or her cultural community.

Community: Human Organisms, Human Patterns, and Population Organisms

How do we define the broader sense of community? Do we refer to cultural or ethnic groups? Definitions of 'culture' become increasingly problematic as we make the transition to a global village. Wiley (1992) prefers not to use the term 'culture'. His means of defining group affiliation refers to a 'unit of analysis', located in a particular geographic space, "where the individuals have in common some loosely defined 'culture' and similar goals, constraints, or opportunities" (Wiley 1992:222: full definition in footnote 12).¹⁶

The cultural identity of individuals and groups becomes a major issue when investigating independence. What constitutes independence as we move to ethnic groups within our own Canadian border and beyond into the global village? Complicating the matter further, as we have seen, is the fact that individuals who remain independent and live to be successful survivors and age successfully are primarily from particular ethnic and geographic groups (Hayward et al., 2000; Gibson and Jackson, 1992).

Disciplines That Study Senescence, Individuals, Patterns, and Populations.

Evidence bearing on the question of whether the IADL be used to determine independence across geographical areas to identify successful agers (select

¹⁶ For the purposes of this paper I have chosen to define 'culture' as ecological or geographical area of individuals that have an economic and cultural commonality, based on the WHO Classification of Countries (WHO, 20002b). For further discussion on geographical area see the Materials and Methods, Chapter 3. pp 86.

survivors) comes from a literature representing four disciplines: gerontology, demography, epidemiology, and anthropology. Researchers in these disciplines tend to ask the same sorts of questions about aging, but do so to address different theoretical models. Researchers from all four disciplines have used the IADL to study successful aging, but individual disciplinary canons and particular theories of aging have informed the construction of research goals and methods and the interpretation of results (Rowe and Kahn, 1987, 1998).

Gerontology

At the broadest end of the aging research spectrum, gerontological studies focus on measuring social well-being using IADL data for both specific clinical assessment, and guidance in health-care policy. Such studies are generally informed by theories that view aging as the result of a single mechanism -- generally physiological, and similar across species -- that is responsible for the aging phenotype, or lifespan (Crews and Gerber, 1994). For example, 'wear and tear' theory argues that the body simply wears out after a lifetime of performance, and Hayflick's theory suggests that somatic cells simply cease replicating after a fixed number of generations (Hayflick, 1965).

Gerontologists tend to see physical function as an index of the progressive and pathological processes, such as heart disease and osteoporosis, inherent in aging. When they measure function, they usually produce a list of possible disease states or symptoms. When a gerontologist asks about physical function, she would expect to find out about the behavioural consequences of 'normal

aging' and disease rather than whether the person being assessed remains independent in the community (Kane et al., 1999; Crews, 1990; Ferraro, 1990). Gerontological questions about the aged therefore often concentrate on outcome measures of disease states such as the extent of osteoporosis or cardiovascular discomfort (McDaniel, 1986; Manton, 1986; Wood et al., 1994).

As early as 1949 the assessment of function became known as measuring the 'activities of daily living' (Kane and Kane, 2000). During the 1960s two models of assessment were developed. The first model developed by Katz et al. in 1963 was intended to measure recovery of the personal care skills of the aged (eating, bathing, eating, transfer, and dressing) after hip repair surgery¹⁷.

In 1965 Nagi developed a second model for conceptualizing disability (Kane and Kane, 2000:23). Nagi's single factor model was based on the premise that disease is the precursor of disablement. Further, disablement resulted in the inability to carry out 'role assignments' associated with independence in a work environment (Kane and Kane, 2000). According to the Disablement Process Model, there are linear stages leading to disablement or functional limitation. Initial assessments of disease signs and symptoms lead to assessment of structural impairments in specific body systems that reflect the degree of pathology (WHO, 1984)¹⁸. Functional limitations are the end result of a pathology that restricts the performance of basic physical actions. These objective functional limitations are

¹⁷ The so-called ADL self-care skills/domains, which include hygiene, dressing, transfer (mobility) and eating, are assumed by Katz to be 'vegetative domains' largely under 'biological control' and independent of environmental influence. In contrast, IADL domains are thought to be secondary, dependent in part on capacities needed for the ADL domains, and much more heavily dependent for their development and expression on the effects of social environment, including culture (Katz et al., 1963).

¹⁸ The model is not limited to the aged but applies to all ages.

assessed without reference to situational requirements. The term 'disability', on the other hand, assesses the individual's ability to function in the context of the demands and expectations of the individual's environment: "Disability is a social process -- the pattern of behaviour arising from loss of ability to perform expected or specified social role activities of extended duration because of a chronic disease or impairment." (Avlund, 1997:431).

A problematic issue associated with the Nagi Model is the static sequential nature of the progression from pathology to disability. One of the most vocal opponents of the single-factor Nagi model has been (Elizabeth Badley, September 12, 2001 personal communication with author), who speaks as a consultant for the revision of the World Health Association (WHO) International Classification of Impairment and Disabilities and Handicaps (ICIDH) and Arthritis and Autoimmunity Research Centre.¹⁹ (The development of the WHO's ICIDH Model of disability will be discussed in the following section on 'Epidemiology').

The Katz et al. (1963) model of assessment of basic self-care skills, or the ADLs, was based on a Guttman Scale²⁰. Katz et al. (1987) established a hierarchy of performance according to which skills were gained or lost in a particular order. Later publications by Lawton and associates (1969) established IADL skills or more advanced skills indicative of well community-dwelling aged.

¹⁹ There have been several revisions to the ICIDH. Fillenbaum has called for more input from social scientists in revising the instrument.

²⁰ Guttman scaling is also sometimes known as cumulative scaling or a scalogram analysis. Essentially, a set of items or statements must agree with a specific question asked and the subsequent list of questions will agree with all previous questions.

These researchers found that the basic ADLs had to be present before the more advanced or IADL skills could be performed: If an aged individual is dependent in ADLs, they are also dependent in IADL skills (Spector et al., 1987). On the other hand, individuals who are dependent in IADLs would not necessarily be dependent in ADLs.

While the early work of Kempen et al. (1996) and Meyers (1992) suggested that the IADL did not meet the criteria of a Guttman scale, subsequent studies have proven inconsistent on this point, sometimes supporting and sometimes contradicting this postulated hierarchy between the ADLs and IADLs (Avlund, 1997; Havens and Chappell, 1983; Branch, 1987; Deniston and Jette, 1980; Ferucci et al., 1998; Fisher, 1993; Kane and Kane, 2000; Kempen et al., 1996; Meyers, 1992).

Demography

Demography is the statistical study of human populations focussed on size, density, distribution and vital statistics (McDaniel, 1986). A sub-field of demography that concerns itself with population aging has become particularly prolific in the post-infectious disease period of this century, and has revealed that people in industrial societies are now living longer, and experiencing chronic rather than acute disease in the latter part of life (McDaniel, 1986; Rowe and Kahn, 1987, 1998; Suzman, et al., 1992; Manton and Soldo, 1992; Brant and Pearson, 1994; Arber and Ginn, 1993; Markides and Machalek, 1984; Nam, et al., 1978; Wing et al., 1985; Manton, et al., 1979; Manton and Stallard, 1984).

Demographers have begun to study the implications of the prolongation of life and of higher levels of chronic illness and disability in the aged.

Initially, the demography of the aged was 'mythologized' as the study of a rapidly growing homogeneous population of aged, potentially dependent on the working population.²¹ According to McDaniel (1986), demographers tend to see disability among the aged as an impending health crisis, and, therefore, see a need to address the presumed social and medical burden of a growing population of disabled (dependent) aged (Estes, 1984 et al.).

A number of large-scale national and community demographic studies have focused on physical function among the oldest of the aged. Contrary to Fries' theory of compression of morbidity (compression of morbidity into the later part of life), Manton and Stallard (1996) found an increase in disability across all age categories. If an individual survives to advanced old age functioning actually improves, culminating in the largest gains in individuals over the age of 80.

Interesting data have also emerged from smaller group studies investigating aging issues in the contexts of gender, race²², and socioeconomic status. For example, it has been discovered that patterns of disability differ as a function of

²¹Demographers often express this concern in the form of a dependency ratio, which is the ratio of the number of dependent individuals to the size of the working population. These ratios can include several forms of dependency such as unemployment, and the continuation of the aged in the work force.

²² Although this term is not used commonly in Canada, it is used in the United States to describe people of color or other than Caucasian. The most current description of this group is African Americans or African in Canada. However, the majority of the literature cited in this thesis is from the United States.

gender and race, leading to criticism of the compression-of-morbidity hypothesis (Fries, 1980; Manton and Stallard, 1984; 1996; Crews, 1990). In a British sample, it was found that women live longer than men; therefore a higher proportion of the disabled aged will be female (Arber and Ginn, 1993).

Epidemiology

Epidemiological research and theories of aging tend to focus on external causal factors of aging such as environmental risk and health care. Both fertility and mortality (lifespan) are seen as depending on the combined effect of these factors, which vary in magnitude as a function of the individual's environmental setting (e.g., Crews and Gerber, 1994).

Not unlike biological anthropologists, epidemiologists are looking at senescence of whole human organisms as part of a whole population organism (Crews, 1993). By studying the symbiotic relationship between individuals and their environments, epidemiologists and biological anthropologists can estimate morbidity, disability and dependency. Improving the health of populations is also a common goal for researchers in both disciplines.

In the 1980s the World Health Organization (WHO) published a great deal of literature on improving the health of older people. The foremost concern for this international organization was to help establish a universal instrument to measure the health and function of the aged (Evans, 1990). According to this project, the definition of a functioning member of society was multifaceted and included: "(1) activities of daily living, (2) mental health, (3) physical health, (4)

social resources, (5) economic resources, (6) environmental matters, and (7) strain on the caregiver" (Fillenbaum, 1990:73).

To address the goal of assessing prevalence of community dwelling seniors in need, the Fast Assessment of Community Elderly (FACE) was developed for the WHO project and used in South East Asia (Indonesia, Sri Lanka, Thailand, DPR Korea, and Myanmar), Europe, Eastern Mediterranean, (Bahrein, Egypt, Jordan and Tunisia), Latin America, and the Pacific (Fiji, Malaysia, and the Philippines). FACE was based on the Katz et al. (1963) Lawton and Brody (1969) and the Older American Research and Service (OARS) instruments (Fillenbaum, 1990). Because of problems with FACE it did not become the universal standard in measurement of health and function among the aged, and indeed, little became of the instrument (Fillenbaum, Personal communication November 4th 2002.).

The most recent WHO assessment tool alleged to be universal is the International Classification for Impairment, Disability and Handicap (ICIDH) (Fougeyrollas, 1995; Personal communication Elizabeth Badley; Alison Gray, Suzanne Roy, 2001). The ICIDH has been tested extensively and is being used clinically on a global scale. Unlike FACE the ICIDH was not specifically designed for the elderly, but rather the general population.

After several evolutions of the ICIDH (dating from the early 1980s), the newly-developed ICIDH-2 (not yet released for general use) has incorporated the 'bio-psycho-social model' that emphasizes the universal nature of disablement, classifies human functioning at the level of the body (the whole person), and

considers the person within the complete social and physical environmental context. These categories are then used to identify orders of dysfunction (or disablements) that are linked with health conditions emanating from diseases, disorders, injuries, and accidents:

Studies have shown that in the health care sector, diagnosis alone does not predict service needs, length of hospitalization, level of care or outcomes. We also know that diagnosis is not a reliable predictor for receipt of disability benefits, work performance, return to work, or the likelihood of social integration. So, a purely medical classification of diseases does not provide us with the information we require for planning and management purposes. However, when you take data on functioning into account, you increase the predictive power and understanding of needs and outcomes. The health care sector is also shifting its focus from acute hospital-based care, to chronic and long-term services, in the communities where people live and work. The social welfare sector is looking for ways to provide better and more cost-efficient disability benefits. In the public and private sectors around the world there is need for an international common language to describe and classify the consequences of disease, disorders, injuries and other health conditions [sic] (WHO, 2000)

As this passage suggests, 'an international common language to assess disease and disability' should apply to both Western and third world, or non-technologically developed areas.

The need for cross-cultural studies was implicit in the WHO's original mandate for the ICIDH universal instrument, and WHO's ICIDH project has investigated cross-cultural applications by recruiting applied anthropologists to work in collaboration with teams of biological scientists to understand the determinants of health and disability.

According to ICIDH, health is about human functioning and the ability to live a complete life as an individual as well as a member of society. The ICIDH

instrument assesses a number of facets of human functioning, including body structures, activities and participation, and environmental factors.

The ICHD categories of activities and participation are particularly pertinent to this study, and tend to be based on the more basic IADL instrument. Activities and participation are further broken down into subcategories: mobility, domestic life, receiving and sending communication, self-care, interpersonal relationships, general tasks and demands, major life areas, community and civic life and applying knowledge. These subcategories, together with the rest of the ICHD, were tested internationally (WHO, 2002a).

Over a ten-year period, studies in 65 WHO member states used both qualitative and quantitative methodologies to refine the cross-cultural validity of ICHD. Qualitative ethnographic methodology was used in 17 centers in 15 nations to extract data on disability from local government and advocacy groups (WHO, 2002a).

WHO's approach to the development and validation of the ICHD instrument is consistent with the arguments advanced by Liang and Jay (1992). These authors stressed the importance of establishing a universal tool to measure the health and function of the aged, argued for the need for mixed methodology, and advocated the use of teams of biological and social scientists in comparative cross-cultural studies. Liang and Jay suggested that while epidemiologists were interested in the etiology and consequences of aging, anthropologists appeared to be interested in "illness-labeling and the help seeking process" (1992:302). The

authors suggest that in order to extract useful data for the development of a cross-cultural instrument, the mixed methodology approach is desirable.

Liang and Jay argued that all variables in any cross-cultural measure should be reasonably similar in terms of construct validity, and that each should measure only one physical function. They further argued that it should be possible to develop a uniform operational definition for each variable; ideally one that would be resistant to misinterpretation and understood across cultures. The IADL instrument fulfils the first two of these methodological requirements (Beall, 1984; Becker, 1994; Barker, 1994; Johnson and Wolinsky, 1994; Kane and Kane, 1981; Kane and Kane, 2000). Whether it meets the final requirement is the issue addressed in the present study.

Anthropology

Anthropology is the study of humankind in both past and present from both cultural and biological perspectives. Anthropologists study not only the human-made environment and the tangible products used to further modify or interact with that environment, but also the uniquely human behavioural patterns that contribute to the natural environment, and the intangible byproducts of such behavioural patterns (Moore et al., 1980).

While it would seem natural for physical or biological anthropologists to study how aging individuals adapt to their environments and change the way they function in these environments, aging over the lifespan has not been a popular area of anthropological research.

Beall (1984:83) suggests that few anthropologists seem interested in a) discovering the 'normal' physiological process, b) ascertaining their range of variation, and c) understanding genetic, pathological, and environmental processes that produce the range of variation. Beall argues that physical anthropologists, working with traditional theoretical perspectives, had been 'age parochial', noting "a relative dearth of comparative data on the later stages of the life cycle." (1984:86).

Expressing a sentiment that is repeated throughout the collective ethnographies on aging, Lawrence Cohen (1994:137) writes "anthropology has a long history of being interested in age, but not in aging or the aged". More precisely anthropologists have been interested in the plight of the exotic, the minorities, the socio-economically deprived, and political imbalance in the distribution of health care (Cohen, 1994).

On the other hand, Rubinstein (1990) affirms the analytical value of socio-cultural studies of the aged, and argues that the level of analytical insight across the sub-disciplines has increased with time (Rubinstein, 1990).

The literature indicates that cultural anthropologists have provided ethnographies addressing contemporary issues that impact the aged (Myerhoff, 1979; Kertzer and Keith, 1984; Glascock, 1983; Maxwell, 1970; Neugarten, 1976; Riley and Foner, 1968; Moore, 1976; Clark, 1967; Climo, 1992; Counts and Counts, 1985; Fry, 1990; Hockey and James, 1993; Hockey, 1990), and that applied and medical anthropologists have provided a commentary on cultural institutions that affect the aged. Moreover, anthropologists have taken positions

in many positivistic or scientific disciplines to provide the alternative holistic view of the social sciences (Hahn, 1995).

Cultural anthropologists use qualitative methods to study the aged and their environments. Ethnographic methods have been used to investigate the thoughts of the aged, their socio-cultural status, stereotyping and labeling, and the conditions inside nursing homes and other institutions that deal with the aged (Myerhoff, 1979; Keith, 1980; Hockey and James, 1993).

The research of many socio-cultural anthropologists has helped to publicize the plight of the elderly. For example, the works of Carol Estes (1979), Maggie Kuhn and Mark Luborsky (1995) highlighted the dehumanizing of aged patients within the biomedical system. In her book *Limbo* the anthropologist Constance Laird, writes of "ongoing banality and infantilization, through the grouping of residents by physical functioning rather than by social and cognitive awareness". She had difficulty finding a publisher for her book because, as one editor put it, "Maybe I am a monster, but it does not move me" (Cohen, 1994:155).

Despite the negative stereotypical perception of the aged, cultural anthropologists synthesized their data and developed theories that would mesh well with other disciplinary canons. Early works of cultural anthropologists articulated theories of disengagement from society, liminal status (state of limbo), decrepitude, and a general lack-of-role status in a community (Myerhoff, 1979; Kertzer and Keith, 1984; Glascock, 1983; Maxwell, 1970).

Applied/Medical Anthropology

At first cultural anthropologists were advocates of those in need. Researchers using the 'participant action research' (PAR) model²³ shared their findings with the group they are studying with the goal of empowering the 'other' (native peoples, ethnic groups, the homeless, the aged, etc.)

More recently, advocacy has transformed anthropological research into a search for the 'voice' of the 'other', which was to replace the franchise of the 'Ivory Tower' (Cohen, 1994). Feminist, gay, aboriginal, disabled and minority anthropologists have articulated a need for their 'voice'. The aged have had very little voice in their dealings with health care systems.

The ecological approach of anthropology has turned its gaze to disease and health practices, and to the biomedical culture itself (Kormody and Brown, 1998). This biocultural approach to the study of medicine, holistic in nature, recognizes that it is the whole person who is either healthy or suffering from illness. Health is not simply the absence of disease or illness, but rather, the ability to adapt to the environment, including new diseases. When the human organism adapts to the environment, health improves. For the aged, adaptation occurs not just to disease, but to the aging process itself. For both individuals and populations there is a considerable heterogeneity in the aging process and in responses (adaptive and otherwise) to that process.

²³ It has been suggested that this method was developed to alleviate the post-colonial guilt of anthropologists who collected data on unknown cultures before and after the World War II (Cohen, 1994; Singer, 1995).

Physical and biological anthropologists have been slow to enter the study of successful aging (Beall, 1984; Crews, 1993). Because many medical anthropologists straddle the physical and cultural sub-disciplines of anthropology, the life-course perspective that began with cultural anthropologists (Neugarten, 1976; Riley and Foner, 1968; Moore, 1976; Clark, 1976; Climo, 1992; Counts and Counts, 1985; Fry, 1990; Hockey and James, 1993; Hockey, 1990) has moved to the biological realm of anthropology with researchers like Cynthia Beall (Beall and Goldstein, 1982a; Beall and Goldstein, 1982b; Beall, 1983; Beall, 1984; Beall, et al., 1985; Beall and Goldstein, 1986; Beall and Weitz, 1989) and others (e.g, Barker, 1989; Barker, 1994; Crawford and Rogers, 1992; Crews and Garruto, 1994; Henderson, 1993; Johnson and Wolinsky, 1994; Turnbull, 1983).

These researchers have published the evidence of continued growth, development and adaptation throughout the life span. As early as 1986, Beall and Eckert wrote that "functional health assessment seeks to measure level of biological fitness and ability to perform self-maintenance activities rather than the extent of pathology" (1986:23). This statement preceded the successful aging model proposed by Rowe and Kahn (1987).

In order to learn more about biological age (to determine select survival) Beall and Weitz (1989) join Rowe and Kahn in calling for behaviours or characteristics such as low risk of disease, high mental and physical function, and active engagement with life (Rowe and Kahn, 1998), but reiterate the principles of biological anthropology.

Very few aging phenomena have been studied from the perspective of biological anthropology, and the potential for variation across individuals and populations is poorly documented. It is not known whether certain phenomena found in well-studied Western groups are universal, nor whether these effects are inevitable, pathological, or attributable to certain environmental or other factors.

Studies of the biological experience after maturity in a variety of populations is an essential further step toward a full characterization of the basic biology of the human aging process (Beall and Weitz, 1989:198). Studies most pertinent to this thesis have been taken from biological gero-anthropology.

In the last 15 years, the evolutionary perspective on aging has yielded a number of studies on "complex interactions between genetic, environmental, stochastic, and historical factors that affect phenotypic variation" (Crews, 1990:26), but little attention has been paid to the process of 'normal' or 'successful aging'. Crews (1990) argues that the use of a biocultural perspective in comparative cross-cultural studies provides a safeguard against an over-generalization of data from a few societies or cohorts of aged whose individual variation increases with age.

According to Crews (1993) the central problem in biological gerontology is to define adequately the phenomenon of 'aging' both across cultures and across disciplines (Crews, 1993). The advent of the 'life course perspective' in anthropology may make the solution to this problem easier to find. The life course perspective is a holistic approach that goes beyond the chronological definition of age to consider the biological, psychological and social processes

involved in aging (Fry, 1990). The biological conception of aging that drove research on the understanding of different populations in various environments has burgeoned into the study of causes and consequences of changes across the life span. Areas of study include: a) the decline of function and response to aging, b) the inability to maintain homeostasis, and c) the oldest old individuals across gender and ethnic groups (Crews, 1993).

Theoretical integration across anthropology's sub-disciplines may lie somewhere between concepts derived from the ecological or biological model of aging (Nesse and Williams, 1994; Beall, 1994; Crews, 1993) and Rowe and Kahn's socio-behavioural model of 'successful aging' (Duke University Center for the Study of Aging and Human Development, 2001) .

In many ways this holistic method of studying the aged individual in her environment bridges the gap between cultural and physical anthropology. However, more sound data, conceptual frameworks, the development of a definition of aging, and integrated theory will also bring together cultural anthropologists and physical/biological anthropologists under the umbrella of medical anthropology. Ann McElroy understands this integrated approach as follows:

Many anthropologists are indeed concerned with social injustice, but they may choose to address such issues in community service and their personal lives rather than through research. Health research may deal with ethnic and class divisions, impacts of colonialism, or environmental effects of multinational corporations, but certainly such issues are non mandatory (McElroy:1995:519).

Despite the volume of cross-cultural research on human adaptation, growth and development, an extensive search of the literature²⁴ revealed only two studies that involve anthropological cross-cultural research of the aged, physical function, independence and the IADL (Barker, 1989; Beall, 1984). More specifically these authors of these studies argued against a universal IADL measure.

While these studies closely resemble epidemiological studies in their focus on the pathology of the aging process in relation to biological, behavioural and socio-cultural factors, only Cynthia Beall and her colleagues investigated the physiological independence of long-lived (Nepalese) elders.

Their research on 279 Sherpas over the age of 60 from two villages in the Himalayas, suggested that the Sherpa do not experience physiological aging to the extent that Westerners do (Beall and Goldstein, 1982a; 1982b; Goldstein and Beall, 1982). The Sherpa definition of independence also differed from that of their Western counterparts. Although the aged Sherpa were healthy, economically self-sufficient and fully functional, they preferred to live with their children²⁵. Ultimately, they wished to remain independent but live with their

²⁴ Literature searches were carried out over a five year period during the data collection and writing of this paper. Earlier searches include "After Dark" Dialog services of the Library Congress and databases such as Ageline, Social Work Abstracts, Med-line, Psychological Abstracts, Social Sciences Index, and Sociological Abstracts. More recent searches were conducted using Copernic that searches all known databases on the Web. As a member of a number of gerontological organizations that publish the most recent literature in Gerontology and Anthropology, I used bibliographic searches by hand through each publication dating as far back as publication dates permitted.

²⁵ Beall and Goldstein (1982a) measured biological functional ability of Sherpas over the age of 60. They found that the aged were capable of farming and living alone with no reported functional ability problems. Interviews with a sub-sample of 30 aged

extended family. This was not possible due to a recent emigration of young adults to urban areas, and the aged Sherpas felt neglected, even though they were independent.

Barker (1989) conducted a thorough health and functional analysis of the aged on the Polynesian island of Niue. Islanders eke out a living in this tropical less-than-paradise society based on a strong work ethic, a priority on individual achievement, egalitarian ideals, and an informal social hierarchy. Using medical records, archival, political and historical documents, and her previous research as a medical anthropologist, she was able to contextualize her observations of the aged and their families.

The aged are located in the lower socioeconomic level of Niue society, and are removed from large extended kin dwellings to isolated dwellings with the onset of frailty. Using an assessment instrument based on IADL (but contextually appropriate for Niueans), Barker reported that no individual in a random sample of Niuean elders asked for assistance with any IADLs, though based on physician diagnosis 43 % were considered 'infirm'.

Sherpa over a two-week period of high agricultural activity revealed that the work pattern did not vary even into the 8th decade of life. "The debility and senility normally associated with aging in the West is not present among the Sherpas studies, although there was clearly evidence of morphological and functional involution with increasing age." (1982b:145) Interestingly, data on household composition revealed that those who are biologically older or less physically fit are not necessarily the aged living with kin. Rather, those who were most self-sufficient and living alone were the most dissatisfied with old age, as they wished to live with kin. Economic conditions did not permit extended family living accommodations.

Barker also measured and listed separate ratings for mobility impairment, limitations in ability to work, subsistence needs, social and household activities, number of medical conditions, seriousness of medical conditions, consultation with health care professionals, and cognitive and emotional problems.

Comparative relational analysis of each of these variables revealed that functional status as rated by ADL self report was not related to the number or seriousness of medical problems as rated by health care professionals (physicians or public health nurses): Many Niueans with no medical problems reported severe functional impairment, while some elders with many medical problems reported only mild impairment. Barker found that, for both males and females, self-ratings of functional status were related to self-ratings and nurse ratings of health status. Barker concludes that both elders and nurses based ratings of health status on functional ability. Functional status was significantly related to both sex and age, as well as to mobility and activity. More significantly (and in contrast to the racial crossover observed in the U.S.), Niuean men appeared to suffer more than women from chronic disability.

Like demographic and epidemiological studies of small groups and sub-populations, biological anthropology studies involve structural analyses. However anthropological studies go one step further in adopting an emic approach (Beall and Goldstein, 1986a; Beall and Goldstein, 1986b; Beall et al., 1985; Barker, 1989; Beall, 1982). The emic approach to functional ability involves two premises: First, that biological incapacity may preclude the ability to function and second, that individual adaptation to biological incapacity may occur between observation

periods. Observations can be qualified by questioning individuals on the meaning of particular activities. Moreover questions about the relation of everyday function to gender, health, and socioeconomic status can be solicited from respondents (Barker, 1989; Weitz et al., 1989).

Assessing Physical Function with the IADL

In the literature on successful aging, the most frequently used tool for measuring physical function and assessing disability is the IADL. In use for over three decades, and widely regarded as a reliable and valid measure of physical function, the IADL has high face validity for the measurement of self care skills and skills needed for independence in the community. IADL scores are also generally considered to be a reasonable basis for inferring the extent of disability, at least within the North American culture in which the IADL was developed, and is most widely used. On the other hand, researchers and theorists have raised concerns about whether the IADL is a 'universal instrument', suitable for making cross-cultural comparisons about disability (Beall, 1984; Barker, 1989, 1994, Johnson and Wolinsky, 1994; Avlund, 1997)²⁶.

Before we consider the documented uncertainties about the IADL's cross-cultural (geographical space) validity, which is the primary concern here, there are a several issues with respect to its administration, scoring and interpretation which should first be addressed.

²⁶ Those researchers most concerned with the 'cultural sensitivity' of the IADL are anthropologists Beall and Barker.

Administering the IADL

Many studies have used the IADL scale in conjunction with modified ADL scales (National Health Interview Survey, 1984; Supplements to the National Health Survey, 1984,1987; Longitudinal Study on Aging, 1984; NHANES, 1982 - 1984; Duke Longitudinal Studies; Piedmont Health Survey of the Elderly, EPESE, OARS: see Harris and Kovar, 1992), and/or in tandem with self-report assessments of specific health problems (The Manitoba Longitudinal Study on Aging, Roos, Haven and Black, 1993); [Canadian] National Population Health Survey,1998).

Since the premise of large scale community or national surveys is to extract as much information as possible from the sample (Colsher, 1992), it is not surprising that the national studies cited previously included (in addition to the ADL and IADL), questions about chronic and acute disease, as well as socio-behavioral tests (Ilg test) and cognitive tests (Folstein Mini Mental Test). Unfortunately, these studies do not uniformly provide IADL scores as separate data, so it is difficult to examine comparable data across studies (Colsher, 1992).

With respect to cultural/geographic or adaptive unit sensitivity, the literature on the IADL is less than straightforward. Ethnic and geographical groups are often not clearly defined in national surveys or are pooled because of small sample size. In addition, large ethnic groups such as European or African Americans may be surveyed, but smaller groups, such as Pacific Islanders, are not included in the survey.

Often, no distinction is made between ADL and IADL skills, with both described as 'daily living skills'. While the same 'database' of IADL skills is used discriminatingly by those who support 'culturally-sensitive' individual measures of function, some researchers have used the entire database of ADL and IADL skills as if they constituted a 'naturally occurring' (and hence universal) hierarchy of physical function skills. These researchers hypothesize that while ADLs reflect personal care activities most often of concern in the institutional aged, IADLs reflect the natural extension of these skills that allows an individual to maintain independence in the community. They argue that IADLs skills can be listed in a 'natural' order - a form of Goodman scale - just as ADLs have been listed in a hierarchical order of recovery (Sector et al., 1987).

Sidney Katz, an original developer of the ADLs scale, is among the authors who have provided evidence for the hierarchical order of acquisition of ADL and IADL skills. (Gallo et al., 1988; Goto et al., 1996; Heikkinen, 1983; Kane and Kane, 1981). Both Thomas et al. (1979) and Kempen et al.(1996) found that the IADL did meet the criteria for a hierarchy, though the latter also determined that the IADL did not meet the criteria of Guttman's scalogram program. Conversely, Spector et al.(1987) applied item response theory to data from the [U.S.] National Health Care Survey to show that ADL and IADL items are not hierarchically related.

Many scholars concerned with cultural sensitivity of the skills themselves reject this indiscriminate combination of more universal ADL skills with more specifically Western IADL skills (though others argue for including IADL skills that

are 'natural extensions' of universal ADD skills). Although the term 'ADL' is often used in the literature as a generic term for any measure of functional ability, rather than as a reference to a specific measuring instrument (Hogan et al., 1999; Heikkinen, 1983), if little differentiation is made between ADL and IADL skills outcome data cannot be analyzed for IADL cultural sensitivity.

A number of researchers have presented evidence confirming that more accurate ratings of function are obtained when a health care professional (physician or nurse) objectively observes the respondent's behaviour or ability to carry out functional tasks (Beall and Eckert, 1986; Branch and Meyers, 1987; Thomas et al., 1979; Avlund, 1996).²⁷ With the ADL, self-care activities can be observed directly, and are most often measured while the respondent is institutionalized or under the homecare supervision of a health care professional.

If IADLs are being measured it may be possible to observe some, but not all, activities if the respondent is visiting a health care professional, rather than being assessed in an institution or at home. Some skills, such as mobility (an IADL), may be directly observable during an office visit, while others can be assessed by enquiring whether the individual usually engages in these activities and, if so, is continuing to do so. Activities that require cognitive skill (e.g., management of finances, use of telephone, use of transportation and self-medication), while not directly observable, may be objectively ascertained by a

²⁷ Effects of gender, self-report and socio-economic issues may be circumvented to a certain extent by using physician observation or report. Physician observation is based on patient history and a special confidante relationship between patient and doctor. Physicians are trained not judge, but rather treat and cure.

physician who has established a solid confidante relationship with the elderly respondent over the years.

The relationship between physician and patient involves an implicit confidentiality which allows the respondent to admit vulnerability, need, or dependence. Moreover, the respondent's medical record would contain not only health and disease data but a historical perspective on life-course function that provides a context for evaluations of physical function and independence (Kane, Ouslander and Abrass, 1999).

Though some studies support the validity of 'self report' compared with objective professional assessment, it is not clear whether these studies refer to the ADL basic self-care assessment scale or to the more advanced IADL skills used to measure independence in the community (Bastida and Gonzalez, 1993; Yu et al., 1993; Kaufman, 1994; Johnson and Wolinsky, 1994).

The discrepancy remains between function as assessed by self report and function as assessed by a health-care professionals and researchers²⁸.

Typically, self-reported functional ability is higher than functional ability as rated by respondent proxy, or by health-care professionals (which includes the bulk of researchers). Although Harris et al. (1986) found a high level of agreement between objective observation and self-report of functional ability

²⁸ The issue of physician report versus self report is made more complex by the fact that many studies do not make clear the source of IADL data. In many cases, researchers lump all sources together under the rubric 'self-report', even though there may be discrepancies between the subjective self-reports and the objective measures of functional ability provided by health care professionals (Truscott, 1996a).

using the ADL scale, the sample was gathered from a hospital list of convalescing hip fracture patients -- precisely the group for which the ADL was designed (and the IADL was not designed). It is not clear that this level of agreement is obtained from the non-institutionalized elderly who are the subjects of large-scale surveys. Foley (1990), for example, found that 23% of a sample of aged individuals with physician-confirmed arthritis failed to note their condition on the ADL questionnaire. Becker (1994), using life histories as well as ADL and IADL assessment, noted that none of those whose ADL and IADL scores (as determined by a health care professional) classified them as 'dependent' described themselves as either frail or dependent.

The debate over self-report vs. physician report (Bastida and Gonzalez, 1993; Yu et al., 1993; Kaufman, 1994; Johnson and Wolinsky, 1994; Harris et al., 1986; Foley, 1990) is more than a question of objectivity and accurate outcomes of measure. The IADL is used both at a clinical and population level with different outcome expectancies. At the clinical level, a health care practitioner is looking for incremental improvement in the quality of life of an individual. Alternatively, when population researchers use the IADL, they are looking for independence at a population level (Kane and Kane, 2000).

The IADL has been used repeatedly and its internal reliability conclusively demonstrated (Kane and Kane, 1980; Kane and Kane, 2000; Kane, Ouslander and Abrass, 1999). The IADL measurement instrument performs well in the hands of a physician (Kane and Kane, 2000), as Katz et al. (1963) designed the original ADL scale to be used by physicians.

Scaling and Scoring the IADL

Although the use of ADL or IADL instruments either individually or in tandem is an almost universal method of measuring function in a clinical setting, the scaling methods used to score the level of function are not. Instruments used to measure function range from simple tools used to measure basic self-care activities to very complex scales (including skills and corresponding ranking systems).

Using the Katz et al. (1963) ADL instrument aged patients were ranked using an index to calculate a grade (A,B,C,E,F,G, or Other) on self-care skills such as bathing, dressing, going to the toilet, transfer, continence, and feeding. Thus, the original ADL was intended to be used by a health care professional to rank the range of self-care function on an arbitrary rating scale that rated the 'degree of assistance by another person or device' needed to perform each functional skill.

The variety of scaling methods used with the IADL often make it difficult or impossible to compare results from a range of studies. One common problem is that 'degree of difficulty' scales often produce a higher prevalence of disability than 'degree of assistance' scales (Jette, 1994). Often there is a failure to inquire about mode of assistance, as many elders use mechanical or technical rather than human aids in performing functional skills. This may be a particular problem for cross-cultural comparisons of disability and dependence if (as one might expect) the amount and type of assistance available (e.g., mechanical and social) differs across cultures.

Because there is no agreed-upon method for operationalizing disability, researchers often tailor the skills assessed and the scaling methods to specific research objectives (Jette, 1994; Barker, 1989; Beall, 1984), which may be as diverse as validating a course of treatment or determining the prevalence of disability due to a particular disease. Researchers often construct scales tailored to their specific research objectives²⁹ by choosing from both ADL and IADL skills, with those deemed applicable in certain cultures (usually these skills are teased out through fieldwork interviews) considered culturally valid (Becker, 1994; Barker, 1989). Therefore, findings are only replicable by, and comparable to, studies using the same scaling method on a similar population.

Many researchers acknowledge that their studies have failed to address the comparative utility of a universal scale or definition of disability (lack of independence), and a number have articulated the need for such a scale (Jette, 1994; Branch and Meyers, 1987; Skelly, 1989; Galo et al., 1988; Manton, 1989; Sector et al., 1987).

Gender and Ethnic Biases vs. the Universal IADL

In addition to concerns about authenticity there may be concerns about possible gender bias in the skills assessed with the IADL. According to La Plante (1991), British women report the inability to complete household instrumental

²⁹ These studies may in fact contain few representatives from other cultures and pose no great problems for the interpretation of more advanced IADL skills. However, there may be members of ethnic minorities who are represented but not recorded or treated as members of sub-populations.

instrumental tasks such as bathing, and laundry beginning at relatively early ages through to elderhood. It may be that these tasks are those most often delegated to the male of the household (Lawton, 1972; Kane and Kane, 1980). Johnson and Wolinsky (1994) argue that the list of tasks on the IADL are gender-biased in content (and not universal), containing more tasks (e.g. shopping, preparation of meals) that would normally be performed by women, and asking relatively few questions that assess the ability of men to perform more traditionally male household tasks such as gardening and other outdoor activities (Jette, 1996; Avlund, 1997).

Gender issues cannot be easily separated from issues of ethnicity and socio-economic status, and all three must be considered when we assess the aged. In assessing individuals from ethnic sub-populations, where males in particular tend to live beyond the high morbidity average for their cohort group, careful attention should be paid to statistical interactions between gender, ethnicity and socio-economic status. This is especially relevant to cross-cultural comparison with respect to phenomena such as mortality cross-over and select survival: select survivors appear to come from ethnic populations, are not primarily female as in mainstream populations, and in many cases have come from lower socio-economic environments. This general pattern has been observed in smaller-scale studies of functional ability among sub-populations of the aged that consider the variables of gender, race, and economic status.

Havens and Chappell (1983) have confirmed triple jeopardy (ethnicity, age, and sex) among one group of Polish, Russian and Ukrainian women. In a

probability sample of 2,755 urban and rural Chinese, Liang et al.(1993) found (as expected) that women tended to rate their health as worse than men. However, she found no evidence of compression of morbidity.

Additional departures from the general pattern of male-female differences in disability among the aged have been reported in studies from ethnic or minority populations in the United States. For example, the functional ability of both black male and female elders decreased in tandem; however after the morbid died off, men who were classified as 'impaired' outlived women (Gibson and Jackson, 1992; Bastida and Gonzalez 1993; Foley et al., 1990). Similarly, Ailinger (1989) noted that Hispanic men showed a higher functional ability than women at a more advanced ages.

Beall (1984) suggests fieldwork that enables a researcher to observe various habitual activities and the social context in which they are performed. Ethnographic interviews with local informants supplement these observations with local values on issues of gender, race, and socioeconomic status.

Beall (1984) also argues that the effects of environment, socio-economic status, technologically advanced or non-technologically advanced lifestyles and societal interpretation of immediate geographical area require that the skills required for independence must be relative or sensitive to the people being studied: skills must be adapted for different areas of the world because people simply do things differently.

Is the IADL a Universal Measure -- and of What?

Concerns over the cultural sensitivity of the IADL fuel the debate on the use of the IADL as a universal measurement of physical function (Beall and Eckert, 1986; Barker, 1989). A concern for cultural relativity³⁰ in successful aging is a move away from the conservative canons of traditional biomedical gerontology toward a nexus between epidemiology, demography and anthropology. Cultural relativity, a respect for emic traditions and beliefs unique to cultures, is a concept developed within the boundaries of anthropological thinking.

Based on past misinterpretations of anthropological concepts and theories that inform the use of the present IADL as a universal measure of function,³¹ one must be very careful how canons imported from one discipline are interpreted in others. For example Katz et al. (1963), who used an earlier theory of development and anthropological theory, neglected to consider contemporary anthropological theories, i.e. cultural relativism, prevalent at that time.

The IADL is built on, and extends, Katz's concept of ADL. The widely-held assumption that the ADL (but not the IADL) is a universal and culturally

³⁰According to Holmes and Holmes (1995:10) "Cultural relativism is both a methodological tool that ensures objective data collection and a philosophical and theoretical principle that calls for open-mindedness in accepting cultural diversity. It emphasizes the idea that no single culture can claim to have a monopoly on the 'right' or 'natural' way of doing things. From this standpoint anthropologists who study the aged believe that the meaning of old age and the effectiveness of solution to problems old age can only be understood and evaluated in terms of the cultural context in which the aged reside".

³¹ See the latter part of this chapter for an analysis of the Katz et al.(1963) theory based on the 'sociobiological' primacy of 'vegetative' functions.

independent measure of function and disability is based primarily on arguments about the nature of human development. Katz and Akpom (1963) argue that the physical skills assessed by the ADL are acquired in a biologically-determined order. Children first acquire the ability to feed themselves, toilet, ambulate, dress, and bathe themselves in that order, based on what Katz et al. (1976) describe as 'sociobiological primacy'. According to Katz et al. (1963), feeding, toileting and ambulating are universal 'vegetative skills'³². Dressing and bathing, though universal in some form, may be influenced by culturally-based ritual and symbolic meaning. More advanced skills are more heavily influenced by culture. No one has tested the Katz et al. (1963) hypothesis, yet it has been and continues to be cited in the literature (Sector et al., 1987; Branch, 2001; Kane and Kane, 2000).

³² "The functions which comprise the Index of the ADD, and their characteristic order, bring to mind the recognized patterns of child growth and development as well as the behaviour of members of primitive societies." The definitions in the Index of feeding, continence, and transfer are thus recognized to reflect the organized locomotor and neurologic aspects or simple vegetative functions, exclusive of their more complex cultural and learned characteristics (Katz et al., 1963:917).

Katz et al. (1963) further argue that when, in adulthood, an individual convalesces following incapacitating illness or surgery, these skills are reacquired in the same order in which they were acquired in childhood. They assert that their model is based on 'anthropological' and childhood developmental theories, noting that

anthropology provides independent confirmation of the biological primacy of functions which comprise the index. All peoples, 'primitive'³³ and advanced, develop self-regulation of feeding and elimination as requirements for survival. They also develop independent locomotion, moving from one place to another to adapt themselves and their environments to their needs (1963:98).

Katz et al. assert that pediatric texts describe the development of children largely in terms of bathing, dressing, going to toilet, locomotion, elimination and feeding.

Terms used in the [ADL] Index, which was developed independently, are strikingly similar. Pediatric [sic] descriptions distinguish between vegetative and culturally learned behaviours, and analogous distinctions can be recognized in the [ADL] Index. The definitions in the Index of feeding, continence, and transfer are, thus [sic] recognized to reflect the organized locomotor and neurologic aspects of simple vegetative functions, exclusive of their more complex cultural and learned characteristics (Katz et al., 1963).

Despite their claims, the child development literature that they cite, including the collected works of Gesell and Mussen (Gesell and Ilg, 1943; Mussen and Conger, 1956; Gesell, 1940; Almy, 1955), contains little to substantiate their model

³³ Although this is a term that anthropologists currently do not include in their research vocabularies, it is a term used in the past by anthropologists and by Katz et al. (1963).

of biologically ordered physical development. Gesell and Ilg (1943) describe only basic mechanisms such as temperature regulation and the startle reflex as 'vegetative functions', and make the recommendation that daily schedules of sleeping, feeding, elimination, bathing, dressing and self-activity be followed. They present no evidence supporting the notion that the emergence -- or reacquisition -- of these functions necessarily occurs in a fixed order.

With respect to the supposed anthropological foundations of this model, Katz et al. (1963) state that "anthropology provides independent confirmation of the biological primacy of the functions which comprise the Index" (1963:98). In support of this statement Katz et al. reference Murdock's book 'Our Primitive Contemporaries' (1934). In fact no mention is made of hierarchical physical development of children across cultures on the pages cited (which describe Samoan dress, and cloth patterns designed by the Ainu of Japan).

While Katz et al. (1963) refer to a single work by Murdock as an example of universal biological functions, it is important to acknowledge the lineage of thinking in this area. The early works of Tylor (1889), Wissler (1923), Malinowski (1944), Murdock (1949), and Simmons (1945a) provide an anthropological foundation for the methods and conceptual orientation of this study.

A Reference in Time: Context of Thirty Years of Anthropological Ideas

Three decades of anthropological thought had taken place between Murdock's publication of 'Our Primitive Contemporaries' (1934) and the work of

Katz et al. (1963). It is essential to contextualize anthropological thinking prevalent in the 1930s, and at the time Katz et al. published their manuscript.

An examination of the relevant literature suggests that anthropological thinking in the pre-World War II period was an eclectic mix of orienting concepts, perspectives, and themes drawn from a vast collection of data (Honigman, 1976; Harris, 2001; Holmes and Holmes, 1995; Voget, 1975; Boch, 1999).

The two schools of anthropological thought that are most directly relevant to the development of this study, cultural relativism and historical functionalism, were both exploring evolutionary issues, but from different perspectives.

Cultural relativists emphasized the autonomy of each individual culture, arguing that each culture is distinct and cannot be meaningfully compared with other cultures. Nevertheless, cultural relativists pursued the possible biological bases of culture, considering whether the differences between 'primitive' and more 'advanced' societies could be understood as a form of social evolutionary development (Harris, 2001; Honigman, 1976).

The historical functionalists, perhaps more strongly influenced by Darwinian notions of biological evolution, considered whether evolutionary concepts could be applied to the changes in, and differences between, human cultures. One such theorist was E. B. Tylor who, in 1889, conducted comparative research on a sample of 300 to 400 societies.

Convinced that statistical analysis ("social arithmetic") was the methodology best suited to anthropology, Tylor used statistical methods to uncover universal patterns of social behaviour (traits) across cultures (Harris, 2001). Tylor's list of

universal human traits included cooking, group living, social life, family households, marriage, and parent/child biological affinity (Murdoch, 1949; Brown, 1991). Tylor argued that the similarity of behaviour patterns was based on the shared - and biologically based - human nature of all individuals, independent of culture. These shared behaviours are “independent of what seem the comparatively superficial differences of race, language, but shaped by similar human nature acting through successively changed conditions of savage, barbaric and civilized life” (Tylor, 1889: 269).

A quarter of a century after Tylor's work, Clark Wissler (1923) developed a similar list of cross-cultural universals that included food habits, shelter, transportation, dress, treatment of the sick, and finance. Wissler's list, which is strikingly similar to the items on standard IADL scales, was derived from analyses of both his fieldwork notes from a sojourn with the Plains Indians, and some 365 ethnologist from the American Museum of Natural History.

In 1944, one year before the publication of Murdock's list, Malinowski also provided a list of biological needs which must be fulfilled for “the survival of the individual and the group”. According to Malinowski (1944:75), “all men have to have to eat, they have to breathe, to sleep, to procreate and to eliminate waste matter from their organisms wherever they live and whatever type of civilization they practice”. For each basic need, Malinowski described the behaviours or physiological function that meet the need, and the emotional or physiological state that results from satisfying the need. For example, the impulse of hunger is met by eating, and the satisfying result is satiation. Malinowski argued that the

behaviours that meet these basic needs are “the least variable ... as regards any cultural influences or motivation” (Malinowski, 1944:77).

Murdock sought to refine Tylor’s comparative analyses using the Human Relations Area Files (HRAF), and expanded Tylor’s list to include aspects of human physiology in addition to general social relationships (Murdock, 1949). What Murdock (1945:69, cited in Brown, 1991; Harris, 2002; Honigman, 1976) called the ‘common denominator of cultures’ included a number of aspects of physical function incorporated in IADL scales similar to that used in the present study, such as the need to eat, the use of medicine, regard for natural function or hygiene, the need for trade or financial organization, and the need for transportation for the purposes of visiting (Murdock, 1949).

Strongly influenced by primatology, Coon (1948) developed a list of universal functional skills using the “universalistic model for the analysis of society and culture”. Coon’s list, similar to Malinowski’s, contains “those activities which human beings in all known societies have in common with lower animals ... the very ones with which our ancestors ... started their unique career, and out of which more elaborate behaviour patterns have developed” (Coon, 1948:581). These activities included dressing, drinking and feeding, grooming and healing, learning and teaching, talking, mating, sharing, leading and deciding, fighting, playing and entertaining, getting raw materials, processing, carrying, trading, and testing and experimenting (Coon, 1948:581-597).

Similarly inspired by the work of primatologists, Kluckhohn (1962) reviewed the work of Wissler (1923), Malinowski (1944), and Murdock (1948). While

Kluckhohn critiqued the generality of some categories, he agreed that all humans share a set of fundamental functions such as eating, sleeping, and hygiene.

Kluckhohn's crucial point is that "biological, psychological, and sociosituational [sic] universals afford the possibility of comparison of cultures in terms which are not ethnocentric, which depart from "givens", begging no needless questions"(1962:314).

Honigman (1976) describes the 30 year period between the 1930s and the 1960s as one involving the evolution of formal comparative works. In contrast, Harris saw the 1930s as a return to the study of the biological basis of culture. Harris describes a return to scientism (macro-theory), hologeistic comparative methods, and a search for universals. While Harris notes that the influence of this school of thought did not begin between 1930 and 1960, neither did it end there.

For example, from the late 1960s on, anthropologists (most especially ethnologists) have been influenced by the work of sociobiologists and evolutionary biologists (e.g Fox, 1970; Tiger, 1970) who approach social behaviour from an evolutionary perspective. They note that evolution selects both physiological processes and behaviour processes that increase reproductive success. From this perspective, human culture can be seen as an adaptive mechanism that is equally responsive to the same sorts of selection pressures (see Voget, 1965; Honigman, 1976; Harris, 2001).

There is a nexus between the comparative research work done to date and this study. The similarity between biological universals proposed by Tylor (1889),

Wissler (1923), Malinowski (1944) Murdock (1945) and Coon (1948) to the IADL domains is striking. This similarity has provided inspiration for this comparative study of physicians (from areas around the world) ranking of a set of very basic physiological functions (functions based on biological needs).

Biologically Based Universals and the Study of Aging?

The notion that, despite their differences, all cultures rest on a common biological bedrock based on the physiological realities we all share is an idea that has been applied more specifically to an examination of cross-cultural similarities (and differences) in the treatment of the aged.

A contemporary of Murdock, Leo Simmons (1945a, 1945b, 1946, 1960) was a pioneer in applying holocultural (or hologeistic) methodology in investigating the treatment of the aged. Using ethnographic data on 71 non-industrial societies from Murdock's Human Relations Area Files (HRAF), Simmons analyzed 109 socio-political traits to determine whether there were universal patterns of behaviour in the treatment of the aged. One important conclusion he reached was that it was a common feature of most (if not all) cultures that the loss of physical function by the aged relegated them to (at best) a subordinate status in the community. At worst, they were marginalised or discarded. (Simmons, 1945) Unlike Murdock, Wissler, and Malinowski, Simmons' primary interest was in the social status of the elderly rather than in the level of biological functioning that helped determine it.

Echoing Simmons methods and results more than three decades later, Glascock and Feinman (1980) conducted comparative holocultural research on the Probability Sample Files (PSF), which contain 60 cultures extracted from Murdock's HRAF. Like Simmons, these authors established that, across the societies analysed, the way aged individuals are treated is directly related to their functional ability. Individuals who are physically unable to contribute to the survival of the community are denied universal necessities of life (provision of food, transportation, and shelter), while fully functioning elders are considered independent and provided with food, shelter, medical care, and transportation.

The school of cultural relativism offered resistance to the development of socio-biological thinking in the study of the aged (Sokolovsky, 1990). There was a return to the examination of the role of social evolution (the progression of a society from primitive to modern) in the treatment of the aged. Maxwell (1980; Maxwell and Maxwell, 1980; Maxwell and Silverman, 1986), using an analysis based on modernization theory, argued that modernization would result in more external and egalitarian family structures, and that this loosening of the more rigid family structure in non-industrialized societies would alter kin-based social organization and change (probably adversely) the position of the aged within the culture.

Cultural relativists have continued to assert the importance of individual cultural difference. Beall (1982a, 1982b) and Barker (1989, 1994), both physical anthropologists, studied the aged in two remote geographical areas.

Anthropometric tests were performed on both the Nepalese and Niuean elders.

Both anthropologists compared medical physiology from an emic perspective, and rejected the notion of comparing activities of daily living. They disputed the universality of daily functions that satisfied the very basic biological needs of not only the aged but all individuals.

Using mixed methodology, they investigated the utilization and cultural sensitivity of the IADL skills in remote populations (Beall, 1982a, 1982b; Barker, 1989, 1994) concluding that IADL skills were culturally sensitive and should be modified for cross-cultural research. However, as pointed out earlier, this work dealt with specific IADL tasks, rather than the broader, more general domains that were investigated in this thesis.

It has long been assumed that other instrumental activities of daily living (IADLs) are culturally mediated or learned. For example, Beall (1984) argues that individual IADL skills may have different meanings and values as a function of culture. Complex IADL activities such as telephone use, transportation, or managing money can be Western skills that apply to industrialized populations. She calls for 'culturally sensitive' measures for functional capacity, arguing that tests of the simpler agrarian skills of 'third world' countries should be designed specifically for cultures of interest (Beall and Goldstein, 1982a, 1982b). What is needed, she argues, is "culturally relevant activities and categories and the construction of appropriate indices" to measure "activity and its relationship to dependency" (1984:32).

Other anthropologists who study the variability of the aging process inform us of the cultural norms (or emic view) in individual cultures (Beall and Eckert,

1986; Ikels, 1993; Barker, 1989; Friedlander and Page, 1989; Crews, 1990).

Self-report of health and function are established by observing cultural norms (using mixed methodology) considering, everyday behaviour, and by collecting the data while living in the elder's environment. Appropriate skills from the ADL and IADL scales are subsequently chosen to comprise a measure that would be 'culturally relevant' to the 'emic' analyses or the individual's perception of everyday function.

While these authors are arguing for a 'culturally relevant' measure, they are still modifying and re-ranking a reasonably finite list of ADL and IADL skills³⁴, perhaps the best measure of late-life function to gauge symptomatology of chronic degenerative and acute disease. Their justification for this selection process is that there is a need to record functional ability as a result of these diseases even though they may vary from culture to culture (Beall and Eckert, 1986). Moreover, it may be important to establish norms and individual perspectives on health (Barker, 1989; Crews and Gerber, 1994; Plato et al., 1994; Gam, 1994).

As epidemiologists, Liang and Jay (1992) encourage anthropological methods but suggest collecting fewer qualitative data on illness labelling or help-seeking behaviour. They call instead for more recording of cross-cultural variation and for more verification of the generalizability of health and disease

³⁴ It would seem that a selection from the ADL and IADL set of skills verifies the cultural relevance of these skills. Some skills may be more important than others in different cultures.

outside our culture. Liang and Jay (1992:302) are moving toward a nexus on cross-population comparison by suggesting that illness labelling and help-seeking behaviour characterized in qualitative data “overlook or de-emphasize the significance of diseases and related medical facts”. Moreover, they suggest there is some urgency to understanding the prevalence of morbidity, disability, and mortality across populations, which will require a common group of variables to measure physical function.

Liang and Jay (1992) argue that in studies of health and function, we must be sensitive to the emic perceptions in different cultures. They suggest that making meaningful comparisons of variables measured in different cultures requires us to show that these variables “are sufficiently similar in terms of construct validity and measurement properties to treat them as the same phenomena”. As these authors note, variables may differ by degrees across cultures, rather than being simply incompatible or inapplicable. Liang and Jay (1992:302) are careful to point out that factor analyses showing mean differences in functional-scale scores between cultures may not be the result of cultural differences, and that there may be greater heterogeneity within geographic or cultural groups than between them.

Emic measures (developed in a single culture), usually developed in North America, are simply assumed to be etic (appropriate for use across diverse cultures). That is, instruments composed of items reflecting Western cultures are translated and used in other cultures with little regard for the conceptual and metric equivalences across different cultures. Mean differences found between cultural groups are assumed to be cultural differences. However, this approach rarely yields useful results, since the validity of the measures across cultures has never been established. (Liang and Jay, 1992:305)

Like Liang and Jay, epidemiologists involved in studies of world health seek tools that can be used to measure physical function across populations. World Health Organization (WHO) researchers study the health and function of the world's aged (not an immediate issue for third world countries, but an important preparatory measure)³⁵ in the belief that the knowledge gained will benefit all nations (Suzman et al., 1992; Kane; Macfayden, 1990).

The International Classification Disease, Impairment, Disability and Handicap (ICIDH) recognizes a progression from Disease through Impairment to Disability and finally Handicap (WHO, 2002a; Gray, 2001). The implication that this conceptualization has universal validity was heavily influenced by the work of Heikkinen et al. (1983). However, it is important to note that Heikkinen et al. (1983) only studied Western, industrialized, European countries (see Shanas, 1968; Havens and Chappell, 1983). The European countries studied at the time, moreover, were fairly homogenous in terms of population composition when compared to Canada and the United States. The study sample was comprised of a mixed institutional and community dwelling group at different time periods of sampling. Further, because this was a self-report survey, the subjective data were strongly influenced by a population of educated health consumers

³⁵ According to Macfayden (1990) it is the graying of Europe and North American that most concerns researchers and policy makers at this time. Far greater numbers of aged live in these regions. However, it is argued that if the appropriate understanding is gleaned from scholars who study these regions it can be shared and help the third world prepare for such eventualities. While only a greater percent of the whole population live in developed countries. The absolute number of older individuals is much greater in developing countries than in developed countries, because of their large total populations.

(Heikkinen et al., 1983:56). This WHO-sponsored study reported no significant differences in mobility between the elderly living in six Western countries, and concluded that "the physical capacity of the aged may be independent of culture" (Heikkinen et al., 1983:3; Shanas, 1968).

Apart from the question of whether evidence from six Western countries adequately represents the full range of possible cultural differences in disability, the WHO conceptualization begs the question of whether the relationship between subjectively assessed 'physical capacity' and the ability to function independently in the community is the same across cultures. These efforts illustrate the dilemma posed by Liang and Jay, (1992): How do we measure function at a population level with an instrument that can be used across cultures to produce prevalence studies, while respecting culturally indigenous understandings of disease, and cultural differences in the physical functions important to maintaining independence in the community?

Whether physical function is studied for patterns of disease states, adaptation to the process of aging, or structural patterns of populations, the debate on how we can measure prevalence, while respecting 'culturally relevant' explanations of disease seems to impede collection of population data at an international or inter-cultural level.

Cross-Cultural and Minority Group Comparisons

In addition to basic issues of cultural relativity that affect measurement of functional ability, the dilemma of adequately representing minorities and ethnic groups in national or large scale studies remains. While the national, cross-sectional, and longitudinal studies of aging (e.g., National Long Term Care Survey, 1982-1984; Baltimore Longitudinal Study of Aging, 1984; Duke Longitudinal Study, 1980; National Health and Nutrition Examination, Survey I Epidemiologic Follow-up Study, 1971; 1980) have spawned smaller sub-population studies by demographers and epidemiologists (Gibson and Jackson, 1992; Gibson, 1990; La Plante, 1991; Hogan et al., 1999), it has become apparent that not only have ethnic and minority groups been poorly represented in the primary and secondary data sets³⁶, but also that methodological concerns with respect to gender, self-report, and cultural relativity of the IADL instrument have seriously impeded cross-study and cross-cultural comparison (Barker, 1989; Beall and Eckert, 1986; 1984; Arber and Ginn, 1993; Gibson and Jackson, 1992). In an attempt to accommodate the minority populations and address the 'culturally relevant needs' assessment of these populations, demographers and epidemiologist have either used instruments tested for validity within specific

³⁶This lack of representation may also be due to a phenomenon referred to by Rubinstein (1994) as 'statistical inevitability'. Often minorities are under represented because there are just too few in a sample to show any statistical value (enormous standard errors). I would argue that this may in fact be a 'snake swallowing its tail' phenomenon as surveys simply fail to engage sample selection processes that would recruit minorities in larger numbers. (cf NHANES, (1984) that only recruited black, Hispanic and white population by their known numbers).

minority populations, or used the ADL as a 'universal measure of self-care'. The results may be either inappropriate for cross-cultural comparisons or did not fully reflect the independence of community-dwelling aged.

Despite the wealth of information from previous national studies (the MacArthur Foundation series of studies), there are still few data that allow cross-cultural comparisons of successful aging, since it is not clear that these studies used similar IADL instruments and adequately represent ethnic minorities (National Long Term Care Survey, 1982-1984; Baltimore Longitudinal Study of Aging, 1984; Duke Longitudinal Study, 1980; National Health and Nutrition Examination, Survey I Epidemiologic Follow-up Study, 1971; 1980).

In general, large scale national and prevalence studies of functional ability among the aged have been characterized by low response rates and unrepresentative samples. Nevertheless, they have generalized findings based predominantly on the oldest old females to the whole population (Manton and Soldo, 1985; Manton and Soldo, 1992; Cornoni-Huntley et al., 1990; Statistics Canada, 1994; Palmore, 1985; Suzman et al., 1992; Kovar, 1992; Branch and Meyers, 1987; Manton, 1989; La Plante, 1991; Johnson and Wolinsky, 1994). They report that the prevalence of disability is highest among the oldest old.

While it would be relatively easy to cite general statistics on the prevalence of disability among the aged, a closer examination of the literature suggests that the dependability of any such estimates has to be considered questionable. Many such studies freely acknowledge the questionable cultural relevance of their definition of average daily living skills, and the unreliability of self-report

responses (Suzman et al., 1992). However, rather than investigate the structural causes of causes of relevance conflict, many of these researchers advocate increasing the volume of collection of objective health care professional data to compare with self-reported data (Suzman et al., 1992). There may be a problem of misdirected measurement when it comes to cultural relevance and self-reported dependability in the area of physical functional ability of the aged. Ultimately those who wish to study either small-group disease etiology or nosology and small minority or sub-population health risk have designed studies to be used on target populations (convenience samples of hospital or clinical patient and clients of social service agencies)³⁷ that are amenable to particular research questions rather than measure a phenomenon such as successful aging in the general population (for example: what is the recovery rate from stroke, how long before a patient is mobile after hip replacement, and monitoring independence skills after cardiac bypass surgery). Although, this study-specific use of the IADL satisfies specific research mandates, it contributes little to knowledge of comparative population aging and disability.

³⁷These populations are often contained on finite client or patient lists (Repetto, et al., 2002).

Drawing Authentic Inferences About Independence

It is widely accepted that the IADL, at least when administered by health professionals, provides a reliable and objective measure of an individual's ability to successfully exercise basic physical functions required for daily living. The IADL skills have been shown to measure what they should measure: self care. Secondly, if physicians are using the IADL instrument the internal reliability is high. Physicians are well acquainted with the application and use of this measure (Kane and Kane, 2000; Kane, Ouslander and Abrass, 1999; Spector et al., 1987). It also seems reasonable that the ADL has cross-cultural relevance: whether an individual can feed herself or can move from a bed to a chair without assistance would not seem to vary substantially with ethnic or cultural background. A strong argument can also be made that the tasks represented on the IADL, even though they are assumed to be much more susceptible to cultural influence, still represent a valid, objective measure of physical function: whether the individual can perform a specific task without human or mechanical assistance, or how much assistance the individual requires to perform that task, seem to be issues that can be objectively determined (Shanas, 1968).

For the purpose of this study, the use of the ADL and (more importantly) the IADL in making cross-cultural assessments and comparisons raises questions of whether physicians objectively measure physical function, and whether we can use assessments of physical function provided by ADL and IADL scores to draw

credible inferences about the ability of individuals to live successfully in their respective ethnic or geographical areas.

As suggested earlier, the IADL individual tasks that comprise a domain used to assess physical function (for example, using the telephone) may make very different contributions to independence within different societal contexts and geographical areas (Beall, 1986; Beall and Eckert, 1984; Barker, 1989). There may also be differences in the extent to which culturally-defined institutions and social relationships allow individuals unable to perform particular tasks to be perceived, by self and others, as successfully living on their own. The observation of compression of morbidity, select survival, and mortality-crossover among minority groups makes it particularly important that our studies of these phenomena employ measures of physical function whose relationship to successful independent living -- as defined within an individual's cultural community -- is clear.

There are many ways to determine (or begin to determine) the cross-cultural utility of the IADL. A quality of life approach would require a survey of the aged themselves. However, the goal of this thesis is to examine the variability among health care professionals, particularly physicians, with regard to their ranking of IADL skills. Between the older individual and her physician lies a complex network. The view of the physician is that of aging pathology. Alternatively, the older individual has her own sense of what aging is and how it is perceived, or the lived experience of aging. Hence, there is a black box between the ideology and

practice of biomedicine and the reality of aging, between those who are providing care and those who are seeking it.

We require a reasonable assessment, across cultures, of the relative importance that each of the IADL skills plays in determining an individual's capacity for independent living. One way to accomplish this is to ask health care providers, who obtained their medical training or practice in a variety of geographical areas, their opinions on the relative importance of each of the skills that make up a typical IADL instrument. This is the approach taken in the present study. Are health care providers who work with the elderly objective observers? This is a very important question to ask in Canada and elsewhere, as health care providers are involved in daily decisions, based on IADL scores, concerning the services needed by elderly individuals in order to meet their daily living needs and receive social/medical services.

The IADL itself does not give differential weight to the various daily living tasks that it assesses. Thus, asking physicians from a variety of geographical areas to rank in order the importance of these activities, which is the approach taken in this study, does not necessarily indicate the way in which they actually use the instrument. This study is intended to provide an indication of the extent to which physicians' perceptions of the requirements for daily living - a part of successful aging - may be influenced by different cultural conventions and institutions (such as biomedicine). Does biomedical training supercede the beliefs, traditions and cultural beliefs of practising physicians?

From the anthropological perspective, we are interested in questions that relate to variability both within and between geographic areas: is there consistency or consensus among members of a particular area concerning the ranking or relative importance of the IADL items? How much variability in ranking occurs within a single area? What is the nature and magnitude of differences in rankings between areas?

In the next chapter I describe the design, administration, materials, and methods used to address the question of how the relative importance of individual IADL skills or function is perceived across geographical areas. This study is simple in design, but as demonstrated in this chapter, it represents a step toward establishing a means to measure the common denominator in all studies of disability or independence of the aged in the community.

□ Chapter 3: Materials and Methods

The Sample

The original intent of this study was to compare the IADL rankings of two groups of health care professionals: physicians and nurses.

The sampling frame of physicians was extracted from the Medical Directory of all 21,000 licensed physicians in Canada compiled and published by the Canadian Medical Association, the Royal College of Physicians, and the College of Family Physicians (Canadian Medical Association, 1996). In addition to contact information, the Medical Directory provided information on each physician's country of education, year of graduation, and medical specialty. All physicians identified in the Medical Directory as having been educated outside Canada ($n = 1751$) were included in the sampling frame.

Demographic and contact information provided by the Medical Directory was supplemented by information from University calendars, web sites, professional organizations, and physician databases. These additional resources provided email addresses for 50 of the physicians (3% of the sampling frame), and email addresses for physicians practising elsewhere in the world. These latter addresses were used to compile a list of physicians practising outside Canada.

No list of Registered Nurses in Canada comparable to the Medical Directory was available. Repeated attempts to solicit addresses or contact lists of nurses from the Registered Nurses Association of Ontario (RNAO) proved fruitless, and an ad in the RNAO newsletter soliciting respondents educated outside Canada drew only five responses. Consequently, the plan to incorporate Registered Nurses in the study was abandoned.

Questionnaire Design

First Draft: Questionnaire #1

The First Draft of the survey questionnaire was constructed by combining ADL and IADL tasks from fifteen of the most widely known and proven instruments (Appendix I), especially those that showed promise for cross-cultural studies (Beall and Eckert, 1986)¹ (Appendix II). These activities included both those intended to evaluate average daily living skills (ADL), and those designed to assess higher-level instrumental tasks of daily living (IADL) (see also Jette et al., 1996). To simplify the survey, similar tasks from various instruments were combined under a single heading hereinafter referred to as a domain.

For example, several scales included (more or less complex) tasks assessing the ability to prepare and eat food unaided. The Lawton Scale (Lawton, 1971:472) rates an individual's functioning with respect to 'food

¹ As McDowell and Newell indicate, there are many instruments to choose from. Older surveys dealing with ethnicity (Roos, Havens and Black, 1993) did not include IADL skills, only ADL skills. More recent studies used more complex facets or tasks of domain (ICIDH, WHO, 2002a; WHOQOL, 1998).

preparation and eating' on the following six-point scale: "a) plans prepares and serves meals independently; b) prepares adequate meals if supplied with ingredients; c) heats and prepares meals but does not maintain adequate diet; d) needs meals prepared and served; e) eats with a spoon; and f) drinks from a cup".

A similar ADL set of tasks appears on the self-report FAST Scale (1995:4), which rates 'food preparation and eating' on the following scale: "a) do you eat and drink without coughing and choking?, b) do you plan adequate meals?, c) do you make or get your meals?, d) do you get your own groceries?, e) do you understand food restrictions?, f) do you cook without burning pots, the counter, or yourself?, and g) do you know enough not to eat spoiled food?"

For the purposes of this study, these and other similar ratings were combined into a domain listed in the first draft of the questionnaire as 'Food Preparation and Eating'.

As another example, the survey domain called 'Hygiene' combined tasks from various rating scales which assessed a range of individual activities, e.g. 'getting on or off the toilet, reaching for toilet paper and wipe bottom, bowel and bladder control, combing hair, brushing teeth and doing laundry, get in and out of the bathtub and washing and drying your whole body' (Deniston and Jette, 1980; Gross-Andrew and Zimmer, 1978; FAST, 1995).

Some instruments, however, only list one task related to hygiene. For instance, if an individual were assessed using the Ernst and Ernst Scale (1984)

she would be asked if she were able to complete the task of toileting with no assistance, some assistance or maximum assistance. This particular instrument lists no other task that could be classified as hygiene (e.g. brushing teeth, bathing or toileting). Other tasks may not have been important to this particular study, but this is a good illustration of how the plethora of study-specific instruments hampers comparison across studies.² While many instruments define an activity in great detail, still others simply list the domain. FAST (1995) modestly asks, 'Do you get your shopping done?' while the Lawton Instrument (1971) defines tasks related to shopping as follows:

1. Takes care of all shopping needs independently.
2. Shops independently for small purchases.
3. Needs to be accompanied on any shopping trip.
4. Completely unable to shop.

To achieve a simple test instrument for this research project, all tasks that could be listed under a general heading or one word descriptor were collapsed into one domain on the questionnaire.

²See Spector (1990) for 'transfer' defined as 'mobility'.

Appendix II presents the collapsed list of the 12 general domains that formed the basis for this study, along with their corresponding definitions in all fifteen instruments. The final twelve domains were:

1. Dressing
2. Telephone (ability to use)
3. Eating (ability to)
4. Finances (ability to)
5. Laundry (ability to do)
6. Outside Mobility
7. Hygiene
8. Shopping (ability to)
9. Medication (ability to use)
10. Housekeeping (ability to do)
11. Transportation (ability to use)
12. Inside Mobility

Once the twelve domains had been constructed, the questionnaire and its delivery mode was honed in two pretests.

First Pretest

The First Draft of the questionnaire (Appendix III) was sent out via surface mail to 30 area physicians in the sampling frame. Four physicians (13%) responded. Three of them gave the same numeric ranking to several domains, and one did not rank all of the domains. A Second Draft of the questionnaire was therefore constructed which provided more explicit instructions on how to rank the individual domains.

Second Pretest

The Second Draft together with an introductory letter was sent via fax (in order to speed delivery and return) to a second group of 30 local physicians drawn from the sampling frame of 1751 (Appendix IV). Only three questionnaires (10%) were returned.

Based on previous work with questionnaires, it was hypothesized that the low response rate on both pretests may have been due to the length of the questionnaire. The literature suggests that lengthy questionnaires often receive low response rates (McAuley, 1987; Babbie, 1989).

According to Babbie (1989:145) "the format of the questionnaire is just as important as the nature and wording of the questions asked. The layout of a questionnaire can lead respondents to miss questions, can confuse them about the nature of the data desired, and in the extreme, may lead them to throw the questionnaire away." Babbie goes on to say that the questionnaire should be simple, uncluttered, and visually appealing.

Various features of the questionnaire therefore were redesigned in the Third Draft: The definitions of domains were dropped, so that items contained only the general domain (Appendix V), and the questionnaire was simplified by grouping all three elements of the questionnaire on a single page. It was anticipated that the simplicity of the general domains in this instrument (referred to hereinafter as the IADL Domain Screen) would allow the respondents to rate the categories based on their own interpretations of them, rather than on the basis of published

definitions. This would also likely reduce the ethnocentricity of the instrument and, conceivably, make it more flexible for cross-cultural research.

The header contained the McMaster crest and clearly identified my academic affiliation, and a second boxed element contained the introduction and instructions. A third box listed the one-or two-word domains to be ranked and was designed to appear small, simple and easy to complete.

A mini-survey was then conducted in which the Second Draft and the one page Third Draft were hand delivered to 10 health care professionals at Hamilton area hospitals. Participants were asked which questionnaire they preferred, and why. All participants preferred the shorter Third Draft, the general tenor of their comments being that they would be more likely to complete the shorter version. The Third Draft was therefore used as the Final Version of the questionnaire distributed to the respondents in the sample. All subsequent to 'the questionnaire' refer to this Final Version of the IADL Domain Screen.

Survey Distribution

The questionnaire was sent via surface mail to 1701 of the physicians in the sample, and by email to 50 physicians in the sample. Only those physicians for whom individual (as opposed to departmental) email addresses had been located received the questionnaire via email.

The questionnaire content was identical in the surface mail and email versions, which differed only in the absence of the McMaster University crest and graphic boxes from the latter, because graphic elements could not be reproduced

in a text-based email message. The surface mail version of the questionnaire also included a return envelope with prepaid postage.

After the surface mail questionnaires had been sent out to members of the original sample (referred to hereinafter as HP-1), a second sample (referred to hereinafter as HP-2) of physicians practising outside Canada was constructed using information gathered through the Harvard International database of hospitals, which contained links to a large number of hospitals (and their staff databases) around the world. The staff lists of all hospitals on the Harvard international database were searched, and the HP-2 sample included all 764 physicians for whom an individual email address (as opposed to a general departmental email address) was available.

The 764 physicians in the HP-2 sample were sent the same email version of the questionnaire that was sent via email to 50 physicians in the HP-1 sample.

Survey Returns

Of the 1751 HP-1 questionnaires sent via surface mail, 366 were returned, for a response rate of 20.9%. Only 44 replies were received to the 764 HP-2 questionnaires sent via email, for a response rate of 5.8%. A chi square analysis comparing response by surface and electronic mail revealed significant differences in the response rates ($\chi^2=69.27$; $df=1$; $p=0.00$).

Fifty-five questionnaires or 15% of the returned surface mail questionnaires were spoiled. The respondents simply failed to complete the questionnaires according to the instructions (e.g. ranking all activities as either 1 or 2 instead of

from 1 to 12; leaving out activities; filling in only four activities and failing to enter anything at all). The most common errors involved failing to rank all domains, or giving several (occasionally all) domains the same ranking. Of the HP-2 or email questionnaires, only 3 of those returned, or less than 1% were spoiled. A Chi Square test revealed no significant difference in the spoil rate for response via surface mail vs the spoil rate for response via email ($X^2 = 1.74$, $df = 1$, $p=.18$). Although information about the nature of the spoilage was recorded, spoiled questionnaires were eliminated from all subsequent statistical analyses.

All respondents were categorized by gender on the basis of first names³. The gender of four email respondents could not be identified since only their first initials, not their first names, were available. These four questionnaires were dropped from the sample.

Since email responses were statistically indistinguishable from surface mail responses, the remaining email responses ($n=37$) were combined with the unspoiled surface mail responses ($n = 311$) to form a single overall sample of 348 physicians.

³ A list of seventeen first names that were difficult to categorize by gender was given to several McMaster University graduate students and faculty who, based on their association with a particular culture or geographic area, were familiar with the relationship between given names and their gender.

Table 3.1: S1 Returns by Medical Training/Practice : WHO Classification of Geographical Areas (n = 348)

Geographical Area	n	%
Africa	11	3.2
Australia	27	7.8
Bangladesh	2	0.6
Belgium	8	2.3
Caribbean	3	0.9
China	2	0.6
Czechoslovakia	9	2.6
Egypt	12	3.4
England	3	0.9
France	7	2.0
Hong Kong	7	2.0
India	54	15.5
Ireland	26	7.5
Mediterranean	7	2.0
Mexico	5	1.4
Middle East	4	1.1
Northern Europe*	4	1.1
Netherlands	3	0.9
Oceania	3	0.9
Pakistan	6	1.7
Philippines	13	3.7
Poland	16	4.6
South Africa	32	9.2
South America	4	1.1
South Central Europe*	5	1.4
South East Asia	3	0.9
Scotland	25	7.2
Singapore	10	2.9
Sri Lanka	10	2.9
Taiwan	6	1.7
Russian	1	0.3
United States	1	0.3
Vietnam	8	2.3
West Indies	7	2.0
Yugoslavia	4	1.1
Total	348	100.0

Geographical Areas of Training for Overall Sample (S1) of Physicians

Table 3.1 breaks down S1 by geographical area of training (in the HP-1 sampling frame) or practise (in the HP-2 sampling frame), indicating the number and percent of total responses from physicians in each geographical area.

The geographical areas shown in Table 3.1 were selected on the basis of the World Health Organization International, (WHO) Classification of Countries and previous worldwide studies done by WHO testing the IADL (PAHO, 1985; Shah, 1985; Heikkinen et al., 1983; WHO, 1987; WHO, 2002b). The authors of these studies collapsed countries with similar IADL scores to create the WHO Field areas . In this study, I use the term 'geographical area of training or practice' to represent the WHO Field Areas⁴.

Description of Main Sample

Because many of the original 35 geographic areas contained fewer than 10 respondents, the S1 sample of 348 physicians was trimmed to 236 physicians representing the 11 geographical areas for which there were at least ten respondents (Table 3.2). This sample, designated S2 (or "the main sample"), was the sample on which all statistical analyses were performed.

⁴ Areas of Europe marked with an asterisk were broken down into Northern and South Central Europe based on small target group individual studies that conflicted with the results of the WHO investigations (Jette, 1997; Lundgren-Lindquist and Jette, 1990; Repetto et al., 2002). While WHO categorization was followed it was necessary to cite the alternate results.

Geographic Area of Training	n	%
Africa ⁵	11	4.7
Australia	27	11.4
Egypt	12	5.1
India	54	22.9
Ireland	26	11.0
Philippines	13	5.5
Poland	16	6.8
Scotland	25	10.6
Singapore	10	4.2
South Africa	32	13.5
Sri Lanka	10	4.2
Total	236	100.0

Gender

Information on gender was provided by 166 (70%) of the 236 physicians in S2. Of those for whom gender information was available, 35% were female, 65% male. Table 3.3 presents a breakdown of gender by geographical area.

As the Table indicates, male and female responses were equal, or nearly so, in Australia, Scotland, and Africa. Males dominated among the respondents from India (69%) and Ireland (77%), whereas females dominated (67%) among respondents from the Philippines.

⁵ Based on criteria from the WHO Country Classification Countries Ghana, Nigeria, Ethiopia, Uganda and Kenya were collapsed into the geographical area of Africa (WHO, 2002b). See footnotes 12, 14 and 16 in Chapter 2.

Country	male	female	total	male %	female %
Africa	3	3	6	50	50
Australia	14	10	24	58	42
Egypt	8	2	10	80	20
India	18	8	26	69	31
Ireland	17	5	22	77	23
Philippines	4	8	12	33	67
Poland	9	6	15	60	40
S. Africa	20	6	26	77	23
Scotland	15	10	25	60	40
Total	108	58	166	65	35

Cohort

Year of Graduation	n	%
1950 - 1959	6	3.0
1960 - 1969	70	34.8
1970 - 1979	87	43.2
1980 - 1989	38	19.0
Total	201	100.0

Table 3.4 presents the graduation cohort, by decade, of the respondents in the S2 sample. Information on the date of graduation from medical school was available for 201 (85%) of the S2 respondents. Nearly all (97%) of the respondents graduated from medical school between 1960 and 1989.

Table 3.5 presents a break down of gender by decade of graduation for the 166 respondents for whom both data were available.

Year of Graduation	male	female	Total	male %	female%
1950 - 1959	3	2	5	60	40
1960 - 1969	39	22	61	63.9	36.1
1970 - 1979	51	18	69	73.9	26.1
1980 - 1989	19	12	31	61.3	38.7
Total	112	54	166	68	32

As the Table indicates, the substantial majority of physicians (78%) graduated during the period between 1960 and 1979. The proportion of female physicians in the sample remained essentially unchanged across the decades. This reflects a much greater willingness of female physicians to respond to the survey, unless it suggests that physician education patterns outside North America were very different from those that obtained here during those decades.

Western	n	%
Australia	25	10.6
Ireland	26	11
Scotland	27	11.4
South Africa	32	13.6
Western Total	110	46.6
non-Western		
Africa	11	4.7
Egypt	12	5.1
India	54	22.8
Philippines	13	5.5
Poland	16	6.8
Singapore	10	4.2
Sri Lanka	10	4.2
Non-Western Total	126	53.3
Grand Total	236	100

Western vs. Non-Western Geographical Areas

Table 3.6 shows the distribution of respondents among Western (technologically developed) and non-Western (technologically less developed) countries. As the Table shows, there is a balanced number of respondents from both categories.

Non-Specialist vs. Specialist

Of the 164 respondents (69.4% of the S2 sample) who provided valid specialty codes, 33% were non-specialists, while 67% were specialists. Table 3.7 presents the breakdown of specialists vs. non-specialists for the 11 geographical areas into which the S2 sample was divided, together with the respective totals and percentages.

Area	Non-specialist		Specialist		Total	
	n	%	n	%	n	%
Africa	0	0.0	4	3.6	4	2.4
Australia	9	16.7	15	13.6	24	14.6
India	9	16.7	25	22.7	34	20.8
Ireland	5	9.2	12	10.9	17	10.4
Egypt	1	1.8	7	6.4	8	4.9
Philippines	4	7.4	4	3.6	8	4.9
Poland	7	13.0	6	5.5	13	7.9
South Africa	9	16.7	9	8.2	18	11.0
Scotland	9	16.7	11	10.0	20	11.4
Singapore	0	0.0	10	9.1	10	12.2
Sri Lanka	1	1.8	7	6.4	8	4.9
Total	54	100.0	110	100.0	164	100.0
Division Totals		32.9		67.1		

Sample		Gender		Cohort	Western vs. Non Western		Non-Specialists vs. Specialty	
Group	n	male	female	1960 - 1979	West	Non	general	specialty
S1	348	67%	33%	61%	29%	71%	33%	67%
S2	236	65%	35%	78%	47%	53%	33%	67%

Table 3.8 summarizes the overall demographic factors that might influence the ranking of IADL domains by physicians in this study. Although the effect by geographical area of medical training/practice is the focus of this study, demographic factors must be investigated before proceeding to test the variability of ranking in IADL domains and compare samples S1 and S2. In both samples, males outnumber females respondents (67 and 65% respectively), the 1960 - 1979 graduation cohort has the highest percent of respondents (61 and 78%), and non-Western physicians (71 and 53%, respectively) and specialists predominate (67 and 67%).

Statistical Methods

Analyses of variance (ANOVA) were used to analyze the IADL rankings derived from the physician questionnaires. The purpose of the procedure was to determine whether IADL domains were ranked in a similar manner within geographical groups and differently across geographical groups.

Analyses of variance (ANOVA) are used in this study to uncover the main effect of a categorical independent variable (geographical area of training or practice, gender, cohort, Western or Non-Western and Specialist and Non-

Specialist) on an interval dependent variable (IADL skill rankings).

While Student *t*-tests were a plausible alternative to the use of the ANOVA in comparing means scores, the analysis of variance test was chosen for the following reasons. While the Student *t*-test is usually done by comparing pairs of means, this method would not provide the same accuracy or multiple comparison characteristic that is provided in a one-way ANOVA. Secondly, the ANOVA requires two *a priori* tests to verify that each member of the geographical groups is representative of an independent random sample from a general population. Moreover, an analysis of the homogeneity of variance is essential in order to demonstrate that the rankings of physicians from different areas are not significantly different⁶. The ANOVA tests whether differences between group means are sufficiently large that the possibility of their occurrence solely by chance can be rejected.

In this study the SPSS (Version 8) software program (Norusis, 1994) was used to make two comparisons for each domain/variable within and between groups. If the group means do not differ significantly, then it is inferred that the independent variable had no effect on the dependent variable.

After all of the individual variables of the IADL were tested for within and between group variability, the variables (considered to be all part of a single instrument or composite scale/index) were tested as one group of within-subject

⁶ Both standard errors plots and Levene tests were run before each analysis of variance was conducted.

factors, compared with between-subject factors or geographical area.

Ultimately, the operative word in this study is variation. Significant differences or variation in rankings between geographical areas would cast serious doubt on the possibility of a universal IADL instrument for physical assessment, and suggest that the traditions and social background of a particular area have an impact on the way physicians rank domains.

□ Chapter 4: Results

Both descriptive and inferential analyses of the data are presented in this chapter. The descriptive analyses involved calculating the means and associated standard errors of physician's rankings as functions of both IADL domain, and of the 11 physician groups in the main sample (S2) sorted by geographical area of training or practice - hereafter referred to as 'geographical areas'.

The inferential analyses involved analyses of variance (ANOVAs). Separate series of one-way ANOVAs were conducted to determine (a) whether there were significant differences in physicians' rankings of individual IADL domains/variables as a function of geographical area, and (b) whether there were significant differences in overall IADL rankings as a function of gender, cohort, Western vs non-Western physicians, and specialist vs non-specialist physicians.

Descriptive Analysis

The overall mean rankings of all twelve IADL variables by the eleven geographical areas are presented in Table 4.1. Keeping in mind that lower scores represent higher rankings of importance, we can see that (with very few exceptions) both the mean and the relative ranks (i.e, 1st, 2nd, 3rd, etc.) of each IADL variable were very similar across geographical areas.

Table 4.2 presents the mean ranking (and standard deviation) for each IADL variable collapsed across geographical areas. The same data are depicted graphically in Figure 4.1. As can be seen from both the Table and the Figure, there was a noticeable difference in the mean rankings given to the 12 IADL domains. The standard deviation values indicate that the variability in rankings within each domain was similar, and fairly low, across domains. The significance of these mean differences was confirmed in a subsequent ANOVA which will be described below.

The graphic display of the means and associated standard errors in Figure 4.1 orders the mean IADL rankings from lowest (most important) to highest (least important). As the Figure suggests, the mean rankings of the 12 IADL domains can be visually grouped into five clusters of variables (identified by surrounding boxes in the Figure). Within each cluster, the standard errors of the means overlap to such an extent that the means would be statistically indistinguishable, while there is little or no overlap in standard errors between clusters.

The leftmost cluster groups the four highest ranked IADL variables: Inside

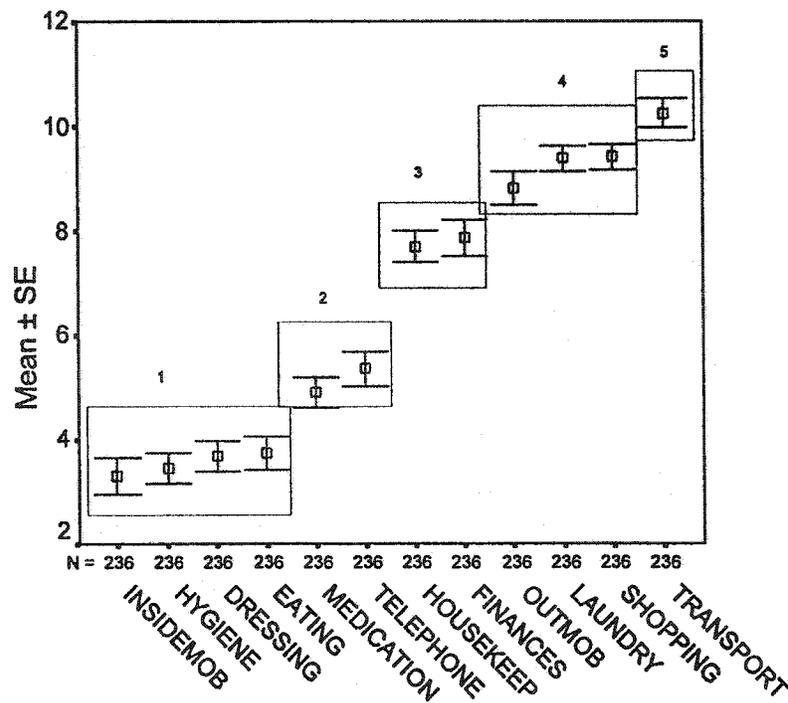
Mobility, Hygiene, Dressing, and Eating. The second cluster includes the two variables Medication and Telephone. The third cluster, clearly separated from the first two, contains the variables Housekeeping and Finance. The fourth cluster contains the variables Outside Mobility, Laundry, and Shopping, while the final cluster consists of the Transportation variable.

Table 4.1: S2 Mean IADL scores by geographical area

Location	Inside Mobility	Hygiene	Dressing	Eating	Meds	Phone	Housekeep	Finance	Outside Mobility	Laundry	Shop	Transport
Africa	2.09	3.36	3.55	4.82	5.00	5.00	7.82	7.64	8.00	8.92	10.00	10.91
Australia	3.33	3.44	3.78	5.00	4.59	4.81	7.89	7.59	8.37	9.44	9.52	9.96
Egypt	2.92	2.67	5.08	3.42	4.00	6.00	7.25	8.00	9.33	9.50	9.17	10.75
India	3.36	3.70	3.27	3.84	5.71	5.93	7.55	7.79	8.57	9.00	9.45	9.82
Ireland	2.71	3.58	4.00	3.96	4.63	5.50	7.88	7.42	9.13	9.33	9.67	10.21
Philippines	5.00	3.38	3.46	3.08	3.85	5.77	7.92	6.92	9.23	9.54	9.85	10.00
Poland	3.62	3.25	5.38	2.81	4.75	5.38	7.00	8.44	9.69	10.06	9.31	9.63
S Africa	2.94	3.31	3.66	3.25	4.81	5.13	8.00	8.34	8.75	10.09	9.19	10.56
Scotland	3.32	3.68	3.16	3.24	6.76	4.96	7.88	8.36	9.44	8.88	9.08	11.06
Singapore	3.40	3.50	5.20	4.10	4.60	5.70	7.90	6.90	7.70	9.80	9.00	10.30
Sri Lanka	4.60	3.00	3.20	3.60	5.20	3.90	7.50	8.90	9.00	8.50	9.90	10.70

Table 4.2: S2 Overall order of IADL variables (domains) by mean score

Functional Variables	\bar{x}	SD
Inside Mobility	3.31	2.6
Hygiene	3.45	2.23
Dressing	3.69	2.18
Eating	3.75	2.56
Medication	5.11	3.71
Telephone	5.36	2.56
Housekeeping	7.71	2.29
Finances	7.87	2.5
Outside Mobility	8.83	1.88
Laundry	9.4	1.88
Shopping	9.43	1.98
Transportation	10.26	2.15

Figure 4.1: Mean Rankings of IADL variables (domains) (± 1 standard error) collapsed across geographical area. (Overall n=236)

A series of one-way ANOVAs, one for each IADL domain, was performed on the data shown in Table 4.1. This analysis of variance was used to determine whether there were significant differences across geographical areas in the mean importance ranking given to each IADL domain. Because multiple comparisons were being made, type-one error rate was controlled by requiring each comparison to meet a $p < .01$ standard for significance. The results of these ANOVA's are presented in Table 4.3.

As the table indicates, there were no significant differences between geographical areas in the mean rankings of any of the 12 IADL variables. In 6 of the comparisons, the F ratio was less than 1.0, indicating greater variability in ranking within each geographical area than between groups.

Table 4.3: S2 One-way ANOVA summary for comparison of all 12 domains (variables) across geographical areas (n=236)

Source		Sum of Squares	D.F.	Mean Square	F.Ratio.	F.Prob.
INSIDEMOB	Between Groups	86.91	10	8.69	1.3	.233
	Within Groups	1507.51	225	6.7		
	Total	1594.42	235			
HYGIENE	Between Groups	15.95	10	1.59	.312	.977
	Within Groups	1148.44	225	5.1		
	Total	1164.39	235			
DRESSING	Between Groups	71.18	10	7.2	1.53	.128
	Within Groups	1043.24	225	4.64		
	Total	1114.42	235			
EATING	Between Groups	93.46	10	9.35	1.63	.099
	Within Groups	1288.27	225	5.73		
	Total	1381.75	235			
MEDICATION	Between Groups	68.15	10	6.81	1.46	.157
	Within Groups	1052.98	225	4.68		
	Total	1121.13	235			
TELEPHONE	Between Groups	63.35	10	6.33	.965	.475
	Within Groups	1477.31	225	6.57		
	Total	1540.66	235			
HOUSEKEEP	Between Groups	18.43	10	1.84	.340	.969
	Within Groups	1217.98	225	5.41		
	Total	1236.41	235			
FINANCES	Between Groups	58.22	10	5.82	.780	.648
	Within Groups	1679.96	225	7.47		
	Total	1738.19	235			
OUTMOB	Between Groups	58.57	10	5.86	.936	0.501
	Within Groups	1407.31	225	6.25		
	Total	1465.88	235			
LAUNDRY	Between Groups	50.3	10	5.03	1.45	0.161
	Within Groups	782.26	225	3.48		
	Total	832.56	235			
SHOPPING	Between Groups	17.45	10	1.745	0.433	.929
	Within Groups	906.32	225	4.028		
	Total	923.77	235			
TRANSPORT	Between Groups	49.75	10	4.975	1.08	.380
	Within Groups	1037.96	225	4.613		
	Total	1087.71	235			

Demographic Variables

Additional statistical tests were conducted to determine whether any of the four available demographic variables (gender, early or late-cohort graduation from medical school, Western vs. non-Western geographical areas, and specialists vs non-specialists) were related to IADL rankings.

Gender

With respect to gender, Figures 4.2 and 4.3 present the mean rankings, and ± 1 standard error bars, of the 12 IADL variables by male physicians (Figure 4.2) and female physicians (Figure 4.3). Gender information was available for only 198 of the physicians in S2: 134 males and 64 females.

Separate figures are provided for the two genders (and for all other binary comparisons) since the substantial overlap in mean group ratings for each IADL item would make the points difficult to distinguish visually on a single figure.

The results of the ANOVA conducted on these data are presented in Table 4.4

Figure 4.2: S2 Standard Error of the Mean for Male Physicians (n=134)

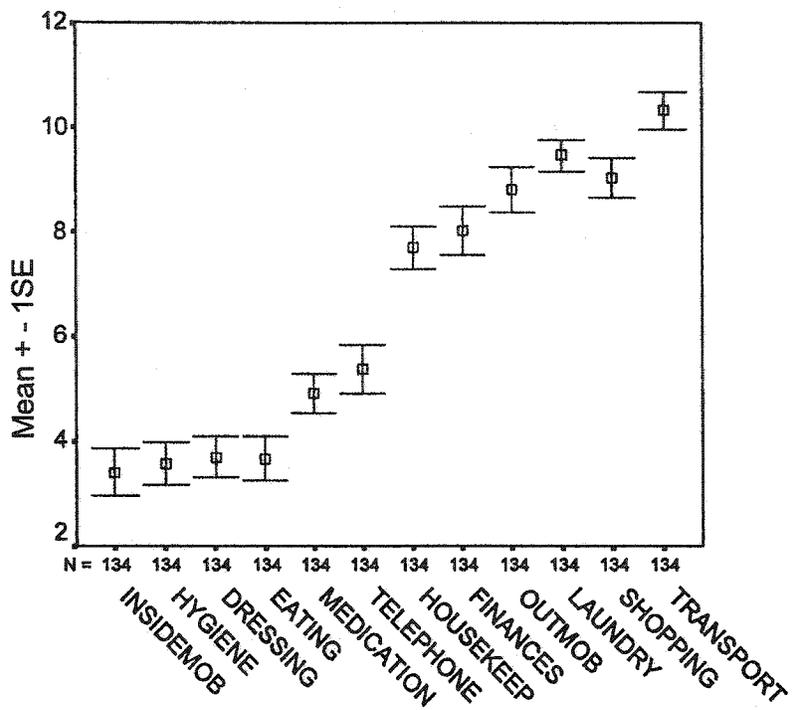


Figure 4.3: S2 Standard Error of the Mean for Female Physicians (n=64)

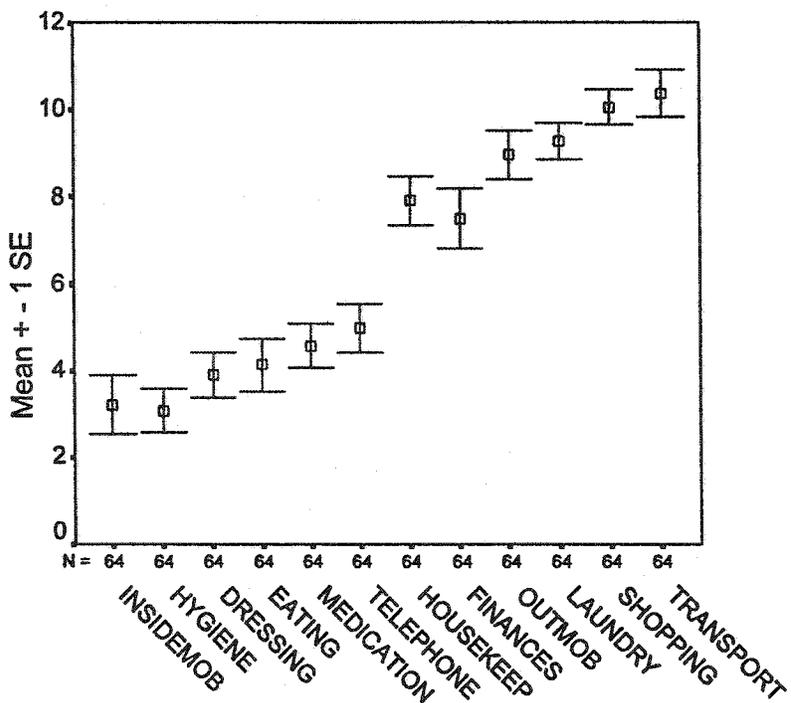


Table 4.4: S2 One-way ANOVA summary for comparison of gender means (n =198)

Source		Sum of Squares	DF	Mean Square	F	Sig.
DRESSING	Between Groups	1.951	1	1.951	.400	.528
	Within Groups	955.893	196	4.877		
	Total	957.843	197			
TELEPHONE	Between Groups	6.297	1	6.297	.966	.327
	Within Groups	1278.066	196	6.521		
	Total	1284.364	197			
EATING	Between Groups	9.832	1	9.832	1.628	.203
	Within Groups	1183.622	196	6.039		
	Total	1193.455	197			
FINANCES	Between Groups	10.798	1	10.798	1.495	.223
	Within Groups	1415.955	196	7.224		
	Total	1426.753	197			
LAUNDRY	Between Groups	1.426	1	1.426	.453	.501
	Within Groups	616.251	196	3.144		
	Total	617.677	197			
OUTMOB	Between Groups	1.255	1	1.255	.206	.650
	Within Groups	1193.497	196	6.089		
	Total	1194.753	197			
HYGIENE	Between Groups	10.677	1	10.677	2.163	.143
	Within Groups	967.363	196	4.936		
	Total	978.040	197			
SHOPPING	Between Groups	45.522	1	45.522	11.460	.001
	Within Groups	778.563	196	3.972		
	Total	824.086	197			
MEDICATION	Between Groups	4.783	1	4.783	1.046	.308
	Within Groups	896.535	196	4.574		
	Total	901.318	197			
HOUSEKEEP	Between Groups	1.951	1	1.951	.374	.541
	Within Groups	1021.893	196	5.214		
	Total	1023.843	197			
TRANSPORT	Between Groups	6.649E-02	1	6.649E-02	.015	.904
	Within Groups	886.888	196	4.525		
	Total	886.955	197			
INSIDEMOB	Between Groups	1.353	1	1.353	.193	.661
	Within Groups	1374.975	196	7.015		
	Total	1376.328	197			

There were no significant differences between male and female physicians in any mean IADL rankings except for Shopping, which male physicians rated as more important (mean ranking = 9.04) than did female physicians (mean ranking = 10.06).

Graduation Cohort

One of the demographic factors that might be related to the influence of cultural factors on physicians' IADL rankings is the length of time since graduation from medical school. This variable is a proxy for the physician's biological age, the physician's experience, and for the particular era during which medical training was completed.

The initial plan was to compare mean rankings of four cohorts of physicians: those graduating from medical school in each decade from the 1950s to the 1980s, inclusive. Table 4.5 shows the number of physicians in the S2 sample who fell into each of those cohorts, and the proportion of the S2 sample each cohort represented. As the table indicates, graduation dates were not available for 35 of the 236 physicians, leaving a total sample size of 201.

Given the large range of sample sizes in the four cohorts (ranging from 6 subjects in the 1950s cohort to 87 in the 1970s cohort), it was decided to collapse the data into two cohorts for the purpose of analysis: Early graduates (between 1950 and 1969), and Late graduates (between 1970 and 1989). The makeup of the two groups is shown in Table 4.6.

Figures 4.4 and 4.5 present the mean rankings of all IADL variables for

Early and Late graduates, respectively. The results of the ANOVA comparing these two sets of rankings is displayed in Table 4.7. The analysis revealed no significant differences between graduation cohorts in mean ranking of any IADL variables.

Table 4.5: Number of physicians and percent of sample, by graduation cohort

Graduation Cohort	Number	% of sample
1950s	6	2.5
1960s	70	29.7
1970s	87	36.9
1980s	38	16.1
Missing	35	14.8
Total	236	100

Table 4.6: Number of physicians by collapsed graduation cohort category

Graduation Cohort	Number	% of Sample
1950-69	76	37.8
1970-89	125	62.2
Total	201	100

Figure 4.4: S2 Standard Error of the Mean for Early Cohort (1950-69; n=76)

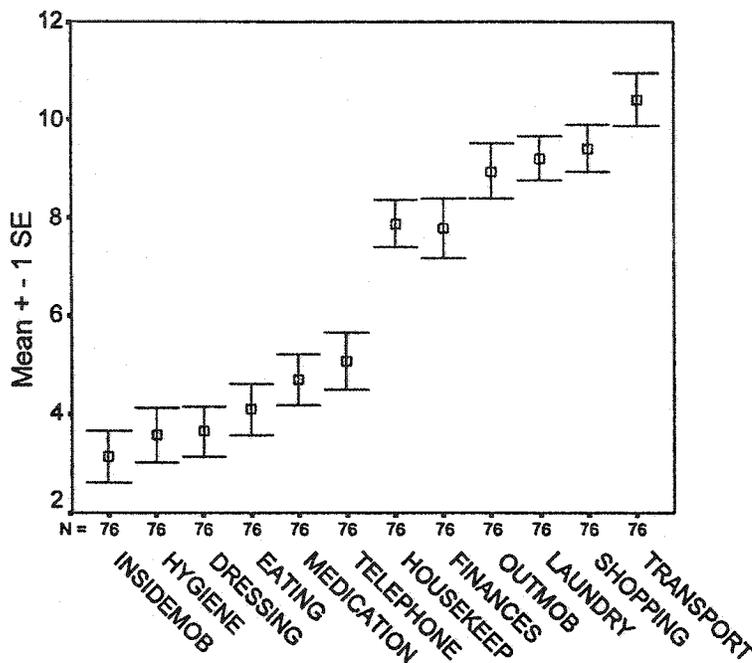


Figure 4.5: S2 Standard Error of the Mean for Late Cohort (1970-89; n=125)

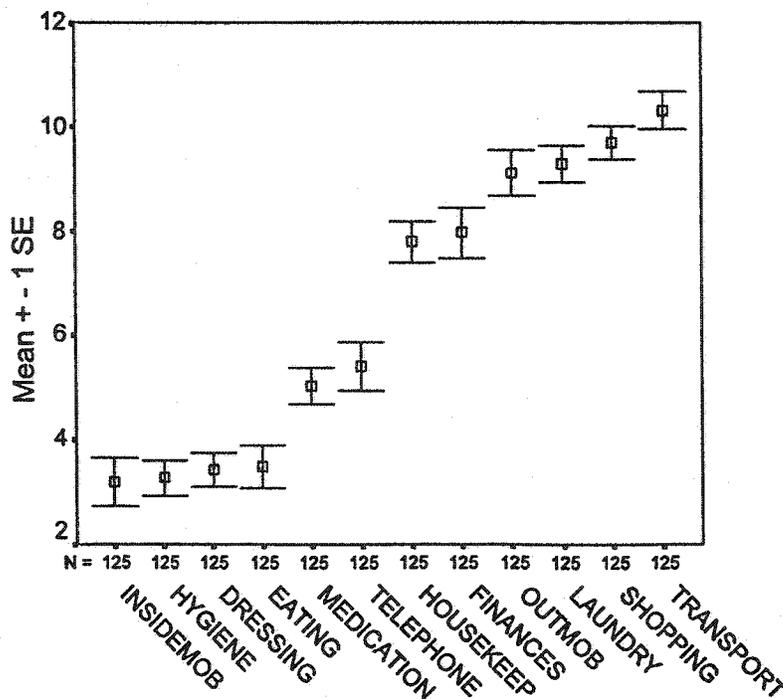


Table 4.7: S2 One-Way ANOVA summary for comparison of graduation cohort means (n=201)

Source		Sum of Squares	DF	Mean Square	F. Ratio	F.Prob.
INSIDEMOB	Between Groups	8.92	1	8.92	1.306	.254
	Within Groups	1358.7	199	6.83		
	Total	1367.62	200			
HYGIENE	Between Groups	13.98	1	13.98	3.076	.081
	Within Groups	904.17	199	4.54		
	Total	918.15	200			
DRESSING	Between Groups	12.95	1	12.95	3.066	.081
	Within Groups	840.32	199	4.22		
	Total	853.26	200			
EATING	Between Groups	6.66	1	6.66	1.141	.287
	Within Groups	1160.61	199	5.83		
	Total	1167.26	200			
MEDICATION	Between Groups	5.89	1	5.89	1.329	.250
	Within Groups	881.7	199	4.43		
	Total	887.59	200			
TELEPHONE	Between Groups	0.885	1	0.885	.134	.715
	Within Groups	1312.74	199	6.6		
	Total	1313.62	200			
HOUSEKEEP	Between Groups	5.45	1	5.45	1.029	.312
	Within Groups	1052.88	199	5.29		
	Total	1058.33	200			
FINANCES	Between Groups	0.631	1	.631	.085	.771
	Within Groups	1474.65	199	7.41		
	Total	1475.28	200			
OUTMOB	Between Groups	13.84	1	13.84	2.307	.130
	Within Groups	1193.73	199	6		
	Total	1207.56	200			
LAUNDRY	Between Groups	1.97	1	1.97	.585	.445
	Within Groups	669.05	199	3.36		
	Total	671.01	200			
SHOPPING	Between Groups	9.18	1	9.18	2.623	.107
	Within Groups	696.78	199	3.5		
	Total	705.97	200			
TRANSPORT	Between Groups	1.59	1	1.59	.328	.567
	Within Groups	962.96	199	4.84		
	Total	964.55	200			

Western vs Non-Western

An ANOVA was conducted to determine whether Non-Western physicians ($n=78$) would rank the IADL domains differently than Western physicians ($n=158$). The composition of these two categories, as described in the Methods chapter, differentiates primarily between technologically advanced and non-technologically advanced areas.

The mean ratings for each IADL variable (± 1 standard error) by Western and Non-Western physicians are shown in Figure 4.6 and 4.7, respectively ($n=236$). The results of this analysis, presented in Table 4.8, indicate no significant differences in ranking of any IADL variable between these two physician groups. In most cases, variability in ranking was as high or higher within the two groups as between the groups.

Non-specialists vs. Specialists

The final demographic variable to be evaluated was medical specialization. The 165 physicians for which information was available were divided into two groups, non-Specialist ($n=55$) or Specialist ($n=110$). Figures 4.8 and 4.9 show the mean IADL variable rankings (± 1 standard error) for Specialists and non-Specialists, respectively. The results of this analysis, presented in Table 4.8, indicate no significant differences between Specialists and non-Specialists in the ranking of any of the IADL variables.

Figure 4.6: S2 Standard error of the mean for Western areas of training (n=78)

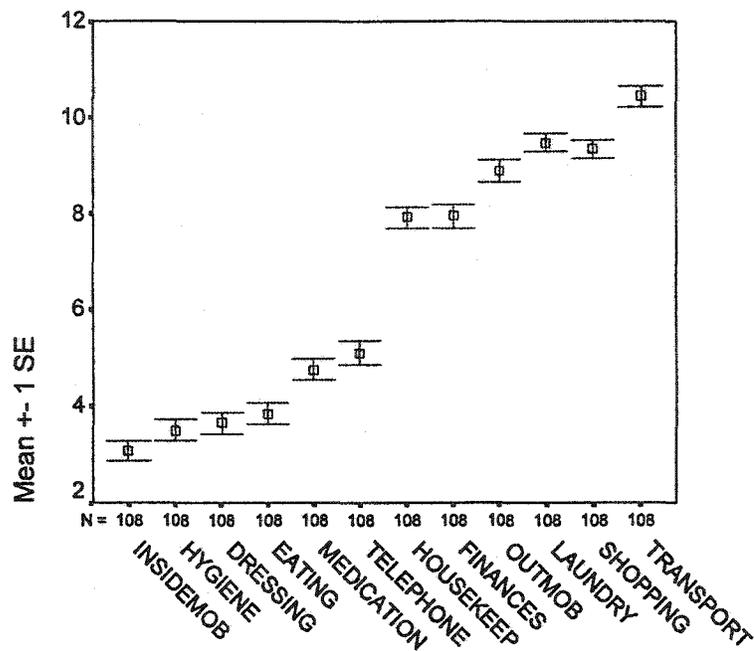


Figure 4.7: S2 Standard error of the mean for Non-Western training areas (n=128)

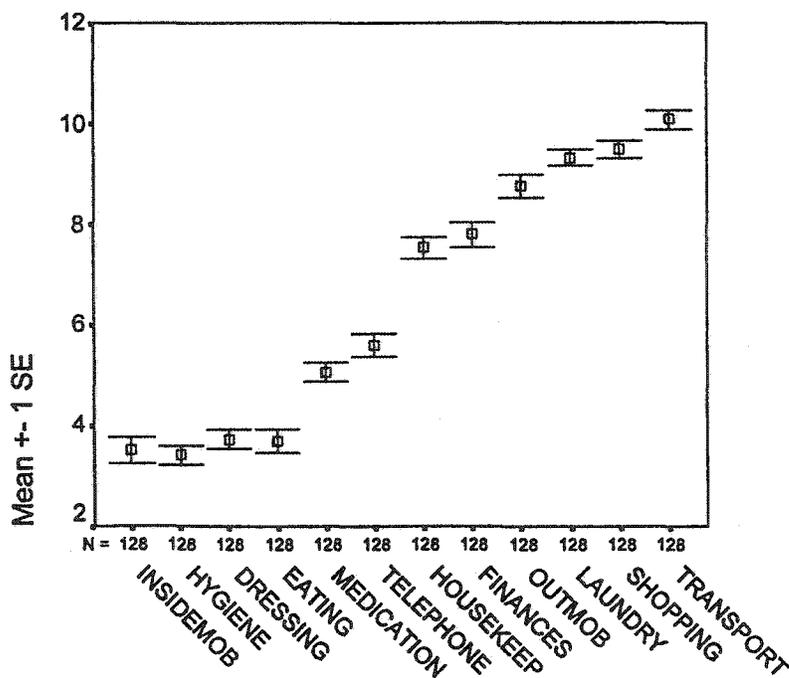


Table 4.8: S2 One-way ANOVA summary for comparison of Western and Non - Western means (n=236)

Source		Sum of Squares	DF	Mean Square	F.Ratio	F. Prob
INSIDEMOB	Between Groups	3.54	1	3.54	.521	.471
	Within Groups	1590.88	234	6.8		
	Total	1594.42	235			
HYGIENE	Between Groups	1.52	1	1.52	.307	.580
	Within Groups	1162.86	234	4.97		
	Total	1164.39	235			
DRESSING	Between Groups	0.24	1	.237	.050	.824
	Within Groups	1114.18	234	4.76		
	Total	1114.42	235			
EATING	Between Groups	12.8	1	12.8	2.19	.140
	Within Groups	1368.95	234	5.85		
	Total	1381.75	235			
MEDICATION	Between Groups	4.51	1	4.51	.944	.332
	Within Groups	1116.62	234	4.77		
	Total	1121.13	235			
TELEPHONE	Between Groups	9.13	1	9.13	1.4	.239
	Within Groups	1531.53	234	6.54		
	Total	1540.66	235			
HOUSEKEEP	Between Groups	3.23	1	3.23	.613	.435
	Within Groups	1233.18	234	5.27		
	Total	1236.41	235			
FINANCES	Between Groups	0.78	1	0.78	.105	.746
	Within Groups	1737.41	234	7.42		
	Total	1738.19	235			
OUTMOB	Between Groups	2.02	1	2.02	.323	.570
	Within Groups	1463.86	234	6.26		
	Total	1465.88	235			
LAUNDRY	Between Groups	3.42	1	3.42	.965	.327
	Within Groups	829.14	234	3.54		
	Total	832.56	235			
SHOPPING	Between Groups	5.36	1	5.36	.001	.971
	Within Groups	923.77	234	3.95		
	Total	923.77	235			
TRANSPORT	Between Groups	2.36	1	2.36	.509	.476
	Within Groups	1085.35	234	4.64		
	Total	1087.71	235			

Figure 4.8: S2 Standard error of the mean for Non-Specialists (n=55)

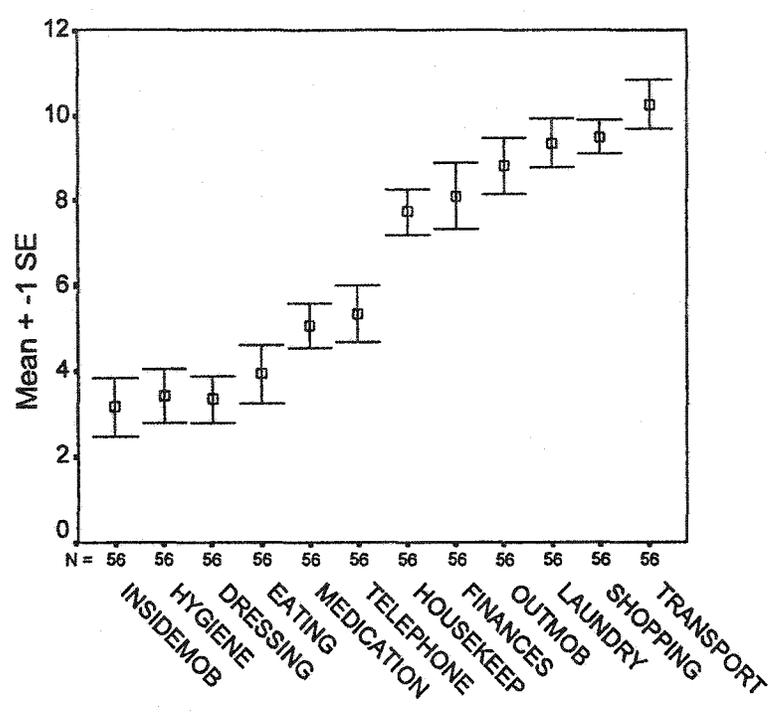


Figure 4.9: Standard error of the mean for Specialists (n=110)

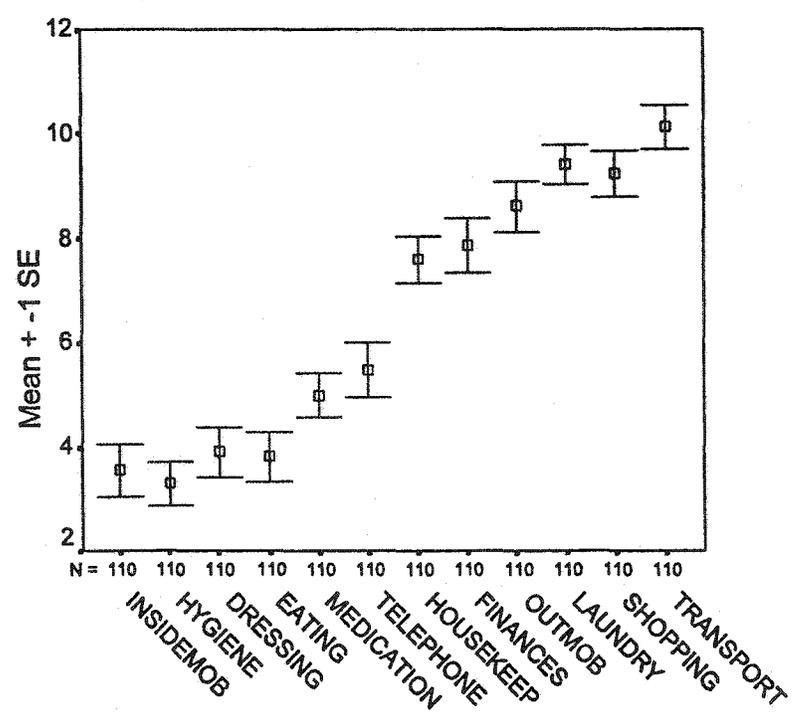


Table 4.9: S2 One-way ANOVA summary for comparison of Non-Specialists and Specialists means (n=165)

Source		Sum of Squares	DF	Mean Square	F	Sig.
DRESSING	Between Groups	11.276	1	11.276	2.006	.159
	Within Groups	916.336	163	5.622		
	Total	927.612	164			
TELEPHONE	Between Groups	.367	1	.367	.051	.822
	Within Groups	1178.082	163	7.227		
	Total	1178.448	164			
EATING	Between Groups	7.576E-02	1	7.576	.012	.913
	Within Groups	1032.991	163	6.337		
	Total	1033.067	164			
FINANCES	Between Groups	5.867	1	5.867	.748	.388
	Within Groups	1277.745	163	7.839		
	Total	1283.612	164			
LAUNDRY	Between Groups	.876	1	.876	.214	.645
	Within Groups	668.518	163	4.101		
	Total	669.394	164			
OUTMOB	Between Groups	6.982	1	6.982	1.097	.296
	Within Groups	1037.345	163	6.364		
	Total	1044.327	164			
HYGIENE	Between Groups	2.209	1	2.209	.423	.516
	Within Groups	851.100	163	5.221		
	Total	853.309	164			
SHOPPING	Between Groups	2.727	1	2.727	.639	.425
	Within Groups	695.600	163	4.267		
	Total	698.327	164			
MEDICATION	Between Groups	3.927	1	3.927	.857	.356
	Within Groups	747.018	163	4.583		
	Total	750.945	164			
HOUSEKEEP	Between Groups	.512	1	.512	.104	.748
	Within Groups	803.100	163	4.927		
	Total	803.612	164			
TRANSPORT	Between Groups	.436	1	.436	.089	.765
	Within Groups	796.145	163	4.884		
	Total	796.582	164			
INSIDEMOB	Between Groups	3.503	1	3.503	.504	.479
	Within Groups	1133.200	163	6.952		
	Total	1136.703	164			

Geographical Areas

The most important analysis of the data compared mean IADL rankings across the geographical areas shown in Table 4.1. In alphabetical order, these were Africa, Australia, Egypt, India, Ireland, Philippines, Poland, South Africa, Scotland, Singapore, and Sri Lanka.

For the purposes of this analysis, the 12 IADL variables were treated as repeated measures of a single variable - physical function - and thus as a within-subjects factor. The IADL variables were entered into the analysis (conducted using the SPSS General Linear Models program for repeated measures) in the order in which they appeared on the questionnaire. The results of this analysis are presented in Table 4.10.

Table 4.10: ANOVA of rankings by IADL variable and geographical area

Source of Variance	Sum of Squares	D.F.	Mean Square	F.Ratio	P value
IADL	14183.41	11	1289.4	219.48	<u>0</u>
Geographic Area	0.162	10	0.0162	0.38	0.954
IADL x GA	651.56	110	5.92	1.01	0.459
Error (between)	9.58	225	0.043		
Error (within)	14539.98	2475	5.88		

As the Table indicates, there were no significant differences in IADL rankings as a function of Geographical Area, and no significant interaction between IADL domains and Geographical Area. Confirming an earlier analysis, there were highly significant differences in mean rankings between IADL domains. These results indicate that physician's overall rankings of IADL domains do not differ significantly as a function of geographical area of training, and (given the absence of an IADL x GA interaction) that the pattern of IADL rankings does not differ significantly from one geographical area to another.

Summary

The results of all analyses, descriptive and inferential, indicate two main findings.

The first is that there is considerable consistency across physicians trained in a range of geographical areas concerning the relative importance that should be accorded the various IADL variables in the assessment of physical function and independence in the elderly. When collapsed over geographical areas, the differences in mean ranking given to the 12 IADL variables is highly significant, and the variability in ranking for each IADL variable, as indicated by the standard error of the mean, is both fairly small, and similar for nearly all variables.

The second is that there are no differences in the mean ranking of IADL domains as a function of any of the available demographic variables. There were no significant differences in mean IADL rankings across the 11

geographical areas of training or practice, and none when those areas were collapsed into more (Western) and less (non-Western) economically advanced categories. There were likewise no significant differences in mean IADL rankings as a function of physician gender, medical graduate cohort, or specialist versus non-specialist status. The following chapter considers the implications of these and other findings.

□ Chapter 5: Discussion Measurement, Function and Independence

In this chapter, I describe the relationship of my primary findings to the current evidence concerning the use and validity of the IADL at the population level. Specifically, I examine how the results support a particular trend in the current literature. I then consider how far the overall results of the study can be generalized and their implications for future research on successful aging and the factors that contribute to it. Finally, I address the relevance of this study both for current theory and practice, and for the use of the IADL to identify select survivors (independent successful agers) in cross-cultural populations.

Description of Primary Findings: Overview of Analyses

There are two major findings in this study. The first is that there is overall agreement on the relative importance of the 12 IADL domains. Table 4.1 (in Chapter 4) presents all 12 skills and 11 geographical areas demonstrating the homogeneity in ranking.

Keeping in mind that lower scores represent higher rankings, we can see that (with very few exceptions) both the mean, standard error, and relative rankings (i.e., 1st, 2nd, 3rd, etc.) of each IADL variable were very similar across

geographical areas.

Collapsed across geographical areas, the mean rankings for mobility (3.31), hygiene (3.45), dressing (3.69), and eating (3.75), are all well below the median ranking, while rankings for medication and telephone, are just below the median. Finances, housekeeping (7.71 to 7.87) outside mobility (8.83), laundry (9.40), shopping (9.43), and transportation (10.36) are all ranked well above the median.

This relative agreement in rankings was confirmed by statistical analyses which indicated that, when collapsed over geographical areas, differences in mean rankings of the 12 IADL variables are highly significant. Moreover, the variability in rankings for individual IADL variables, as indicated by the standard errors of the mean, are both fairly small, and similar for nearly all variables.

Secondly, and more importantly, the data reveal no interaction between rankings and geographical area; i.e., there is no significant effect of geographical area of training or practice on the relative ranking of IADL items.

These findings have implications for the question of whether criteria for independent living in the realm of physical function - as seen by physicians - differ across cultures, suggesting that they do not.

The relevant literature reveals general agreement on the cultural universality of the ADL domains (e.g., Katz et. al., 1963; Kane and Kane, 1981, 2000), but considerable disagreement on the universality of the 'higher' (more abstract) IADL domains (see Appendix III for definitions of ADL and IADL).

While many researchers suggest that the ADL is a universally applicable

measure of function, others argue that the individual skills assessed by the IADL may not be 'culturally sensitive', and that the instrument cannot be used to assess and compare function and disability in culturally or geographically diverse sub-populations (Jette et al., 1996; Avlund, 1997; Beall 1984; Beall and Weitz, 1989; Beall and Eckert, 1986; Barker, 1989; 1994; Rubinstein, 1990; Rubinstein and Kramer, 1994). This would be problematic if true, since the oldest old of our population, who show little or no functional loss (disability), are often members of other cultures or members of remote populations.

The results of the present study, combined with that of previous studies (Heikkinen et al., 1983; Goto et al., 1996; Shanas and Maddox, 1976; Shanas, 1974; Shanas, 1971; Shanas et al., 1968; Ferucci et al., 1998; Manton, 1989; WHO, 1984; Lee and Tan, 1997; al-Mahadi and Elzubier, 1997; Gibson and Jackson, 1992), support the contention that the IADL can be used as a general measure of function, at the population level.

While individual questions from the IADL domains have been, and continue to be, used to assess physical function across culturally disparate populations, the present study is one of the first meaningful attempts to assess the universality of the IADL scale domains themselves.

Two possible reasons why a study of this kind has not been attempted before might be the task of organizing a disparate literature on physical function, and the difficulty of dealing with the complexity of existing IADL instruments. During the 1980s there was an increase in the number of IADL instruments to keep up with the increase in studies involving clinical and population

measurement of the aged. More instruments meant more tasks were added to the existing domains (McDowell and Newell, 1996; Branch and Meyers, 1987). For example, detailed tasks such as the ability to cook bacon and eggs required a more complex answer than 'can you eat or not' (e.g. domain is eating), and would seem *a priori* to be less likely to apply across cultures.

The inflexibility of an instrument with complex tasks within domains is demonstrated by Goto et al. (1996) who attacked the question of cultural sensitivity by examining inter-rater reliability in functional assessment by occupational therapists from different cultural backgrounds. No difference was found in inter-rater reliability as a function of either the respondent's or the rater's cultural background.

As a test of the cultural sensitivity of the IADL, Goto et al.'s study had several weaknesses: The Assessment of Motor and Process Skills (AMPS, Fisher, 1993) instrument used in the study included few IADL skills, and most were very task-specific and of questionable generality. For example, respondents' ability to feed themselves was assessed by asking them to prepare a breakfast of bacon and eggs. This task-oriented breakdown is needed in clinical practice but contravenes the goal of using the instrument developed in this study for functional assessment at the population level.

Just as domains can be broken down into individual tasks, tasks can be further reduced to separate motor skills. Just recently occupational therapists have engaged in research to study all of the individual motor skills needed for an individual to transfer from the bed to a chair. In total there are 24 motor skills

involved in this function (Streiner, 2002).

Would these tasks and perhaps motor skills be ranked differently within different geographical areas? Would the results be different from the homogeneous ranking of simple domains found in this study? While Beall (an anthropologist) argues that IADL domains (e.g. eating, finances, shopping) may be culturally sensitive, the present study provides evidence to the contrary, as geographical location had no effect on physicians' ranking of the general domains of the IADL (1984). However given the complexity of surveying individual tasks of the domains, Beall's argument would probably be credible. For example not all people prepare and eat bacon and eggs (1981).

From the anthropological perspective, we are interested in questions that relate to variability both between and within geographic areas: Are there differences between geographical areas in the perceived importance of the IADL domains or skills? Is there consistency or consensus within geographic areas in ranking the relative importance of the IADL skills or domains? Evidence in this study has satisfied this type of inquiry. There is no difference in physicians' ranking of domains between assorted geographical areas. However, there may be a difference in ranking of individual tasks. Motor skills are beyond the purview of anthropological study and perhaps warrant biomedical investigation.

Literature on Descriptive Order of IADL Domains

The literature on assessment of physical function describes the order in which both non-physicians and physicians rank the order of domains. The physician ranking category is dominated by the work of Katz and his colleagues

(Spector et al., 1987; Katz et al., 1963).

The so-called ADL self-care skills/domains¹, which include hygiene, dressing, transfer (mobility) and eating, are assumed by Katz to be 'vegetative domains' largely under 'biological control' and independent of environmental influence. Katz hypothesizes that these ADL domains are developmentally 'primitive', appearing before, and being prerequisite to, other more advanced physical skills. In contrast, IADL domains are thought to be secondary, dependent in part on capacities needed for the ADL domains, and much more heavily dependent for their development and expression on the effects of social environment, including culture. (Katz et al., 1963).

Consistent with Katz' hypothesis, the basic ADL domains were ranked by the physicians in the present study as the most important skills for assessing independence in the elderly, while IADL domains were consistently ranked as less important for assessing independence.

Unfortunately no other studies have asked physicians to rank IADL domains in order of importance. However there is a literature on assessing older individuals based on ranking of the relative difficulty of performing an IADL. Both physicians and non-physicians have been surveyed and their assessments are similar. Non-physicians who did IADL self assessments typically ranked inside mobility high in a three-country study by Shanas' (1963). This self-

¹ Domains and skills are often used interchangeably, however domains are one word descriptors that summarize an infinite number of functions may be part of a particular domain.

assessment or self-report study revealed lack of mobility to be the primary index of dependence.

According to Fillenbaum (1990) the ADL [sic] (IADL) skills² can be grouped into three types of skills: mobility, instrumental and physical skills. All three types of skills are equally important. Mobility skills refer to ability to travel or take transportation as well as both inside and outside mobility. Instrumental skills refer to domestic tasks (shopping, cooking, cleaning, and handling personal finance). The most basic physical ADL skills are bathing, eating, dressing, and grooming. Evidence from this study therefore supports the argument of Fillenbaum, Katz (Spector et al., 1987) and Shanas (1963) on the importance of basic ADL skills. Not only are these skills important, but WHO (1984) argues that these skills are among the first to be affected with advancing age, (WHO results from British, Danish, American and Israeli studies, 1984³).

Inferential analyses order

As Figure 4.1 indicates, the ADL skills of inside mobility, eating, hygiene and dressing were ranked as the most important in determining independence. The placement of inside mobility in this highest ranked cluster may indicate that physicians consider inside mobility a prerequisite for the performance of the

² As explained earlier in this thesis, researchers often refer to the entire set of IADL skills as the 'ADL'. Hence not making a clear distinction between self-care (ADL) skills and the higher level community independence skills or IADLs.

³ 'Inside mobility' is a collapsed domain, as discussed in Chapter 3. As used by occupational therapists, 'mobility' is a broad general term that can be broken down into a multitude of motor skills. Outside mobility is a proxy for outdoor movements such as gardening.

other clusters of skills: those who are able to move about are better able to toilet, dress and feed themselves.

A finer-grained ranking of these ADL skills is not possible, since the mean rankings within this cluster are statistically indistinguishable. Although the data from the present study do not permit any conclusions about a possible hierarchical relationship among ADL skills, they do suggest a hierarchical arrangement of IADL skills: Medication and telephone were statistically indistinguishable as part of a cluster ranked as less important than the ADL cluster, but more important than housekeeping and finances. As a final cluster, outside mobility, laundry and shopping were ranked as less important than housekeeping and finances, but more important than transportation.

Lack of Demographic Effect on Rank Order of IADL

In the present study, neither geographical area (the proxy for culture) nor physician gender, nor specialist vs non-specialist status was related to the ranking of IADL skills. Given the unique design of the present study, and the fact that there are no prior studies that survey physicians with respect to the ranked importance of ADL or IADL skills, it is difficult to compare these findings with related results from the existing literature.

For example, although Goto et al. (1996) reported high inter-rater reliability among culturally diverse occupational therapists, a result consistent with those of the present study, the instrument used by Goto et al. included very few IADL skills. Likewise, although several studies have reported gender bias in rating the importance of certain IADLs (La Plante, 1991; Lawton, 1972; Kane and Kane,

1981; Johnson and Wolinsky, 1994), these studies surveyed the elderly themselves rather than physicians and are therefore not directly comparable to the present study.

Similarly, though Beall and Eckert (1986) suggest the existence of bias when we compare IADLs from technologically advanced (Western) societies and non-technologically advanced (non-Western) societies, they provide no empirical evidence to support that contention.

Implications of the Study Findings on Physical Function Assessment

Theoretical implications.

While there are four major disciplines that study the process of aging, they all have their own individual methodology and theoretical approach. By using a quantitative methodology approach in this study and incorporating concepts, principles and domains from the other disciplines, the evidence in this study can be used across disciplines. The IADL domains can be used as a foundation for mixed methodology to stimulate not only interdisciplinary research but theoretical integration.

For the purposes of this study the four disciplines were divided by their approach to theory and methodology. The two descriptive categories selected were 'micro' and 'macro' approaches to the study of aging. Gerontological, epidemiological, and demographic researchers tend to use the IADL instrument to address positivistic theoretical models of aging. Hence they were categorized

as 'micro' theoretical models representing a reductionist view of aging.

Compared with the other disciplines, gerontology (to include biomedicine) focuses more closely on pathology, and has tended to use the IADL instrument as an outcome measure for disease, and as a measure of incremental change in the health of individual body parts and systems. The sub-discipline in demography that studies aging also focuses on prevalence and prediction of disability in old age. Epidemiology is more difficult to categorize. Many epidemiologists mentioned in this study have adopted a more holistic view of aging. Nevertheless this discipline cannot be categorized as truly holistic in the same manner as one would classify anthropology.

Although anthropology generally takes a holistic approach to the study of aging, it bears a large burden in supporting its holistic view of humanity. The holistic perspective includes many themes, concepts, and anthropological schools of thought. Cultural relativism and historical functionalism (evolutionary theory), the two schools of thought that apply most directly to this study, have distinct and very different views on the study of humanity.

Cultural relativists argue that human behaviour within each society or culture is autonomous, distinct, and cannot be compared. Those who subscribe to evolutionary theory believe that all human behaviour is based on universal biological needs. For example, we all need to eat, sleep, move about, manage our finances and practice good hygiene if we are to survive.

The hypothesis tested in this study utilized both perspectives. Generally, we have used concepts that date back to the very origin of anthropology as a

discipline. A century later, the areas of physical, cultural and archaeological anthropology have become highly specialized. Within each sub-discipline geographical and ideational areas have become even more specialized.

Yet anthropology bears the burden of a holistic view of humanity. It may be this burden that motivates anthropologists in highly specialized areas to return to anthropological canons. For example:

Every man in certain respects [is]

- 1) like all other men
- 2) like some other men
- 3) like no other man

There is the (1)organism moving through a field which is (2) structured both by culture and by the physical and cultural world in a relatively uniform manner, but which is (3) subject to endless variation within the general patterning due to the organism's constitutionally-determined peculiarities of reaction and to the occurrence of special situations.

Kluckhohn and Murray, 1962: 53 & 165

Anthropologists recorded the ethnographies of the aged before they began studying the physiology of the aged. Without the views of the elders there would be no emic view or detailed descriptions of societies. If the details of individual societies did not exist there would be no ethnographic data for comparison. A comparison provides an etic or 'outside' perspective (scientific perspective). There is no resolution to cultural relativism vs biological universals. However, the rivalry fuels the development of future anthropological thinking.

Anthropological macro-models include critical theory, and the life course, interpretive, and bio-cultural models. Traditional physical anthropology, based

on the bio-cultural model, takes a broad perspective on the whole person and the environment she lives in. The life course model is a holistic perspective on aging that goes beyond the purely chronological definition of age to consider and analyze the biological, psychological and social processes involved in aging (Fry, 1990).

Anthropological studies of the physiological, social, and psychological facets of aging dating back to the 1920s have provided evidence to support independence - based heavily on adequate physical functional ability - as a universal cultural value (Simmons, 1945a, 1945b, 1946, 1960; Glascock and Feinman, 1986; Sokolovsky, 1990; Glascock, 1990; Maxwell, 1970; Maxwell and Maxwell, 1980, Maxwell and Silverman, 1986; Ikels et al., 1993; Counts and Counts, 1985).

Using mixed methodological analysis, anthropologists investigating the utilization and cultural sensitivity of the IADL skills in small populations (Beall, 1982a, 1982b; Barker, 1989, 1994) concluded that IADL skills were culturally sensitive and should be adapted for cross-cultural research, however, as pointed out earlier, this work dealt with specific IADL tasks, rather than the broader, more general domains that allow the aged to remain independent in the community.

Cultural anthropologists have relied on qualitative, ethnographic methods to gain insights into the thoughts and behaviour of the aged (Myerhoff, 1979; Keith, 1980; Hockey and James, 1993). Although the present study employed a quantitative methodology, the IADL domains it used were designed to provide a

neutral measure of independence which ethnographers using qualitative methodology could use to establish common ground with respondents. For example, ethnographers asking about the 'eating' domain, could easily set up a dialogue with the respondent about different tasks needed to eat.

In the past anthropologists who engaged in ethnography studied the aged as passive individuals with liminal social status: The aged as a population who had been separated from their communities and were dependent on the care of others. Based on these early studies, traditional theories of anthropology have been re-evaluated and empowered by new models such as interpretive and critical theory.

Current anthropology has spawned researchers who interpret and critique the biomedicalization of everyday life in a community. In the view of contemporary anthropologists, biomedicine is itself a culture with its own 'objective' comprehension of reality, language, and understanding of human experience. Focused on acute care and healing, rather than the chronic and 'incurable' conditions associated with aging (James, 1989; Glascock and Feinman, 1987; Sokolovsky, 1990; Maxwell, 1970; Glascock, 1990; Sankar, 1987), biomedicine distinguishes only between pathology and its absence, ignoring the subjective 'patient' interpretation of their own well-being or autonomy. Indeed, many anthropologists are skeptical of the ability of any individual exposed to biomedicine to remain autonomous.

In this study I avoided coding IADL tasks in medical or ethnocentric

language and provided physicians with one-word IADL domains⁴. The final instrument or the IADL Domain Screen was open to interpretation by individual respondents, designed to elicit information about the potential independence of older individuals rather than to assess pathology, and can be used to elicit more descriptive explanations of functions pertaining to each of the 12 domains.

Applied implications

Immediate implications for anthropological research

Evidence for universal IADL domains that contradicts Beall's argument for culturally sensitive IADL domains is a crucial step toward more cross-cultural studies. Turnbull (1983) notes that anthropologists have always searched for 'universal truths' and 'universal values', and Good (1990) cautions us that getting caught up in cultural differences and paying less attention to human universals may lead cross-cultural studies toward pure relativism.

In a very important sense, the IADL domains are little more than the necessary - and universal - activities of daily living: All members of our species need to move about (mobility), clean themselves, dress, eat, communicate (telephone), clean house, manage finances, move outside, do laundry, shop, and use transportation.

⁴ While some critical anthropologists proclaim that physicians (as representatives of the culture of biomedicine) are at odds with Western culture, it is not clear that physicians from other geographical areas maintain the same relationship with their own indigenous systems of medicine.

Implications for population studies to measure physical function

The results of this study lend support to the findings of large scale cross-sectional and longitudinal studies (National Long Term Care Survey, 1982-1984; Baltimore Longitudinal Study of Aging, 1984; Duke Longitudinal Study, 1980; National Health and Nutrition Examination, Survey I Epidemiologic Follow-up Study, 1971; 1980) that have used the IADL skills alone or in tandem with pre-sampling 'screens' such as the Duke SOS Profile (Duke University Center for the Study of Aging and Development, 1996) or other equally blunt instruments⁵.

As there is no evidence to support the cross-culturally validity of such screens, the IADL Domain Screen developed in the present study would be a useful cursory instrument, especially for identifying individuals who have aged successfully. The present study suggests that the IADL Domain Screen could be used in culturally diverse national and international populations.

Clinical applications:

The IADL Domain Screen was designed to measure only the independence of an individual in their community⁶. The resulting instrument can be applied to all levels of health care (home care, acute care, chronic care and mental health care).

⁵ E.g., the Folstein Mini - Mental test which is a very basic and ubiquitous instrument used in clinical practice as well as in population studies.

⁶ Because physicians were asked to rank the IADL Domains in order of importance, this does not in anyway mean that the IADL Domain test is not for practical assessment or screening. The physicians were asked to rank the Domains to test the hypothesis that there would be differences across geographical areas.

One of the applications of a clinically based IADL assessment is to provide detailed information about 'patient' recovery from an acute condition such as surgery or cardiovascular disease. Health care professionals in an acute care setting need fast, accurate and basic information on their patients regardless of their age. For example when an older individual presents to an emergency room from the community charts are most often not available. The administration of the IADL Domain Screen would provide a cursory history for the attending staff.

Much like the Apgar Test for Newborns the IADL Domain Screen is simple to use, produces one page of information and it directly asks about what it is supposed to measure: function (Feinstein, 2000). Often charts that accompany an individual/patient from one level of care to another are unavailable, or incomplete. The IADL Domain Screen can be used for immediate assessment and attached to existing charts.

Another example of an application of the one page IADL Domain Screen is direct assessment, by family members, visiting nurses and other caregivers, of a community dwelling older individual who has had a fall, requires homecare services, may or may not need temporary placement in a long-term care facility, or is suffering from cognitive impairment. The one word descriptors are readily identifiable and provide immediate cursory information on level of independence⁷.

⁷ Based on previous use of the IADL instrument and the results of this study rudimentary use of the current version of the IADL Screen would be an acceptable. This

Chronic care or long-term care facilities may wish to have a brief summary of an older resident's functional history. With new evidence on recovery from disabled states there is a need for institutional rehabilitative professionals to have access to an individual's previous state of high function (independence). In many cases knowledge of previous function provides a rehabilitative goal that may reverse a state of disability (Manton et al., 1997; Mendes de Leon, 1997; Colsher, 1992; Crews, 1994; Wood et al., 1992; Hayward and Liu, 1992; Crimmins, 1993; Crimmins et al., 1994; Crimmins and Hayward, 1996; Hayward et al., 2000).

When an individual is cognitively or physical impaired and cannot supply immediate IADL information, the IADL Domain test can travel with the individual if and when she is moved to different levels of care. Lack of continuity in charting and use of various measures across levels of care (home care, acute care, chronic care, and mental health care) can lead to different outcomes from each health care professional who assesses an aged individual. More importantly the individual can perform the test on herself and keep a copy.

Beyond the confines of the medical system the IADL Domain test can be used as a neutral physical function assessment instrument. Older individuals may find the outcome of a self-assessment a gratifying experience. According to Rowe and Kahn (1987), the more control an individual has over her life, the better her adaptation to the environment and her sense of well-being. In other words

is not to say that further testing and study is needed.

regular assessment may actually improve the independence of an older individual.

General Methodological Concerns

Since researchers are never sure that a question has been understood, they are consequently unsure of meaning in responses. Validity is undermined in the pursuit of reliability.
(Hahn, 1995:111)

The sample surveyed for this study was drawn from an extensive list of practicing physicians. Every precaution was taken to take a representative and sizable sample. For example, data from geographical areas containing fewer than ten responses were eliminated from the analyses. Nevertheless, it could be argued that the physician sample used may not be adequately representative of physicians practicing in their respective geographical areas. Specifically, the response rate of 20.9% leaves open the possibility that there were systematic differences between those physicians who responded and those who did not.

By sending out some 1751 questionnaires every effort was made to obtain a sample of physicians around the world. The response sample was complete for both demographic and geographical area on each and every physician. Given that the norm for survey response is 21% (Babbie, 1989), a higher response rate would have been valuable, however, it would have made no difference to the variability in responses.

There is, in addition, the possibility that physicians who appear in the sort of registries from which this sample was drawn are, likewise, different in systematic

ways from physicians in general from the region in which they were trained. For example, the socio-economic status of physicians may vary within and across geographical areas. This study has no information on socio-economic background of the respondent. Although there may have been socioeconomic differences between physicians who responded to this study and those who did not, this issue cannot be addressed without information on income and other socioeconomic indicators.

Homogeneous Results and Specific Concerns

One possible alternative explanation for the homogeneous rankings of ADL and IADL rankings across physician rankings is that it has to do with universal characteristics of physicians rather than the universal character of the ADL and IADL domains they ranked. For example, if we could assume that all sampled physicians were trained on a common North American curriculum, we might argue that they responded from a shared biomedical perspective whose cultural dogma combines science with deeply felt moral concerns. However, we have no evidence that medical curricula (especially as they relate to aging and independence) are similar across Canada⁸, much less all of North America. Moreover, we know that many sampled physicians were trained in other geographical areas, about whose medical curricula we have no reliable information.

Many social scientists tell us that physicians are committed to the clinical

⁸. Curricula published on line for Ontario universities differ considerably. Only two medical schools have rotations (not curricula) in geriatrics.

dogma or culture of biomedicine (Good, 1990; Locke and Gordon; 1988; Sankar, 1987; Wiley, 1992; Lindenbaum et. al., 1993; Kettler, 2000; Kaufert and Locke, 1992; Jordan, 1990; Singer, 1995; Hahn, 1995). Is this a clinical gaze, or do all individuals from a particular culture or geographic area have the same homogeneous view of the importance of IADL Domains? Unfortunately, we have no evidence to support this hypothesis⁹.

In contrast, we could speculate that physicians are flexible in subscribing both to their own cultural pro- and prescriptions, and to the edicts of biomedicine. Perhaps the everyday activities embodied in the ADL and IADL domains are sufficiently universal to fall outside the prescriptions and proscriptions of both culture at large and the culture of biomedicine.

If these domains are more universally fundamental than biomedical or cultural mores, then we would expect non-professionals as well as physicians to rank them similarly. Although this direct comparison has yet to be made, it is the case that when self-assessments of physical function by the elderly have been compared to similar assessments done by physicians there is little or no difference (Deniston and Jette, 1980; Kreigsmann et. al., 1996; Brody, et. al., 1997; Harris et. al., 1986; Jylha, et. al., 1986).

A second methodological concern is that physicians who practice at one level of care may differ in their assessments in some systematic way from physicians who practice at other levels. Would there have been significant

⁹ Further, this study does not measure the penetrance of Western medical values into non-Western geographical areas.

differences in rankings if physicians from different working environments (acute care, home care, palliative care, chronic care, long-term care, and mental health care) had been surveyed? Although we cannot be definitive on this point, inferential analyses found no significant difference in rankings between physicians who are non-specialists and specialists.

Qualitative questions often complement a survey such as the one used in this study, broadening the variety of descriptive data while perhaps clarifying, and contextualizing the quantitative data. Although it was enough of a challenge to get physicians to fill out a one page questionnaire, follow-up interviews would have been helpful in finding out more about the politics of medical practice. Many questions were considered for practice information. What is the size of your practice (physicians in Ontario carry 2500 patients in an average practice)? How much time do you have after office hours, billing, charting, professional and consultation? How much time do you spend on professional development? Do you read the journals regularly? A busy practitioner would have little time for reading the current literature on physical function, much less remember medical school curriculum (assuming the IADL assessment of the aged had been part of the curriculum).

To obtain qualitative data of this sort would have required conducting interviews with physicians. Unfortunately, with physicians in the sample spread across the globe, that would have been difficult at best.

The present study is certainly not unique in the literature with respect to these potential problems: large scale national and community studies of

functional ability among the aged themselves have generally been characterized by much lower response rates and clearly unrepresentative samples. For example, many such studies generalize to the whole population of aged based on samples of the oldest old white females (Manton and Soldo, 1985; Manton and Soldo, 1992; Cornoni-Huntley et al., 1990; Norland, 1994; Palmore, 1985; Suzman et al., 1992; Kovar, 1992; Branch, 1988; La Plante, 1991; Johnson and Wolinsky, 1994). While this study is not unique in considerations about generalization, it is unique in using an adaptation of the IADL to survey physicians.

Unique studies using quantitative comparative methods are often contentious because they involve attempts to 'homogenize' what may appear to be culturally distinct populations. One can argue that the same data errors that were attributed to Tylor (1889), Wissler (1923), Coon (1948), Murdock (1945), and Simmons (1945a) can be applied to this study. Some anthropologists still oppose the possibility of biological universals that apply to individuals regardless of their emic cultural perspectives. However, in the tradition of the early work of Murdock and his colleagues, the search for biologically based universal functions continues.

Future research

While the results of this study may have much broader implications, at the very least they suggest many future avenues of research, including a variety of cross-sectional, longitudinal, cross-cultural, and comparative studies. In

addition, they suggest the value of the simplified IADL Domains Screen that was used in this study.

An early research priority should certainly be the systematic replication of the basic results of the present study, taking into account any alternative hypotheses concerning the apparent universality of IADL domain rankings. It would be useful, for example, to establish that the present results hold for other health-care professionals (e.g., nurses, social workers), as well as for non-professionals within each culture or geographical area.

It would also be valuable to determine whether the assessment of physical function by physicians and other health-care professionals is actually informed by the rankings given to the several IADL domains. For instance, how do physicians' assessments of independence change with variations in performance on high ranked versus low ranked domains? And do differences in an individual's mobility skills have more effect on their rated independence than similar differences in their ability to use the telephone?

Ideally, research of this sort would continue to use the IADL Domain Screen employed in the present study. It may very well be the case, as has been argued earlier, that the present results depend at least in part on the general, simplified, and perhaps more culture-free, list of IADL domains that was constructed for this study. Are these domains general and simplified enough for other health care professionals and the aged themselves?

It would also be useful to go beyond the relative ranking of the IADL Domains to determine their relative weight in assessments of physical function:

for instance, while physicians (and perhaps others) may be in universal agreement that 'mobility' is the most important function domain in determining independence, is it 10%, 50%, or 200% more important than the second ranked domain in assessing independence? It may be that differences in relative domain weights would appear across a number of the demographic variables examined in this study (geographical area, gender, age, etc.) where none appear in relative domain rankings.

If research of this sort continues to reveal strong similarities in domain rankings, and in actual ratings of physical function, across a range of health care populations in a more comprehensive variety of geographic areas and cultural groups, then it will be possible to proceed with more analytical and comparative studies of aging across cultures.

Although a number of questions and issues might be addressed using a validated cross-cultural instrument, high on the list is the identification of culturally diverse individuals who have aged successfully. A focus on successful aging would be consistent with the de-emphasis of aging-as-pathology, and the increasing interest in biological aging or aging-as-adaptation.

Screening tools that have been used in the past to identify appropriate samples of aged individuals have some shortcomings from the point of view of researchers and theorists interested in adaptation and independence.

For example, the Duke SOS Profile is a screening instrument widely used as a pre-cursor to assessment (Duke University Center for Aging and Human Development, 1996). However the SOS Profile contains extraneous variables

(to some extent biomedically biased or not relevant to assessment of function), and was not designed to measure independence in the community. In addition, the SOS has not been tested on ethnic or cross-cultural populations. The IADL Domain Screen might provide a valuable replacement (or supplement) to the SOS Profile and other similar screening instruments.

Longitudinal Studies

Once we have identified successful agers - those individuals who are considered (or consider themselves¹⁰) to be independent - we can compile a rich cross-cultural sampling frame that can then be studied with a view to enhancing our understanding of the determinants of independence (extrinsic modifiers of health and well-being) which affect community living for the aged, and, inform both community and family.

An understanding of the determinants of independence can best be achieved by conducting national longitudinal studies and comparing them with other nations around the world. Using family practitioners' medical files, hospital discharge forms, and case histories, a virtual longitudinal study could be conducted. Life histories can be extracted and studied for genetic social, medical, environmental and lifestyle effects than may account for those who age well and remain independent. We can begin to ask questions about the kind of lifestyles these individuals have led, the factors that contribute to their health, independence, and the

¹⁰ Indeed, a comparison of independence according to self-report and independence as assessed by health-care providers would be a particularly interesting application of the adapted IADL instrument.

interaction between health and independence. In other words, we can begin to explore how have they adapted to their environment and the aging process.

The establishment of a cross-cultural database can be the foundation for a longitudinal development study that can track individuals from cradle to grave, and allow unprecedented cross-cultural comparisons of aged individuals.

The inability to track members of other cultures, geographical areas, and ethnic groups would be problematic, since the oldest old of our population, who show little or no functional loss (disability), are often members of other cultures or members of remote populations. The use of a 'culturally sensitive' instrument, that can be used to assess and compare function and disability would identify select survivors. The study of select survivors is integral to the understanding of chronological vs. biological age.

The ability to compare cross-cultural, clinical, population, and small group study results begins with the establishment of a valid universal instrument of measurement.

Cross-cultural validity of the IADL skills has been a concern for a number of researchers (cf Liang and Jay, 1992), and the adapted version of these skills found in the IADL Domain Screen will help researchers move toward a valid cross-cultural instrument.

□ Chapter 6: Conclusion

This thesis has determined that physician rankings of the relative importance of a simplified and more abstract version (the IADL Domain Screen) of the IADL skill set commonly used in functional measurement instruments do not differ across physician age, gender, and geographic area of training or practice. Physician rankings are as variable within demographic categories as they are across those categories.

These findings have potentially important implications in all disciplines that study function and independence among the aged, including gerontology, demography, and epidemiology, as well as anthropology. In addition to offering a simplified and potentially culture-independent instrument for the assessment of physical function as it relates to independence, the results suggest the possibility for expanded cross-cultural and comparative research on aging, the relationship of the aged to their communities, and their status within those communities.

The literature suggests that independence is a universally valued status. Future research using the IADL Domain Screen may extend the current findings in ways that may help restore or perpetuate this valued status for older individuals. As Rowe and Kahn note:

Older people, like younger ones, want to be independent. This is the principal goal of many elders, and few issues strike greater fear than the prospect of depending on others for the most basic daily needs. (Rowe and Kahn, 1999:42).

APPENDIX I

Individual Validity and Reliability for Each Published Set of IADL Domains Used

The instruments used in this study were established, published, and developed before IADL domains were broken down into more complex skills and motor movements. Listed below are the instruments for which reliability and validity were reported by Kane and Kane (1981:61).

Instrument	Reliability	Validity
Functional Health Status (Rosow and Breslau, 1966)	Test-retest reliability was not reported; test-retest coefficient = .91.	Not reported; validity assumed from self-report from earlier studies.
PGC Instrumental Activities of Daily Living (Lawton, 1972)	Reproducibility coefficient = .94; inter-rater reliability not reported.	Instrument more suitable for women.
Instrumental Role Maintenance Scale (Lawton, 1972)	Reproducibility coefficient = .94; test-retest not reported.	Instrument more suitable for women.
PACE II: IADLs U.S. DHEW (1978)	Not reported	Some items may be prohibited by nursing home policy.
OARS: IADL Duke University (1978) Short version to include IADLs (MFAQ)	Test-retest reliability coefficient = .82; inter-rater reliability = .65.	Based on physician assessment predictive validity = .70.
Functioning for Independent Living (Gross-Andrew and Zimmer, 1978).	Not reported	Not reported
Performance Activities of Daily Living (PADL) (Kuriansky and Gurland, 1976)	Interviewer and observer reliabilities were high (.9) in a pilot study.	Predictive validity claimed in terms of disposition of mortality.
Pilot Geriatric Arthritis Project Functional Status Measure (PGAP, Deniston and Jette, 1980).	Repeated measures of same person by different interviewers produced same scores 85 percent of the time; inter-rater reliability best with dependency items and worst with difficulty items; reliability best at lowest level of functional ability and worst for mid-point scales.	Scores correlated with clients' ratings of (1) their joint status and (2) their ability to deal with their arthritis and associated problems. Scores did not correlate with professional rating of their clients' joint status or ability to deal with their arthritis.
Functional Life Scale (Sarno, Sarno and Levita, 1973)	Not reported	Not reported
FACE, Fast Assessment of Community Elderly, (WHO, 1987)	Not reported	Not reported

APPENDIX II**ORGANIZATION OF ALL PUBLISHED IADL DOMAINS AND DEFINITION
(FACE Order)**

- 1. Dressing**
 - a. can you dress yourself (OARS, 1978; Lawton, 1972; FAST, 1995) top (FAST, 1995)
 - b. bottom (FAST, 1995)
 - c. footwear (FAST, 1995)
 - d. appropriate to environment (FAST, 1995)
 - e. change clothes (OARS, 1978)
 - f. take jacket with buttons on and off (PADL, Kuriansky and Gurland, ,1976)
 - g. put on and remove slippers (PADL, Kuriansky and Gurland, PADL, 1976)
- 2. Hygiene**
 - a. getting on and off toilet (FAST, 1995; PGAP, Deniston and Jette, 1980)
 - b. reach for toilet paper and wipe bottom (FAST, 1995)
 - c. bowel and bladder control (Gross-Andrew and Zimmer, 1978)
 - d. washing oneself (PGAP, Deniston and Jette, 1980)
 - e. cleaning bathroom sinks/faucets (PGAP, Denniston and Jette, 1980)
 - f. comb your own hair (OARS, 1978; PGAP, Deniston and Jette, 1980)
 - g. setting hair (PGAP, and Jette, 1980)
 - h. brush teeth (PGAP, Deniston and Jette, 1980; PADL, Kuriansky and Gurland, 1976)
 - i. laundry (PGAP, Deniston and Jette, 1980; Lawton, 1972)
 - j. bladder control (FAST, 1995; Gross-Andrew and Zimmer, 1978; OARS, 1978)
 - k. bowel control (FAST, 1995, PADL, Kuriansky and Gurland, 1976; PGAP, Deniston and Jette, 1980)
- 3. Clothing**
 - a. dressing (FAST, 1995)
 - b. shoes (FAST, 1995)
 - c. top (FAST, 1995)
 - d. bottom (FAST, 1995)
 - e. cut toenails (FAST, 1995)
 - f. bite/chew hard food (FAST, 1995)
- 4. Telephone**
 - a. operates telephone on own initiative; looks up and dials numbers (Lawton, 1972)
 - b. dials a few well-known numbers (Lawton, 1972)
 - c. answers telephone but does not dial (Lawton, 1972)
 - d. does not use telephone at all (Lawton, 1972)
 - e. uses telephone with assistance (OARS, 1978; PADL, Kuriansky and Gurland, 1976; PGAP, Deniston and Jette, 1980)

Note: FAST does not include use of telephone but rather the ability to retain numbers.

5. **Shopping**
 - a. shopping (Lawton, 1972; Lawton and Brody, 1969)
 - b. takes care of all shopping needs independently (Lawton, 1972; Lawton and Brody, 1969)
 - c. shops independently for small purchases (FAST, 1995; Lawton, 1972; Lawton and Brody, 1969)
 - d. needs to be accompanied on any shopping trip (Lawton, 1972; Lawton and Brody, 1969)
 - e. completely unable to shop (Lawton, 1972; Lawton and Brody, 1969)
6. **Food Preparation and Eating**
 - a. heats and serves prepared meals (Lawton, 1972; OARS, 1978)
 - b. plans, prepares and serves adequate meals independently (Lawton, 1972; OARS, 1978)
 - c. prepares adequate meals if supplied with ingredients (Lawton, 1972; OARS, 1978)
 - d. needs to have meals prepared and served (Lawton, 1972; OARS, 1978)
 - e. eat with a spoon (PADL, Kuriansky and Gurland, 1976)
 - f. drink from a cup (PADL, Kuriansky and Gurland, 1976)
 - g. understand and follow any food restrictions (FAST, 1995)
 - h. cooks without burning pots, the counter or yourself (FAST, 1995)
 - i. knows not to eat spoiled food (FAST, 1995)
7. **Medication**
 - a. is responsible for taking own medication in correct dosages at correct time (Lawton and Brody, 1969, Lawton, 1972)
 - b. takes responsibility if medication is prepared in advance in separate doses (Lawton, 1972)
 - c. is not capable of dispensing own medication (Lawton, 1972)
8. **Finances**
 - a. manages financial matters independently, budgets, writes checks, pays rent, goes to bank, collects and keeps track of income (Lawton, 1972)
 - b. manages day to day purchases, but needs help with banking, major purchases etc. (Lawton, 1972)
 - c. incapable of handling finances (Lawton, 1972)
9. **Housekeeping**
 - a. maintains house alone or with occasional assistance (e.g. heavy work domestic help (Lawton, 1972)
 - b. performs light daily tasks such as dish-washing and bed-making (Lawton, 1972)
 - c. performs light daily tasks but cannot maintain acceptable level
 - d. needs help with all home maintenance tasks (Lawton, 1972)
 - e. does not participate in any household tasks (Lawton, 1972)
10. **Laundry**
 - a. does personal laundry (Lawton, 1972)
 - b. launders small item; rinses socks, stockings etc. (Lawton, 1972)
 - c. does not participate in any housekeeping tasks (Lawton, 1972)

11. Mobility

- a. mode of transportation (Lawton, 1972)
- b. travels independently on public transportation or drives own car (Lawton, 1972)
- c. arranges own travel via taxi or automobile, with assistance of another (Lawton, 1972)
- d. does not travel at all (Lawton, 1972)
- e. takes longer trips alone or accompanied (Sarno, Sarno and Levita, 1973)

12. Outside Mobility

- a. engages in simple pleasure activities (e.g. walk, car rides) (Sarno, Sarno and Levita, 1973)
- b. does general shopping (e.g. clothes, gifts) (Sarno, Sarno, and Levita, 1973)
- c. does shopping for food (Sarno, Sarno, and Levita, 1973)
- d. attends spectator events (e.g. theater, concert, sports, movies) (Sarno, Sarno and Levita, 1973)

13. Inside Mobility

- a. gets around in own home (FAST, 1995; Sarno, Sarno and Levita, 1973; Lawton and Brody, 1969, Lawton, 1972)
- b. gets in and out of bed (FAST, 1995; FACE, 1987)
- c. climbs stairs (FAST, 1995; Lawton and Brody, 1969; Lawton, 1972; FACE, 1987; Sarno, Sarno and Levita, 1973)

APPENDIX III: FIRST DRAFT OF QUESTIONNAIRE

MCMASTER UNIVERSITY
 Department of Anthropology
 1280 Main Street West, Hamilton, Ontario L8S 4L8
 CANADA

Deborah Truscott
 Telephone: (905)522-9731
 Fax: (905)525-0150
 E-Mail: dtruscot@mcmail.cis.mcmaster.ca

Thank you for taking the time to complete this survey about your priority ranking of Instrumental Activities of Daily Living. The survey should take only about 5 minutes to complete. After analysis the results will be sent to you via e-mail; comments are welcomed.

Listed below you will find Instrumental Activities of Daily Living. Each individual activity is defined in the box directly beneath it. You will find the definitions are a compilation of the most commonly used assessment tools.

Please rank each individual activity in a descending order of priority. For example if you feel DRESSING is the most important activity please place a 1 in the box adjacent to the activity DRESSING.

1 DRESSING

Top
 Bottom
 Footwear
 Appropriate to environment
 Change clothes
 Take jacket with buttons on and off
 Put on and remove slippers

Please complete the entire questionnaire and return by

- a) email to dtruscot@mcmail.cis.mcmaster.ca
- b) fax to 905-525-0150
- c) Canada Post with enclosed self addressed envelope

NAME:-----E-MAIL-----
Country of Education-----

DRESSING:

Top
Bottom
Footwear
Appropriate to environment
Change clothes
Take jacket with buttons on and off
Put on and remove slippers

HYGIENE

Getting on and off toilet
Reach for toilet paper and wipe bottom
Bowel and bladder control
Washing oneself
Clearing bathroom sinks/faucets
Comb your own hair, setting hair
Brush teeth

TELEPHONE

Operates telephone on own initiative; looks up and dials numbers, etc.
Dials a few well-known numbers
Answers telephone but does not dial
Does not use telephone at all
Uses phone with assistance

SHOPPING

Takes care of all shopping needs independently.
Shops independently for small purchases.
Needs to be accompanied on any shopping trip
Completely unable to shop

FOOD PREPARATION AND EATING

Plans prepares and serves adequate meals independently
Prepares adequate meals if supplied with ingredients
Heats and serves prepared meals, but does not maintain adequate diet.
Needs to have meals prepared and served.
Eat with a spoon
Understand and follow any food restrictions
Cooks without burning pots, the counter or yourself?
Knows not to eat spoiled food.

RESPONSIBILITY FOR OWN MEDICATION

Is responsible for taking own medication in correct dosages at correct time
Takes responsibility if medication is prepared in advance in separate doses
Is not capable of dispensing own medicine.

ABILITY TO HANDLE FINANCES

Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income.
Manages day-to-day purchases, but needs help with banking, major purchases, incapable of handling money.

HOUSEKEEPING

Maintains house alone or with occasional assistance (e.g., heavy-work domestic help)
Performs light daily tasks such as dish-washing and bed-making.
Performs light daily tasks but cannot maintain acceptable level of cleanliness.
Needs help with all home maintenance tasks.
Does not participate in any housekeeping tasks.

LAUNDRY

Does personal laundry
Launders small items; rinses socks, stocking etc.
All laundry must be done by others.

MODE OF TRANSPORTATION

Travels independently on public transportation or drives own car.
Arranges own travel via taxi, but does not otherwise use public transportation.
Travels on public transportation when assisted or accompanied by another.
Travel limited to taxi or automobile, with assistance of another.
Does not travel at all.
Takes longer trips alone or accompanied

OUTSIDE MOBILITY

Engages in simple pleasure activities (e.g. walk, car rides).
Does general shopping (e.g. clothes, gifts).
Does shopping for food.
Attends spectator events (e.g. theatre, concert, sports, movies).

INSIDE MOBILITY

Gets around in own home.
Gets in and out of bed.
Climbs stairs.

**APPENDIX IV: SECOND DRAFT OF QUESTIONNAIRE****MCMASTER UNIVERSITY**

Department of Anthropology

1280 Main Street West, Hamilton, Ontario L8S 4L8 CANADA

Deborah Truscott

Telephone: (905)522-9731

Fax: (905)525-0150

E-Mail: dtruscot@mcmail.cis.mcmaster.ca

Dear Colleague,

This questionnaire is part of a study designed to assess consensus among health professionals on the evaluation of physiological function in the aged. Instrumental Activities of Daily Living are every day activities that allow people to function independently in their own homes. In this questionnaire we have defined each of the 12 activities, we ask that you simply place the number 1 in the box next to the activity that you believe to be most important for a senior to live on their own. Subsequent activities should be ranked 2,3, and so on to 12.

It is not important that you work with the aged or with assessment of physiological function. Think of an elderly relative or patient and consider the relative importance of these activities. How important are these activities to that person's independence?

We hope you will take 5 minutes out of your busy schedule to complete the questionnaire and then return it by e-mail, fax, or the self-addressed stamped envelope. Please be assured that any information you provide in the questionnaire will remain anonymous. Names will not be placed on questionnaires and the information collected will be analysed in such a way that no one's answers can be identified.

Although your participation in this study is voluntary, we would very much appreciate your assistance in making this study a success. If you have any questions about the study, please do not hesitate to contact me 1-905-522-9731 or dtruscot@mcmail.cis.mcmaster.ca.

Thank you for your co-operation!

Sincerely,

Deborah Truscott

Deborah J. Truscott

MCMASTER UNIVERSITY
Department of Anthropology
1280 Main Street West, Hamilton, Ontario L8S 4L8 CANADA



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Listed below you will find Instrumental Activities of Daily Living. Each individual activity is defined in the box directly beneath it. You will find the definitions are a compilation of the most commonly used assessment tools.

Please rank each individual activity in a descending order of priority. For example if you feel DRESSING is the most important activity please place a 1 in the box adjacent to the activity DRESSING.



DRESSING

Top
Bottom
Footwear
Appropriate to environment
Change clothes
Take jacket with buttons on and off
Put on and remove slippers

Please complete the entire questionnaire and return by
a) email to dtruscot@mcmail.cis.mcmaster.ca
b) fax to 905-525-0150
c) Canada Post with enclosed self addressed envelope

NAME:-----E-MAIL-----
Country of Education-----

DRESSING:

Top
Bottom
Footwear
Appropriate to environment
Change clothes
Take jacket with buttons on and off
Put on and remove slippers

HYGIENE

Getting on and off toilet
Reach for toilet paper and wipe bottom
Bowel and bladder control
Washing oneself
Cleaning bathroom sinks/faucets
Comb your own hair, setting hair
Brush teeth

TELEPHONE

Operates telephone on own initiative; looks up and dials numbers, etc.
Dials a few well-known numbers
Answers telephone but does not dial
Does not use telephone at all.
Uses phone with assistance

SHOPPING

Takes care of all shopping needs independently.
Shops independently for small purchases.
Needs to be accompanied on any shopping trip
Completely unable to shop

FOOD PREPARATION AND EATING

Plans prepares and serves adequate meals independently
 Prepares adequate meals if supplied with ingredients
 Heats and serves prepared meals, but does not maintain adequate diet.
 Needs to have meals prepared and served.
 Eat with a spoon
 Understand and follow any food restrictions
 Cooks without burning pots, the counter or yourself?
 Knows not to eat spoiled food.

RESPONSIBILITY FOR OWN MEDICATION

Is responsible for taking own medication in correct dosages at correct time
 Takes responsibility if medication is prepared in advance in separate doses
 Is not capable of dispensing own medicine.

ABILITY TO HANDLE FINANCES

Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income.
 Manages day-to-day purchases, but needs help with banking, major purchases, Incapable of handling money.

HOUSEKEEPING

Maintains house alone or with occasional assistance (e.g., heavy-work domestic help)
 Performs light daily tasks such as dish-washing and bed-making.
 Performs light daily tasks but cannot maintain acceptable level of cleanliness.
 Needs help with all home maintenance tasks.
 Does not participate in any housekeeping tasks.

LAUNDRY

Does personal laundry
 Launders small items; rinses socks, stocking etc.
 All laundry must be done by others.

MODE OF TRANSPORTATION

Travels independently on public transportation or drives own car.
Arranges own travel via taxi, but does not otherwise use public transportation.
Travels on public transportation when assisted or accompanied by another.
Travel limited to taxi or automobile, with assistance of another.
Does not travel at all.
Takes longer trips alone or accompanied

OUTSIDE MOBILITY

Engages in simple pleasure activities (e.g. walk, car rides).
Does general shopping (e.g. clothes, gifts).
Does shopping for food.
Attends spectator events (e.g. theatre, concert, sports, movies).

INSIDE MOBILITY

Gets around in own home.
Gets in and out of bed
Climbs stairs.

APPENDIX V Third Draft Questionnaire



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 CANADA
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Dear Colleague,

This questionnaire is part of a study designed to assess consensus among health professionals on the evaluation of physiological function in the aged. Instrumental Activities of Daily Living are every day activities that allow people to function independently in their own homes. In this questionnaire we have listed each of the 12 activities, we ask that you simply place the number 1 in the box next to the activity that you believe to be most important for a senior to live on their own in the community. Subsequent activities should be ranked 2,3, and so on to 12.

It is not important that you work with the aged or with assessment of physiological function. Think of an elderly relative or patient and consider the relative importance of these activities. How important are these activities to that person's independence?

We hope you will take 5 minutes out of your busy schedule to complete the questionnaire and then return it by e-mail, fax, or the self-addressed stamped envelope. Please be assured that any information you provide in the questionnaire will remain anonymous. Names will not be placed on questionnaires and the information collected will be analyzed in such a way that no one's answers can be identified. Although your participation in this study is voluntary, we would very much appreciate your assistance in making this study a success. If you have any questions about the study, please do not hesitate to contact me at 1-905-522-9731 or dtruscot@mcmail.cis.mcmaster.ca.

Thank you for your co-operation!

Sincerely,

Deborah Truscott

Deborah Truscott

<input type="checkbox"/>	DRESSING	<input type="checkbox"/>	HYGIENE
<input type="checkbox"/>	USE TELEPHONE	<input type="checkbox"/>	SHOPPING
<input type="checkbox"/>	FOOD PREPARATION AND EATING	<input type="checkbox"/>	RESPONSIBILITY FOR OWN MEDS
<input type="checkbox"/>	ABILITY TO HANDLE FINANCES	<input type="checkbox"/>	HOUSEKEEPING
<input type="checkbox"/>	LAUNDRY	<input type="checkbox"/>	MODE OF TRANSPORT
<input type="checkbox"/>	OUTSIDE MOBILITY	<input type="checkbox"/>	INSIDE MOBILITY

APPENDIX VI: S 1

Table 1 respondent returns by location of training(n=348)

Geographical Area	N	Geographical Area	N	Geographical Area	N
Africa	11	Ireland	26	South Central Europe	5
Australia	27	Mediterranean	7	South East Asia	3
Bangladesh	2	Mexico	5	Scotland	25
Belgium	8	Middle East	5	Singapore	10
Caribbean	3	Northern Europe	4	Sri Lanka	10
China	2	Netherlands	3	Taiwan	6
Czechoslovakia	9	Oceania	3	United States	1
Egypt	12	Pakistan	6	Russia	1
England	3	Philippines	13	Vietnam	8
France	7	Poland	16	West Indies	7
Hong Kong	7	South Africa	31	Yugoslavia	4
India	54	South America	4	Total	348

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