

THE EFFECTS OF VISION IMPAIRMENT ON DEPRESSION IN THE OLDER ADULT

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The older adult population in the United States is rapidly expanding both because of longer life expectancies as well as the aging of the baby boomers. While vision impairment is a growing concern among older adults, there have been few, mostly small studies, of the impact of vision impairment on this population.

The present study uses a national data set, the Second Supplement on Aging, 1994-1996 (SOA II) from the National Health Interview Survey, in a cross-sectional study of 9,447 civilian non-institutionalized persons, aged 70 years and over at the time of their interview.

The SOA II has been studied in the context of a social theory of aging that emphasizes interdependence through the life course, using a stress process model that has been refined into a Disability model. Disability is understood as a social construction outcome rather than as a medical outcome. Vision impairment is the stressor which is mediated by health (falls, functioning and self-health report), financial resources (education, income and having only public health insurance) and social support (marital, living alone, having no living children, social activities in number and intensity). Depression is a possible, but not a necessary result of vision impairment. Disability may result when a medical pathology leads to an impairment which results in a functional limitation and finally a social disability.

This secondary analysis used a multinomial logistic regression for both the whole sample as well as separately for each gender. For the whole sample the results indicate that a typical profile of a vision-impaired older adult *depressed some/all of the time*, would be a younger-old white woman (aged 70-74 years old) who has fallen in the past twelve months; has difficult with one or more activities of daily living or with both one or more activities of daily living plus instrumental activities of daily living; has a poor to fair self-health report; a family income under \$20,000; a high school or less education; lives alone; has a living child; lacks social activities in number and intensity. In the gender samples, only the female sample at the some/all of the time depression category is substantially significant. Older vision-impaired adults, especially older women who have more social supports are less likely to be depressed and so disabled.

There is a need for social policies that will educate, encourage and support older vision-impaired adults as they seek to compensate for the loss of vision, which often occurs late in life at a time of many other losses.

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## CHAPTER 1

### THE CONTEXT OF THE VISION IMPAIRMENT AND DEPRESSION RELATIONSHIP

#### Statement of the Problem

In the United States there is a rapidly expanding population of older adults, both because of the sheer numbers of the baby boom cohort (1946 – 1964) as well as the fact that the average life expectancy at birth is now the late 70s (Hooyman & Kiyak, 2005). The older adult population uses more medical care than any other age group. While they are about 13% of the present population, they use 28% of the total medical outlays (Estes, Wallace & Linkins, 2000).

Older adults make up a significant proportion of hospital beds and are moved out from these beds as soon as acute care needs are satisfied. Recuperation of acute care needs, as well as management of chronic care needs, are managed either at home with caregivers and home health services or in nursing homes and other long term care facilities. By 2030 almost a fifth of the United States population will be Medicare recipients. There is concern that the expanded needs of the baby boom generation will bankrupt the retirement health system (“Medicare plan may bring pain to government”, 2005).

Those 85 years of age and over, mostly women, are the fastest growing segment among older adults. A minority of these oldest-old older adults, but still a significant proportion, need help because of severe limitations (Atchley, 1997). Racial and ethnic minorities have a significantly more difficult older age, in both financial and health outcomes (Stoller & Gibson, 2000).

## *Depression's Costs to Society*

Depression is an increasingly important factor in the health of the older adult, since physical and mental health becomes increasingly intertwined with chronic and acute limitations as well as life course losses. The current annual direct and indirect costs of depression among older adults is \$43 billion, equal to the costs of coronary heart disease. With the aging of the baby boomers, this cost will greatly increase. By 2020 there will be almost 5 million older adults aged 65 and over with depressive symptoms, an increase of 60% (Birrner, 1998).

Depression in the older adult is very treatable but often not even diagnosed. Neither the doctor nor the patient may understand that the patient is depressed or even suicidal. Suicide is greatest for older white men. Rates of completed suicide for white men increase through the life course and are at a peak from ages 80 to 90. The ratio of suicide attempts to completed suicides among older adults in the United States is about four to one (Baker, 1996). Even without suicide, there is a risk of death for the older adult who is also depressed (Penninx et al., 1999).

It has long been assumed in the West that the older person is more prone to depression. This understanding goes back to at least the second century when the Roman physician Galen described a relationship between melancholia and aging (Birrner, 1998). In contemporary media older adults are often portrayed as sad and withdrawn. Depressive symptoms are especially common among medically ill older adults (Alexopoulos, Young, Abrams, Meyers & Shamoian, 1989; Reynolds, 1995). There is a positive relationship between disability and depression.

Basic symptoms of depression include depressed or sad mood, loss of interest in activities, fatigue, weight change, sleep problems, difficulty concentration, feelings of worthlessness, and thoughts of death or dying. Depression in the older adult may express itself differently than in younger patients. Many older adults have a cluster of depressive symptoms

but do not present with what the American Psychiatric Association (1994) would label as depression. Often depression is better understood as both a continuum of symptoms, part of a reaction to the environment, or as co-morbid with other diseases (Zarit & Zarit, 1998).

The causes of depressive symptoms and depression are complex but, in addition to physical health, other general predictive factors are socioeconomic status and social support losses which are often cumulative through the life course. The result is stress with a possible depression outcome. Stress occurs when an environmental event or process, as the physical limitations resulting from vision impairment, pushes a person beyond normal limits. Lack of financial resources, as well as the loss of social support may increase depression. Depression itself is a risk factor for the loss of physical function in the older adult (Hays, Saunders, Flint, Kaplan, & Blazer, 1997). A concern for many adults as they age is the fear of losing independence.

#### *Vision Impairment Adds to Depression's Costs*

According to The Lighthouse Inc. (2003), the loss of independence among older Americans costs us \$26 billion each year in medical and other costs. They also report that vision impairment, from low vision to blindness in one or both eyes, is one of the four most important impairments to independence for older Americans. The monetary cost to society of increased vision impairment will only continue to increase with the rise in the number of older adults. There is also the loss of employed and volunteer productive service that many older adults provide.

The significance of tracking depression in visually impaired older adults can also be understood in terms of the social cost to society. Because independence is a fundamental American cultural trait, any chronic impediment to independence, as vision impairment, may

lead to depression. When any group of people are hindered from reaching a meaningful older age because of such health challenges, society as a whole becomes less socially and meaningfully integrated (Durkheim, 1984). We all have something to learn from one another, especially from our elders who have gone before us and often continue to have the ability to impart their wisdom to new generations (Roszak, 1998). In addition to aging limitations, the psychosocial pain of depression becomes an increasing cost to the life satisfaction of the older adult and to society itself.

Vision impairment greatly increases as one ages, affecting 15% of adults aged 45 to 64 years old and 26% of adults aged 75 and older, or one in four older adults (The Lighthouse Inc., 1995). Independence is often negatively affected when eyesight is impaired; it may be more difficult and at times even impossible to take part in many everyday personal and social activities. Personal savings may be also be depleted because of increased costs of care.

Vision loss is included among the common medical problems associated, not just with independence, but with depressive symptoms and depression (Verbrugge & Patrick, 1995). In a review of the literature, Horowitz (1995) finds that older vision-impaired adults are at greater risk for depression than older adults with better sight. Treating depression may reduce the added disability that is associated with impaired vision (Horowitz, Reinhardt, McInerney & Balistreri, 1994; Rovner & Ganguli, 1998).

The most frequently reported diagnoses of vision impairment among older adults are cataracts, glaucoma, macular degeneration, and diabetic retinopathy (Desai, Pratt, Lentzner & Robinson, 2001). Cataracts are a clouding of the lens in the eye. They can often be corrected through surgery and good glasses or other visual aids and are most prevalent among older

women. According to Desai et al. (2001), about one fourth of non-institutionalized older adults reported having cataracts in 1995.

Glaucoma results in an abnormal increase of pressure in the eye. Untreated, it can lead to blindness. A common result of glaucoma is tunnel vision, central vision with limited peripheral vision. In later stages of glaucoma there may be damage to the optic nerve, reducing visual acuity and blurring vision. Glaucoma is twice as common among the black older adult as it is among the white older adult (Sommer et al., 1991). It is estimated that many older adults who have glaucoma are unaware of it.

AMD (Age related macular degeneration) is the leading cause of irreversible visual impairment in the older adult, affecting about 26% of those over age 75 (The Lighthouse Inc., 1995). It is more common in older women than older men. While AMD does not usually proceed to full blindness, there is no treatment to save the sight of an afflicted person. AMD results in the loss of one's central vision, leaving only peripheral vision. As the macula, the central part of the retina, degenerates there is a blind spot in the middle of one's vision field. As a result, for the AMD impaired older adult, it is difficult to recognize faces or even food, to read or navigate stairs or curbs.

Diabetic retinopathy, a progressive disease, leads to retinal detachment and hemorrhaging which can result in complete blindness. Those with such an impairment may suffer daily vision changes. It occurs mostly in those younger than 70 years of age, in more women than men and in more black than white older adults.

Most older adults with vision impairment have some eyesight. Even those defined as legally blind have a visual acuity of 20/200 in their best eye with normal corrective visual aids

and/or a restricted visual field that is less than 20 degrees in width. Only a small percentage of those with vision impairments are totally blind.

There is a great variety of capacities among those visually-impaired. Some are only able to see light, or distinguish light from dark. Others can see shapes or colors and even travel alone or see normally within a prescribed field of vision. The result is that there is a lack of clarity regarding evaluation criteria for visual assessment. While distance acuity is the most common indicator used for functional vision impairment, there are other indicators as depth perception, contrast sensitivity, glare and color perception. Often data on multiple indicators are not available (Horowitz, 1994).

*Common Multiple Indicators of Vision Impairment:*

Although there is no one criterion for vision impairment, common indicators that are most frequently used come from self-reports that include:

- Non-recognition of a person from across a room with and without glasses
- Loss of ability to read regular newspaper print while wearing glasses
- Poor self-rating of vision
- Other problems seeing, even with wearing glasses
- Blindness in one or both eyes

(The Lighthouse Inc., 1995)

To be vision-impaired does not necessarily mean that one is also disabled, since disability is a social destination (Verbrugge & Jette, 1994). One who is medically vision-impaired, however, does have a vision limitation in processing sight. Vision impairment leads to stress in the environment, which may result in depression. One who is depressed because of vision impairment has a disability.



In a review of the literature, vision impairment is among the highest risk factors for functional status decline among older adults living in the community (Stuck et al., 1999). Lenze et al. (2001), in another review of the literature, conclude that there are high levels of co-morbidity between physical disability and depression in the older adult. The effect of vision impairment does not seem to be dependent on the level of impaired vision itself, but rather on the quality of life the vision-impaired older adult reports.

Those who report more stressors report higher levels of vision disability (Branch, Horowitz & Carr, 1989; Carabellese, Appollonio, Rozzini, Bianchetti, Frisoni, Frattola et al., 1993). Social support has been shown to have a positive effect on depression in the older adult; however, most of the research with vision-impaired older adults comes from small studies (Horowitz, 1995). There is a need to study the effects of depression on large representative samples of visually-impaired older adults (Crews & Whittington, 2000).

### *Research Question*

There is a growing need to improve the older vision-impaired adult's quality of life but there are at present many questions. Vision impairment is a mostly unexplored area in older adult life satisfaction. Why do some older vision-impaired adults have better depression outcomes than others? What can be changed in the older adult's environment that will promote better depression outcomes? A quantitative research study, using the National Health Interview Survey: Second Supplement on Aging, 1994-1996 (SOA II) has been designed to explore these questions.

The National Health Interview Survey: SOA II, is the baseline for the Second Longitudinal Study on Aging, 1994-2000 (LSOA II). The SOA II is a prospective study with a nationally representative sample of 9,447 civilian non-institutionalized persons, aged 70 years and over at the time of the SOA II interview (National Center for Health Statistics, 2002).

The purpose of this research is to study the implications of health, financial resources and social support on depression in the older visually-impaired adult. Specifically, this study seeks to answer the following research question: How does age-related vision impairment, when mediated by health, financial resources and social support, affect the level of depression in the older adult, using the SOA II?

A social theory of aging will first be explored, seeking to understand social stress in terms of the life course perspective using a sociological definition of disability. The results of the SOA II will then be reported and discussed with implications for future research

### *Summary*

The baby boom cohort, born between 1946-1964, has come to represent a rapidly aging demographic process, challenging Social Security, Medicare, and Medicaid, as well as many other health, financial and social institutions. There are, and will continue to be, many changes as a result of this great demographic increase of older Americans.

Depression has become an increasingly important factor in the health of older adults, since physical impairments and illnesses, as well as life course losses, often affect a long term sense of well-being in many older adults. Vision impairment as a common and unexplored limitation for many older adults can lead to depression. It has been found to be among the highest risk factors for functional status decline among older adults living in the community. There are also high levels of co-morbidity between physical disability and depression in the older adult. The effect of vision impairment does not seem to be dependent on the level of impaired vision itself, but rather on the quality of life the vision-impaired older adult reports. Among the different vision impairments, there are a number which disproportionately affect women

(cataracts, age-related macular degeneration and diabetic retinopathy) and blacks (glaucoma and diabetic retinopathy).

Most studies of vision impairment in relation to depression outcomes have been small studies. This study uses a national representative sample, taken from the SOA II. A social theory of aging will be examined in order to explore the research question: How does age-related vision impairment, when mediated by health, financial resources and social support, affect the level of depression in the older adult, using the SOA II?

### Literature Review

#### *Disability in the Older Adult Affects Depression*

*Disability is a social process.* There have been a number of schemes used to conceptualize disabilities. This dissertation will build on that of Verbrugge and Jette (1994), the Disablement Process model. It is built on two earlier schemas: that of the International Classification of Impairments, Disabilities and Handicaps (ICIDH of the World Health Organization) and the Nagi scheme by the sociologist Saad Nagi (1965).

The ICIDH was designed to parallel the International Classification of Diseases, the standard disease taxonomy for health and medical statistics (World Health Organization, 1980). Verbrugge & Jette, (1994) summarize that in the ICIDH *disease*, “the intrinsic pathology or disorder,” may lead to *impairment*, “loss or abnormality of psychological, physiological, or anatomical structure or function at organ level,” which may lead to *disability*, “restriction or lack of ability to perform an activity in normal manner,” and which may finally lead to *handicap*, “disadvantage due to impairment or disability that limits or prevents fulfillment of a normal role” (p.2). This scheme depends on age, sex, and sociocultural factors.

In contrast, the Nagi scheme, a sociologically organized scheme, places more emphasis on a social construction of disability. Verbrugge & Jette (1994) summarize that in this scheme *active pathology*, an “interruption or interference with normal processes, and efforts of the organism to regain normal state”, may lead to *impairment*, “anatomical, physiological, mental, or emotional abnormalities or loss”, which may lead to *functional limitation*, “limitation in performance at the level of the whole organism or person,” which may finally lead to *disability*, “limitation in performance of socially defined roles and tasks within a socio-cultural and physical environment” (p.2). In contrast then to the ICIDH scheme, the Nagi scheme emphasizes that functional limitations may lead to social disability.

Verbrugge and Jette (1994) have adapted both schemes in creating the Disablement Process model, which they label “socio-medical model,” that takes seriously both the medical and social aspects of disability. Their scheme uses the Nagi sociological scheme as its main foundation but also makes use of the scope and detail of ICIDH. Following the Nagi scheme, *pathology* may lead to *impairments* and then to *functional limitations* and finally *disability*. At each part of the scheme there is input from 1.environmental and medical support, as well as medication factors; 2.personal lifestyle, behavior, coping and activity factors; 3.risk factors within the person as well as in the environment (p.4). Disability occurs when one has trouble doing activities (functioning) in any part of life that is normal for one’s age or sex because of health or physical problems.

As a result of this expanded definition of the disablement process, chronic conditions can affect any activity, rather than the two main criteria of function often used with older adults: activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Verbrugge and Jette (1994) offer an expanded definition of disability that is also more flexible and complex

in terms of causes and effects. The Disablement Process model emphasizes disability as a social process in a social context. There is a positive, but not a necessary relationship between disease and disability. The creation of functional limitations has both a social and a medical aspect which may lead to disability. A disability arises only when the older adult has a functional limitation that the social environment cannot manage. Conceptualizing both functional limitations and disability is a complex process.

*Disability, health and depression.* Health is a strong predictor of life satisfaction for the aging adult (Cockerham, 2004). A social impairment can result when the older adult has trouble doing something because of a health impairment. When health impairments lead to a functional loss, they narrow the ability of the older adult to perform everyday social and personal activities. The results may be social role change, leading to isolation and stigma, as relationships with family and friends are altered. It is at this point that an impairment may become a social impairment, a disability. Depression often accompanies disability. An unpredictable course of impairment, resulting in a lack of symptom control as well as pain and discomfort, can also add greatly to disability stress and depression (Lyons, Sullivan, Ritvo with Coyne, 1995). Depressed older adults are at risk for lower life satisfaction and shortened lives.

Mirowsky, Ross and Reynolds (2000) have found that situations that promote physical health generally promote mental health, even as each type of health problem contributes to the other. Self-assessment of health predicts changes in health (Borowski, Kinney & Kahana, 1996; Ferraro, Farmer, & Wybraniec, 1997). As one ages, chronic health conditions are more likely. With such conditions, there is also the likelihood of depression. Depression has been found to be the highest in older adults, since impairments increase as one ages (Mirowsky & Ross, 1992).

Functional limitations have been found to be a significant risk factor for depression, no matter the status of disease (Zeiss, Lewinsohn, Rohde, & Seeley, 1996). Lenze et al. (2001), in a review of the literature, have concluded that depression intervention studies should include functional limitations disability as an outcome measure. They found that older adults, who have a physical limitation which makes them disabled, were more likely to have significant depressive symptoms. Depression has been found to be an increasingly likely outcome for older adults with chronic impairments which often limit functions and become permanent disabilities. Treatment for depression can lower impairments, even when they are chronic. Oslin, Streim, Katz, Edell, and TenHave (2000) studied 2,572 patients aged 60 and over with significant depressive symptoms and reported that depression treatment can lower depressive symptoms and raise functional abilities.

*Summary.* Disablement is a social process which is dependent on both the individual and society's definitions of pathology, impairment, functional limitation and disability itself. Disability results from the interactions of psychological, social supports and environmental factors, as well as risk factors. The Disablement Process model emphasizes disability as a social process in a social context.

Physical and mental health have been found to be interrelated. Health impairments often lead to functional limitations and social disability which can lead to depression. Health problems can also alter social relationships with family and friends, changing social roles and increasing social isolation and stigma.

#### *Disability and Depression in the Stratification Process*

Disability and depression are related to the stratification process. Throughout the life course, factors such as race, class, gender and age are central health issues which continue to be

important in older age. Older adults with more socioeconomic resource capital tend to have better health outcomes in old age and less disability (Frytak, Harley & Finch, 2003; House, Lepkowski, Kinney, Mero, Kessler & Herzog, 1994; Manton, Corder & Stallard, 1997; Palmore, Nowlin & Wang, 1985).

There appears to be a cumulative stratification disadvantage in old age for those who had fewer resources earlier in the life course. Those with fewer resources at younger ages often have less financial, emotional and physical resources to combat the increasing likelihood of chronic diseases and disability as they age (Shea, Miles, & Hayward, 1996; Turner & Lloyd, 1995).

A recent issue of the *Journal of Health & Social Behavior* (2003) focuses on the relationships among race, ethnicity and mental health. Takeuchi and Williams (2003) in their introduction to this special issue find that race and ethnicity matter to mental health, determining epidemiological rates, severity, treatment and outcomes, with minorities having poorer mental health outcomes. They applaud the research that has culminated in this issue but admit that the sociology of mental health itself has often not been clear on how to measure racial and ethnic mental health differences. They conclude that there continues to be a need to clarify and deepen the linkages among race, and mental health.

Mirowsky and Ross (1992) have looked at the relationship between age and depression. Their results show that depression is lowest for the middle aged, at about age 45. Depression is highest in older adults, aged 80 and older, because of deterioration to health as well as other losses to personal control. They acknowledge that some of this difference may be a difference between age and cohort measures. As education increases among the older adult population, depression may decrease. Ross and Wu (1996) have found that those with more education have a

cumulative advantage in health, physical functioning and physical well-being that increases with age.

Mirowsky (1996) has studied the age and gender gap in depression. He concludes that the gender gap in depression rises between men and women through the life course. Women increasingly report more depressive symptoms than men through the life course as their status positions widen. Widowhood is also associated with depression, especially for women, because of the financial strain it produces (Umberson, Wortman & Kessler, 1992).

Race, class, gender and age are interrelated with one another and so must be looked at in the complex terms of their interrelations. Minorities are more likely to have older ages in poverty and poorer health than whites. Minority women are even more likely than white women to have older ages in poverty and poorer health (Dressel, 1988; Ferraro, Farmer & Wybraniec, 1997; Stoller & Gibson, 1997).

*Summary.* Depression is an increasingly likely outcome for older adults with chronic impairments, which often become permanent impairments, leading to disability. Depression is a social process which must be understood in relation to both personal and environmental issues. Older adults with more resource capital tend to have better health outcomes in old age and less disability. Resource capital heavily depends on social environmental factors that are stratified according to race, class, gender and age. There appears to be a cumulative stratification disadvantage in old age for those who have had fewer resources at younger ages. Such disadvantaged older adults often having less financial, emotional and physical resources to combat the increasing likelihood of chronic diseases and disability.



### *Vision Impairment as a Disability Affects Depression*

Vision impairment is one of the most feared and common losses of late life. There is a great fear of losing vision among the American public, especially of going blind. The fear of going blind is the greatest of fears, perhaps, since most older adults think of themselves as normally sighted. In *The Lighthouse National Survey* (1995) 71% of Americans fear being blind more than being deaf; 76% fear blindness more than needing to use a wheelchair; and 70% fear being blind more than losing a limb.

It is difficult also for those who do not have a stable vision, having vision that is either fluctuating or diminishing. There is also the issue of passing as fully sighted when one is either moderately or severely vision impaired, which may be the denial of health limitations and the need for assistance.

Vision impairment is accompanied by increasing functional limitations with age. *The Lighthouse National Survey* (1995) points out that vision impairment in the United States greatly increases as one ages, affecting 15% of adults aged 45-64, or 7.2 million people; 17% of adults aged 65-74, or 3.1 million people; 26% of adults aged 75 years and older, or 3.5 million people. Almost 20% of older adults, aged 60 and older, report some kind of vision impairment. This percentage will increase with the number of older adults living longer, as well as in absolute numbers with the baby boom generation approaching older age. The older adult population will be increasing especially among women, minorities and among those aged 85 years and older. In fact, among those aged 85 years and older, 42% self-report having impaired vision (The Lighthouse Inc., 1997).

Vision impairment is affected by the stratification of race and class. According to a study based on the Baltimore Eye Survey, (Tielesch, Sommer, Witt, et al., 1990) blindness and visual

impairment for blacks is twice that of whites. In another related study using the same data, Sommer, Tielsch, Katz, et al. (1991) have found that the pattern of blindness in Baltimore seems to be different among blacks and whites. Older whites are much more likely to have macular degeneration, while blacks are more likely to have glaucoma. Klein, Klein, Jensen, Moss, and Cruickshanks (1994) studied the relationship of socioeconomic factors to cataract, maculopathy and vision impairment, concluding that factors such as education and income are associated with impaired vision. Those with better education and incomes had less impaired vision.

#### *Likely Profile of a Vision Impaired Older Adult*

The likely profile of a person who is visually-impaired is that of an older unmarried minority woman who lives alone; has less than a high school education; whose household income is less than 150% of the poverty level. This woman is in fair or poor health and does not have health insurance (The Lighthouse, Inc., 1995).

Vision impairment also affects 53% of middle-aged and older adults in the United States when researchers count those who have had vision impairment themselves, in their family or know someone in their social network who is vision-impaired. The majority of Americans having vision impairment (64%) believe that they are not understood by sighted friends because of the impairment. The use of vision rehabilitation services (clinical, rehabilitation training and recreational services) is extremely low, at 1% use for each type of service (The Lighthouse Inc., 1995).

The older adult often has a belief that nothing can be done, believing that the loss of vision is an inevitable part of aging. This belief is found not only with potential recipients and their families but also with health personnel. Even health personnel in the vision rehabilitation

field may have limited knowledge about vision problems and rehabilitation for the older adult, since they more often work with younger adults (Horowitz, Teresi & Cassels, 1991).

Governmental health services are also not adequate for those visually-impaired. Medicare does not cover the funding for either low vision evaluations or rehabilitation services. Since Medicare sets the pattern for other insurers, vision-impaired older adults often must pay for such services on their own (Watson, 2001).

The stigma of aging in our society is compounded when the older adult is also vision-impaired. In a review of the literature, Horowitz (1995) has found that visually-impaired older adults are at greater risk of depression than their better sighted peers. This risk does not correlate, however, with the severity of the vision impairment. The context of loss as social disability seems to override the functional consequences of the loss.

*Vision impairment is positively related to the disablement process.* In a study using the First Longitudinal Study of Aging (1984 – 1990) data, Rudberg, Furner, Dunn and Cassel (1993) concluded that those with vision impairments alone have an independent risk factor for future ADL limitation. Vision impairment is third, after heart disease and arthritis, among the physical impairments that restrict the daily activities of those 65 years and over (Watson, 2001).

*The Lighthouse National Survey* (1995) has found that almost one-fourth of visually-impaired people report that their vision problem creates at least some difficulty in managing daily household tasks. Stuck et al. (1999), in a review of the literature, reports that the greatest evidence for an increased risk in functional status decline includes depression, disease burden (co-morbidity), low level of physical activity, poor self-perceived health and vision impairment.

There is an increased risk of imbalance in older adults with impaired hearing or vision impediments (Gerson, Jarjoura, & McCord, 1989). Daubs (1973) has emphasized that accidents

are a leading cause of death and that the most frequent causes of fatal home accidents is falling. Older adults with low vision are linked to an increase in risk of falls and especially hip fractures (Felson, Anderson, Hannan, Milton, Wilson & Kiel, 1989). Falls in the older person can cause injuries which are much more dangerous than for younger people because of the brittleness of the bones in the older adult, especially in the older woman. Dunn, Rudberg, Furner and Cassel (1992) have found that the risk of death within two years is greater for both those who fell once and those who fell multiple times.

Verbrugge and Patrick (1995) have reported that both arthritis and vision impairment limit the older adult in an equivalent way to that of fatal conditions. They conclude that there is a need to concentrate more health research on nonfatal disabling conditions, as vision loss, which can lead to earlier mortality.

*Vision impairment leads to loss of communication.* Loss of vision often leads to a loss of mobility, a key requirement for independence, as well as physical and psychological well-being. Vision loss makes it more difficult to communicate with others, even when one can hear. Osborn, Erber and Galletti (2000) have found that background noise significantly affects the perception of what others are saying for both sighted older adults as well as those with severe low vision. Even people with normal or near normal vision and hearing get more speech information in a noisy place listening and watching the face of the speaker. Those with severely impaired vision cannot rely on such visual cues to compensate for what they cannot hear. Vision loss therefore can also compromise mental functioning. Poor vision reduces the amount of external stimuli that is needed to elicit appropriate cognitive responses.

For those older adults who, in addition to vision loss, have hearing limitations there is a dual sensory loss, which greatly adds to the loss of functioning as an adult in our society. Vision

and hearing loss are among the most common conditions of the older adult. Horowitz, Brennan and Su (2001) have been analyzing data on dual sensory loss using the 1984 Supplement on Aging (SOA I) data set. This data show a high prevalence of sensory impairments among older adults aged 70 and older, as 35% reported vision impairments and 42% reported hearing impairments. Dual sensory impairment was found in more than one-fifth of the adults aged 70 years and older in the United States. Minorities were found to be at greater risk for each individual impairment as well as dual sensory impairments.

At times sensory-impaired adults may be treated as though they are cognitively impaired and infantilized. Sensory impairments are often unrecognized in medical settings as hospitals and nursing homes, where the incidence of both vision and hearing impairments is high. The institutionalized patient occupies the classic sick role relationship with professionals who often demand dependency (Crockerham, 2004). Functional strengths and limitations are not always addressed, even as other chronic and or acute illnesses are being addressed.

Vision loss also affects families and social networks as well as social structures. Vision loss and the limitations that result from such a loss are not static impairments. They are both a dynamic process that adds to the losses that older adults experience personally as well as a process that negatively affects many others in society. As a result, vision limitations can become a loss for society as a whole.

*Vision impairment affects depression.* In a review of the small depression and vision impairment literature, Horowitz (1995) finds that the broader depression literature points to high levels of co-morbidity between physical disability and depressive illness for the older adult. Physical disability is a risk factor for depression among older adults. Depression has also been found to be associated with greater levels of functional disability and poorer treatment outcomes

among impaired older adults across a range of diseases. Though vision loss is one of the most common ailments in later life, there have not been enough large representative samples studying the relationship between depression and vision loss.

*Summary.* Vision loss in later life is one of the most feared and also common losses. It may result in unfavorable consequences both in functioning and life satisfaction. The older adult often experiences vision loss as a new and unwanted experience. Vision loss is associated with personal and environmental loss, reducing mobility and the ability to function independently, lowering personal safety and control, as well as lowering the ability to take part in social activities. It is affected by the stratification of race, class, gender and age.

The typical vision-impaired person is an older unmarried minority woman with less than a high school education who lives alone, with near poverty level financial resources. The older adult, as well as both health service professionals and governmental agencies, often believes that there is a limited ability to help the vision-impaired older adult, viewing such impairment as a natural result of aging. Depression can be an outcome of becoming vision-impaired; depression as disability, however, arises out of the social rather than the functional context.

Those with impaired vision are more likely to have lower functional abilities. Older vision-impaired adults are linked to an increased risk of imbalance and falls, especially hip fractures. Falling is the most frequent cause of fatal home accidents. Vision loss also leads to a loss of independence since it becomes harder to get around and do things independently. It is also harder to communicate with others, especially when hearing loss is added to vision loss. Families and other social networks are also affected by vision loss, as is society as a whole. Disability is a dynamic social process of change and loss which affects depression. Vision loss is an important variable in the disability process.

### *Social Support Mediates Depression in the Older Adult*

There are a number of ways to define social support. House and Kahn (1985), in a review of the literature, have defined social support in relation to the quality of social support through social integration, the structure of social support through social networks (density, range, and homogeneity) and the function of social support (for individual or family in terms of affection and care). They emphasize that at least two, if not all three of these aspects of social support are necessary to investigate in order to get a complete understanding of how social support can be studied.

Thoits (1995), in a review of the literature, has concluded that social support is functionally a resource that is like a bank account that can be taken out when stressed. Important others in the older adult's life can offer emotional, instrumental and informational help. What is essential is how the support is perceived by the older adult. If social support is perceived as supportive, it will have more of a positive impact on mental health than otherwise. Structurally, social support relates to the ties the older adult has to others, especially in terms of social roles and social networks. Thoits found that it is often not clear exactly what leads to social integration, in terms of the quality of the social support. This is an area that needs to be studied more closely.

Social support has been found to be an important mediator against depression in the older adult. Social support research usually centers on the recipient of support rather than the interaction between the recipient and the donor (Krause, Herzog & Baker, 1992), which can be negative as well as positive (Ingersoll-Dayton, Morgan & Antonucci, 1997; Krause, 1995).

Increasing social support in relationship to other variables can lower depression. Support for negative life events has buffered depressive symptoms for a community sample of older

adults for specific types of stressors, as bereavement (Krause, 1986). Social support has been found to buffer mortality rates for a community of older adults (Blazer, 1982). Dean, Kolody and Wood (1990) have found that social support with older adults decreases depression, with the largest effect coming from spouses, friends and adult children's support.

Financial resources, as income and education, can also increase social support. Those older adults with more income and education in a nationwide sample of a Health Care Finance Administration Medicare Beneficiary Eligibility List had more contacts with friends and positive support from others (Krause, 1995). In another study, older adults with chronic financial strain were more likely to be depressed than those with less financial problems (Krause, 1987). Those with more informational and network support were also less likely to report symptoms of depression, though they had financial strain.

Social support has been found to be a mediator in the relation between functional status and the quality of life in the elderly (Newsom & Schulz, 1996). Perceived and actual social support can lower depressive symptoms and raise life satisfaction for the physically impaired (Krause, 1986). Matt and Dean (1993) have found that social support can moderate psychological effects of age through friendships in older men over the age of 70.

Carabellese et al. (1993) have studied sensory impairment in an older non-institutionalized population. They report that vision impairment, but not hearing impairment, is independently associated with lower social relationships. The loss of social relationships makes visually-impaired old adults at risk for depression. Social support and depression are risk factors for the loss of physical function in the older adult (Hays et al., 1997). In a small study, Hersen et al. (1995) found that there was a significant correlation between poor social support and depression in visually-impaired older adults.



*Social support is increased through social roles and social networks.* Goldman, Korenman and Weinstein (1995) have used data from the first Longitudinal Study of Aging (1984-1990) to explore the influence of marital status on health and mortality for older adults. They conclude that marital status is associated with health and survival outcomes at the oldest ages, with an average age in the late 70s. They also find that single women are more likely to have better health outcomes than those that are married. Those widowed, especially older men have worse survival outcomes.

Social roles can be understood as a type of social support resource. Role identities are important indicators of what people find meaningful and therefore what is stressful to them (Simon, 1997). Stressors in salient social roles are more destructive for older adults' feelings of personal control and well-being than stressors that come out of roles that are less important. While the most salient social roles are that of spouse, parent and grandparent (Krause, 1994), even more transitory social roles may be helpful. In two studies the role of participant in a social support group was found to be helpful for older adults adjusting to visual impairment (McCulloh, Crawford & Resnick, 1994; Van Zandt, Van Zandt, & Wang, 1994).

An individual's ability to function in the social world outside of oneself is a multifaceted concept that includes social networks (how many people are in one's social world, the quality and the number of the interactions) as a basis for social support constructs. Antonucci and Akiyama (1987) have explored social networks in the older adult in terms of what they call a convoy model, taking the term convoy from the anthropologist David Plath (1980). Plath defines a convoy as a layer of family and friends which acts to protect the older adult by surrounding and helping him or her to successfully negotiate life through the exchange of social support. Convoys

are dynamic but lifelong relationships which have both stability and the ability to change function.

The convoy model posits that structural and functional characteristics among its members are determined by age in the life course as well as distance or closeness that is meaningful and predictable. Older adults have life course experiences that affect the structure of their convoys of social support. They are likely to have more losses of support network members than younger adults. Older support network members leave through moves, disability or death. Women seem to have closer relationships throughout the life cycle which may strengthen their social networks and thus social support.

Other research also affirms that social support networks can have positive moderator effects for older adults (Finch, Okun, Barrera, Zautra, & Reich, 1989; Matt & Dean, 1993; Okun, Melichar, & Hill, 1990). Social networks are also important for the older adult who has functional disabilities (Mendes de Leon et al, 1999; Seeman, Bruce, & McAvay, 1996; Stephens, Kinney, Norris & Richie, 1987). Sensory loss of hearing and vision are affected by supportive family networks. Older adults with poorer family networks are more at risk for depressive symptoms (Oppegard, Hansson, Morgan, Indart, Crutcher & Hampton, 1984).

*Summary.* Social support has been shown to be a buffer against life course loss and mortality as well as a mediator between functional status and quality of life. There is some evidence that poor social support and depression are risk factors for the visually impaired. Social roles are another type of social support resource and have also been found to decrease stress and the resulting depression from stress. Social networks are an important part of social support and have been found to have moderator effects for older adults with functional limitation.

### *Need for Depression Research with Visually-Impaired Older Adults*

Research with the vision-impaired older adult is in need of extensive work since the knowledge base is quite limited. There are also many public policy issues concerning aging and visual impairment but as yet there is no comprehensive national policy (Crews, 2000). Instead, services are driven by the needs of providers rather than consumers. Often providers are poorly trained to even recognize the older vision-impaired adult, much less evaluate and offer comprehensive case management.

Service delivery systems among providers of the aging are not equipped to handle the very diverse and complex needs of these older adults both within the community and long-term care facilities. There is also a need for better insurance reimbursement in order to improve function and quality of life among the visually-impaired. The effects of vision impairment on depression are often poorly understood by both the professional and the visually-impaired older person. A better understanding of the role of depression in the lives of vision-impaired older adults could go far toward offering a more comprehensive approach to both treatment and improving their quality of life. There are twice as many citations in the vision impairment literature regarding children as that of older adults, though older adults are by far the biggest proportion of those visually-impaired (Crews & Whittington, 2000).

Crews (2000) highlights the community based vision impairment research that has been done; there has been little research concerning how social support mediates depression in the visually-impaired older adult. It has been a major difficulty to even know who is vision impaired because the definitions have not been consistent. Estimates vary depending if they are based on self-report, a disease model or functionally based definitions. Also, often older adults, especially those in nursing homes, have not been evaluated for vision impairment.

Some of the basic large scale studies of vision impairment have been (Crews, 2000):

- The *National Center for Health Statistics 1984 Supplement on Aging*, a landmark study on aging, using self-report information from a large sample of older adults concerning a range of health indicators, activity limitation and participation measures. This became the foundation for the Longitudinal Study on Aging (LSOA), the first longitudinal study on aging.
- *Baltimore Eye Survey* (1985-1988)
- *Lighthouse National Survey on Vision Loss* (1994)
- *1994 National Health Interview Survey on Disability, Phase I and II*
- *Second Supplement on Aging 1994 -1996* (SOA II). Because it only provides information on those 70 years of age and over, it will be difficult to compare cross-sectional data with other data sets having age variables at younger age.
- *Second Longitudinal Study on Aging* (1994 – 2000). The SOA II is the baseline for this study. As of 2000 little research using this data set had been published.

None of these studies directly seeks to clarify the effects of vision impairment on depression in relationship to the mediators of health, financial resources and social support.

There is a need for an expanded vision impairment research that can undergird public policy issues for a more effective public health and service focus. At present public policy does not begin to take into account the increasing numbers of older adults experiencing vision impairment and disability as the population ages. Governmental programs rarely offer services for this rapidly increasing population. The study of depression in the visually-impaired older population is needed to improve their quality of life.

### *Summary*

Depression is a social process which must be understood in relationship to both personal and environmental issues. Older adults with more resource capital tend to have better health outcomes in old age and less disability. Resource capital heavily depends on social environmental factors that are stratified according to race, class, gender and age. There appears to be a cumulative stratification disadvantage for those with fewer resources at younger ages when they reach old age. Disability is a social process that affects depression.

Vision loss in later life is one of the most feared and also common losses. It may result in unfavorable consequences in life satisfaction and functioning. Vision loss is associated with personal and environmental loss, reduced mobility, the ability to function independently, lowered personal safety and control, as well as the ability to take part in social activities. It is affected by stratification in race, class, gender and age. Often neither health care providers nor the older adult understand vision impairment, except in terms of loss. Depression is a possible outcome of becoming vision-impaired, but depression as disability arises out of the social context.

Social support has been shown to be a buffer against life course loss and mortality as well as a mediator between functional status and quality of life. There is some evidence that poor social support (social roles and social networks) and depression are related risk factors for the visually-impaired. Most older adult vision impairment studies on depression are small exploratory studies rather than national studies with representative samples. There is a need for depression research in adult vision impairment, using national, representative samples.

### A Social Theory of Aging

A social theory of aging is needed to understand how vision impairment can lead to a possible depression and social disability outcome. A life course perspective can give a foundational understanding to a social theory of aging. The broad prism of a life course perspective offers a “connection between people’s personal attributes, the roles they occupy, the life events they experience, and the social and historical context of these events” (Anderson & Taylor, 2003). A life course perspective is understood in relationship to the passing of time, connecting the past with the present and the future. Through a life course perspective, change can be charted as the aging process changes social economic status as well as the biological and psychological. Added to the life course perspective is the structure of the social stress process model (Avison, W.R. & Cairney, J., 2003; Pearlin, 1989; Pearlin, Liberman, Menaghan & Mullan, 1981). Together, the life course perspective and the social stress process model offer a rich framework for a social theory of aging (Pearlin & Skaff, 1996). Such a framework can strengthen social integration for older adults with the rest of society (Durkheim, 1984), even under difficult circumstances.

#### *A Life Course Perspective*

A life course perspective takes seriously the changes one goes through from birth to death in the context of social structure, social institutions and culture. Common to all life course perspectives are three sociological principles. First, there is an emphasis on individual biography through time. In this context there are two concepts that are central to this view, that of transitions and trajectories (George, 1999). A *transition* is a change in status that has clear boundaries in time as, for example, the life event change that occurs when the older adult gets a diagnosis of vision impairment. A *trajectory* is the pattern over time of stability and change, which often includes a number of transitions, as when the older adult becomes more vision-

impaired, has other health and personal losses or needs more social services. Different role transitions are part of trajectories.

Second, there is an emphasis on the inter-relationship of personal biography and social history; how an older person's personal resources and health conditions intersect with the social time they live. Fewer older adults in the SOA II cohort will have had a high school or college education than those of younger generations. It may therefore be more difficult for them to problem solve than for those with more education. They will also probably have lower lifetime incomes than those with more education.

Third, there is an emphasis on the interdependence of lives through social networks, how social support systems, such as families and friends, interact with the visually-impaired older adult. There are also concerns about social isolation and getting needs met.

A life course perspective offers both the flexibility of choosing different aspects of social variables, as well as the ability to include a variety of social, cultural and individual variables. Earlier formulations of the life cycle in the social sciences sought the normative of a class, culture, cohort or developmental aspect (Cumming & Henry, 1961; Havighurst, 1963). In contrast, a life course perspective allows both social theorists and researchers to create more complex and realistic models which can include positive change as well as loss and decay in the aging process (Baltes, 1993; Riley, Kahn & Foner, 1994; Schaie, 1990). A life course perspective underscores the importance for the stress process model of the continuing interactive process of stress and social support that has a cumulative effect as one ages (Elder, George & Shanahan, 1996).

*The Stress Process Model*

Stress process models are either psychological or sociological models of the psychosocial process. The psychological stress process model emphasizes the individual's ability to cope and master stress, while the sociological stress process model places a greater emphasis on mediating and moderating social influences, as culture, social environment and social economic status. Social support (including social networks and social roles) plays a central role in sociological stress process models and may be interpreted through a life course developmental perspective (Kaplan, 1996; Pearlin & Skaff, 1996).

Older adults have different developmental tasks than adults at younger ages. Because of physical and mental health concerns, as well as environmental loss, it is important for older adults to learn interdependence. Social support can develop interdependence with others. This interdependence must be seen through both the prism of the individual actors' histories, abilities and social roles, as well as the social structures and history of the times.

Sociological stress models describe the origin as well as organization and direction of stressors. Wheaton (1999) describes the sociological approach as "both the rooting and the routing of stress" (p.291). Pearlin et al. (1981) find "that social stress is not a happening; instead, it is a complex, varied, and intellectually challenging process" (p. 352). The result is a sociological perspective on stress, where stressors, mediators, and outcomes are understood in terms of the social structure that shapes them (Pearlin, 1989).

#### *The Stress Process Model and the Life Course Perspective*

Pearlin and Skaff (1996) have emphasized a paradigmatic alliance between sociological stress process theory and the life course perspective. Though the conceptual paradigms of each model have developed independently of the other, research into both theories is concerned with how lives change. Even cross-sectionally, lives are more than a moment in time, but encompass



past life course contexts, as well as social and historical events and situations. Pearlin and Skaff emphasize that as researchers become more aware of life course trajectories, life patterns, they are more able to understand how lives can restructure themselves in the face of aging stressors. The mediation of health, financial and social support resources are important to trace at any point in the aging process.

The stress process model itself can offer researchers an important tool in clarifying life course constructs in terms of historical and social variations between and within cohorts. This model is also helpful in giving a framework for timing and sequencing of transitions in people's lives, clarifying both life satisfaction and successful aging constructs.

Respondents in the SOA II (1994 -1996) survey, for example, would have been born from about the late 1890s to 1924. Major historical markers would have been their age at the beginning and end of the Depression and their ages (if born) during World War I as well as during World War II. For older-old respondents, World War I may have been a war that affected them either personally or through family and friends. Older-old respondents, aged 75 and over, may have been young adults when the Depression started in 1929, ending for many hopes for education and careers. They may have seen their children fighting World War II even if they were too old themselves for combat.

For younger-old respondents, aged 70 to 74, World War I may have been a distant memory; they may have been young children at the start of the Depression. Their childhood and adolescences would have been in the shadow of the Depression and its very difficult economic times. But coming to young adulthood toward the end of the Depression they would have had to taken some part in World War II, even if they remained home working in a local factory. Many would have then been able to take part in the new economic opportunities of the post war era,

including the GI Bill for college education. Older-old respondents, therefore, may have had much more difficult economic life stories than those who were younger-old respondents for this survey. Since health is influenced by education and financial resources this may be a factor in the quality of their old age.

Sociologist Blair Wheaton (1994, 1996) describes stress in terms of the engineering stress model. In his example, a bridge suddenly collapses without a clear precipitating event (in terms of the stress process model, without a life event). Here the continued stress to a system weakens the system to the point that there is a breakdown of the structure itself. The result is a process that has an accumulation of effects rather than a clear beginning and climax.

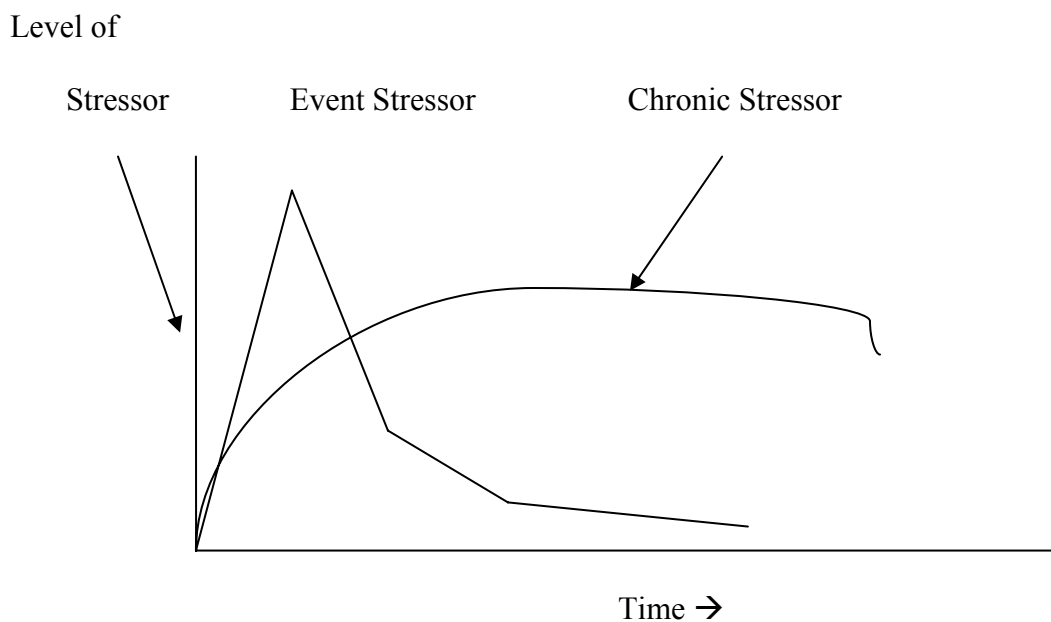
Pearlin (1989) clarifies this conception of stress with the term *chronic stressor*. Chronic stressors can be influenced by a person's coping capacity, which in turn is influenced by a number of mediators including health, financial resources and social support. The end result is that chronic stress can be buffered by these mediators in a changing and dynamic process.

In contrast, *life events* are discrete and observable events that relate to important changes in life. They have a beginning as well as a process of progression. Life event examples are the death of a spouse or the diagnosis of vision impairment. Chronic stressors develop slowly as an ongoing problem in the social world and usually take a longer time than life events to be resolved. Life events may turn into chronic stressors when they are not resolved. Often chronic disease, a chronic stressor, in the older adult starts out slowly and insidiously, building up to an ongoing and life-threatening health problem. Vision impairment may also be considered such a chronic disease stressor, which may only slowly create a major health and safety problem.

Figure 1 depicts the process in time of the event stressor (life event stressor) and chronic stressor. The stress level at any one time may be mediated by health, financial resources and

social supports. When a life event stressor, as for example, the death of a friend who lives in a distant location, does not lead to a chronic stressor, the stress level may soon decrease. But when a life event leads to a chronic stressor, the stress level continues at a higher than normal level. Getting the diagnosis of vision impairment would be a life event stressor, while living with vision impairment would be a chronic stressor.

*Figure 1.* The natural history of event versus chronic stressors. (Wheaton, 1996, p. 45. Used with permission from Elsevier)



#### *Changes in the Stress Process Model Since Its Inception*

The stress process model has undergone change since its first articulation in 1981. In the 1980s Pearlin was especially influential in a number of innovations: 1. chronic stress was added to life events as a central focus of study; 2. social support and personal resource buffers were developed; 3. the elaboration of stress buffering included the impact of earlier stressors on later stressors; 4. the stress process model emphasized the social stratifications of social stressors; 5. the stress process model broke down stress into specific stressors; 6. outcomes were developed which were increasingly varied and complex (Wheaton, 1999).

In the 1990s there developed an increased complexity to the many aspects of the stress model process. Turner, Wheaton and Lloyd (1995) have examined the social distribution of stress exposure; stress is now understood as focal to a process that has many starting points and results. They have found, for instance, that differences in stress exposure are responsible for much more variability in depressive symptoms and depressive disorder than had been previously understood. Stress exposure that is distributed across variables (as sex, age, marital status and occupational status) correspond to distributions of both depressive symptoms and a major depressive disorder across the same variables. This is in contrast to earlier, more psychological findings, which emphasized personal vulnerability differences in stress as being responsible for variations in mental health. The result is a sociological perspective on stress, where stressors, mediators, and outcomes are understood in terms of the social structure that shapes them (Pearlin, 1989).

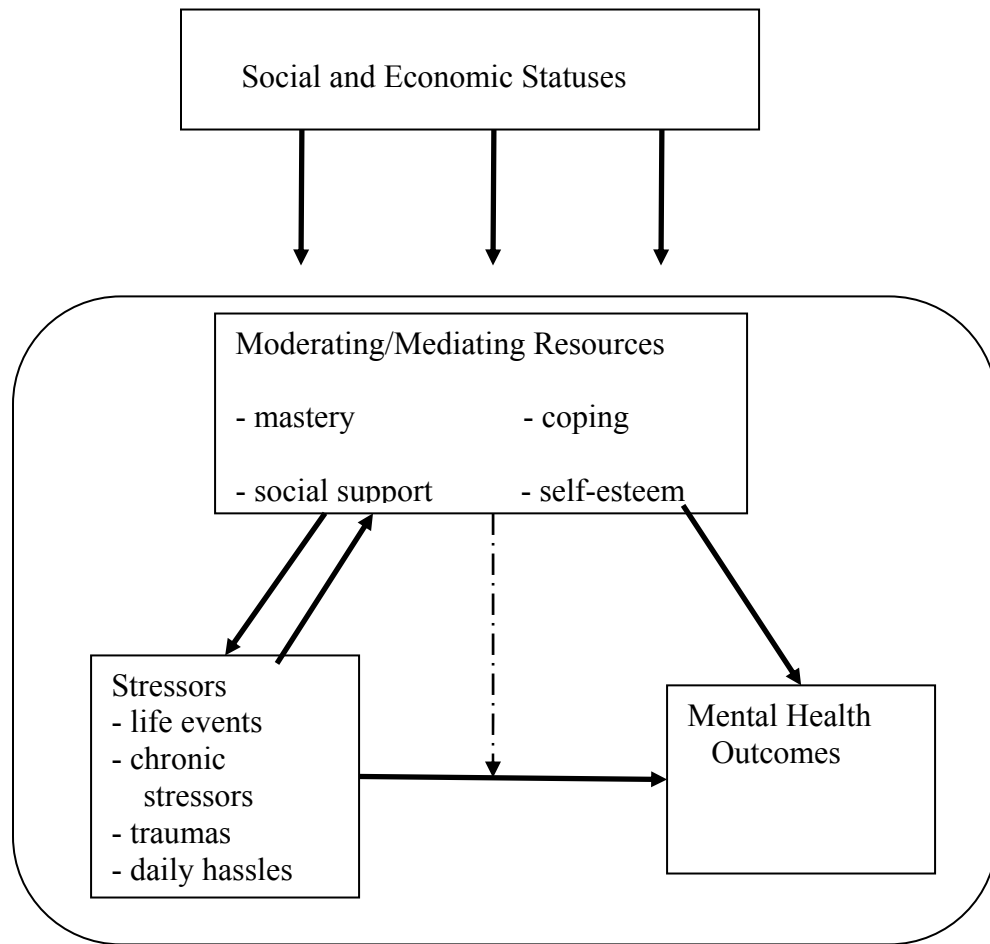
*Other types of stress.* In addition to life events and chronic stressors, there are a number of other types of stressors: daily hassles, nonevents, traumas, and ecological stressors (Wheaton, 1994;1996;1999). If the stress process is a continuum, life events would be at one end and chronic events would be at the other end. In-between in the stress continuum are daily hassles and nonevents; traumas and ecological stressors may be either acute or chronic. *Daily hassles* may seem like chronic stress but are defined more as minor stressors that seem to be a part of everyday life. For the older adult with vision limitations, it may be a daily hassle to perform those ADL (as getting dressed) and IADL (as shopping) activities. *Non-events* are events that one wants or hopes for, but which either do not occur or do not occur when wanted. The non-event of waiting fruitlessly day after day for a son to come for a promised visit can be considered a stressful nonevent for an older adult. A sudden *trauma* is an event that almost anyone would

recognize as out of the ordinary as a stressor. It would be even more traumatic for an older adult to suddenly lose his vision-impaired wife as the result of a fall at their favorite restaurant. This traumatic event would also be a life changing event which might lead to other stressors, including chronic stress. *Ecological* stressors are macro stressors in the environment which are above the individual unit of analysis. When the state and federal government periodically cut back on Medicare or Medicaid, fewer medical and social services are available for many health-challenged older adults, including those visually impaired.

*Stress and mediating variables.* Kaplan (1996) reminds the researcher that a variable with a direct effect in one situation may well also have indirect effects or mediating effects, in other situations. The experience of health-challenged distress in the visually impaired may mediate the relationship with social support, influencing the potency of social support in the stress outcome. An increase in health challenges may also be an outcome of vision impairment, leading directly to an increase in the stress outcome.

Figure 2 shows how social and economic statuses (such as health and financial resources) can impact on mediating resources (such as personal and psychological characteristics as well as social support from the environment). In turn, these mediating resources both impact stressors and mental health outcomes and are impacted by them. In addition, stressors, as a vision impairment diagnosis or living with vision impairment, can also directly impact mental health outcomes as depression.

Figure 2. The stress process model. (Avison & Cairney, 2003, p.129. Used with permission from Springer Publishing Co.)



### *Recent Social Stress Research*

Turner and Lloyd (1999) have studied the ability of the stress process model to account for the social distribution of depression. They conclude that there is a considerable amount of observed differences in depression associated with stratification, as there is more depression associated with lower socioeconomic status. Turner and Lloyd theorize that status differences are

linked to depression because they find important differences in exposure to stress accumulated over time and the availability of coping resources.

Older adults with a physical disability experience the double jeopardy of being both older and disabled in a society where there is a loss of social status for either group. Such a loss may lead to depression. Schieman and Turner (1998) have studied differences in the sense of mastery, as personal control, for older adults with physical disabilities. They have determined that disabled and older adults report lower levels of mastery, suggesting that age and disability have important effects on the sense of mastery. The influence of disability on mastery is influenced by age with the most influence at the higher ages.

There is an increase in stratification when one is older, has less income and education, is disabled and a minority, especially a female minority (Stoller & Gibson, 1997). George and Lynch (2003) have looked at the long term results of stress and depression exposure for African Americans and whites. They conclude that the growth of stress was associated with depressive symptom growth at a greater rate for African Americans than for whites. Lincoln, Chatters and Taylor (2003) have examined the relationships of black and white Americans among social support, negative environmental situations, and personal control and psychological distress. They find that African Americans are more likely to exhibit distress with a loss of social support.

The relationship of vision impaired older adults to social support has been studied in relationship to the social support provided in rehabilitation. Rehabilitation research shows a need for more social support by and to the family as well as to the vision impaired older person (Davis, Lovie-Kitchin, & Thompson, 1995; McCulloh, Crawford & Resnick, 1994; Watson, 2001; Williams, Brody, Thomas, Kaplan & Brown, 1998). The research literature on vision

impairment is in a preliminary stage with mostly small studies that do not encompass the full range of stratification variables in national representative samples.

*A Social Theory of Aging: Interdependence through the Life Course*

Durkheim, in *The Division of Labor in Society* (1984), has conceptualized that modern societies have a distinctly different way of integrating people into society than do traditional societies. In a mechanical solidarity, found in more traditional societies, there is a strong system of connections between the individual and society which is based on customs and religious obligations. Individual autonomy is discouraged as the societal norms dictate thoughts and actions throughout the life course. The individual is always understood in terms of the collective whole and must be subordinate to the group when making decisions. There is a role for each stage in the life course which cannot be altered. For the older person, there is comfort in the continuity with past generations, both in historical continuity as well as in role assignment.

In contrast, in organic solidarity there is much more freedom to move on to another group when the social contract is not fulfilled to one's satisfaction. Yet social contracts involve becoming more reliant on one another as a result of specialized occupations and production processes. No one person can perform all the specialized needs one has for food, clothing and shelter, as well as meaningful pursuits. The result is that in an organic division of labor each person becomes paradoxically more dependent on one another, even as each gains more freedom.

The difficulty in the Western understanding of an organic division of labor is that usually individuals are given status labels in terms of their production or consumption. As a society, what we produce is codified each year in a higher GNP (gross national product); individually it



means having more degrees, a better job, higher pay, or more SES (socioeconomic status) resources. Increasingly though, status also means having increasing consumption abilities. As a society we look for an increase in holiday spending year after year, while individually we want to have a nicer house, car and clothes each year.

Through the socioeconomic lens of production and consumption, those who are best able to produce and consume have more status. Though in a society with an organic division of labor, we are increasingly more dependent on one another, our dependency is hidden. We think we are more independent even while we become more dependent on one another. Older adults often are not able to play this labeling game. As the life course goes on, the older adult often finds less need or ability to either produce or consume for society. When personal or health losses become too great, there is an increasing need to seek out other resources of social networks and roles to make up for these losses. This is perceived as becoming more dependent on others; such direct dependency is not rewarded in our independent-seeking society.

Just by living longer, older adults unmask the great deception in our society, that we are all interdependent with one another; we are all finite; we will all die. As a result of this societal deception, the older adult must often scramble to find needed resources and new social roles at a time of less personal energy and less societal support. Vision impairment starkly accentuates the dependency that lurks behind our proclamations of independent life styles. Perhaps that is why it is so feared, by those of all ages (The Lighthouse, Inc., 1995).

Yet, as Verbrugge & Jette (1994) remind us through their Disablement Process model, a bodily impairment is not a disability. Disability is a social process within a social context. Disability results as the final step when a biological pathology leads to impaired bodily function, which may lead to functional limitations and finally disability. Because one has vision

impairment, therefore, does not mean one has to have a disability outcome. Understanding how stress interacts with the disablement process is central to avoiding such an outcome.

### *Components of a Social Theory of Aging*

First, a life course perspective is needed as a foundational framework to connect people's personal characteristics, their roles in life, and their life experiences in the context of the times. Within the context of a life course perspective, individual biographies are emphasized in terms of transitions, changes in status, and trajectories, pattern of stability and change over time.

Second, a stress process model is needed to buffer mediating social influences which can either promote or hinder well-being and lead to disability.

Third, there is a paradigmatic alliance between the life course perspective and the stress process model, as both are concerned with how lives change in time, where the past influences the present and both influence the future.

Fourth, disability is a social designation which depends on social labeling and is not necessarily a result of mental or physical limitations.

Fifth, social integration is basic to an organic division of labor in a modern society, since the more specialized modern people become the more they need one another. Paradoxically, the more one becomes an individual, the more one has need of the rest of society. An anomic division of labor results when social integration is not working well. Interdependence is needed for social integration, no matter where one is in the life course. We all need one another throughout the life course for health, financial and social resources which are both tangible (instrumental) and intangible (well-being).

Sixth, interdependence is a necessary goal for social integration. There needs to be a balance between dependence and loss versus independence and gain or compensation as one

ages. Independence is increased through 1. health variables that increase well-being, such as higher self-health reports and functioning, lower instances of falls; 2. through financial resources variables that increase well-being, as having more income and education and less dependency on having only public health insurance; 3. through social support variables that are integral to well-being, as functional and structural social support (low levels of lacking social activities, having enough social activities rather than too much or wanting more, social role and social network variables: being married, living with others, and having a living child).

Seventh, the older adult may continue to both produce and consume according to society's mandates, but the older adult's unique gift to society is a life that has modeled itself on social integration, an interdependence with others, including those in other cohorts, and with society as a whole.

### Summary

The relationship between vision impairment and depression can be conceptualized in the paradigmatic relationship between the life course perspective and the stress process model. The disability outcome is dependent on this conceptualization, since disability is a social rather than a biological or psychological designation. The life course perspective and the stress process model work together to enrich each theoretical stance. Both are concerned with how lives change through the life course. As researchers become more aware of transitions (changes in status) and trajectories (patterns of stability and change), they are more able to also make use of the stress process model. Sociological stress process models have become increasingly complex. Social stress has been found to be a process that has a number of starting points and ending points, depending on a wide variety of socioeconomic variables, which may interact with one another, influencing the stress outcome.

A life course perspective understands both stress resources and stressors as either social capital or deficits that have been accumulated over the course of the life course. Vision impairment, in relationship to the stress process model, is a stressor. It can be mediated through other social and health variables (health, financial resources and social support) to influence depression outcomes.

A social theory of aging emphasizes the interdependence of each age cohort with one another. It includes the following concepts: Social integration, or interdependence for the older adult, is found in an organic division of labor which emphasizes 1. a life course perspective; 2. allied with a stress process model; 3. disabilities as social constructs, where society helps the older adult to have the resources for well-being (health, financial resources and social support), thus lowering depression and disability outcomes. In turn, the older adult contributes to society, but often in ways where production and consumption are not central. Instead, the older adult models an integrated life, one that has lived a socially interdependent life; this wisdom is the unique gift of the older adult to society.

## CHAPTER 2

### DATA AND METHODS

Data from The National Health Interview Survey, SOA and the LSOA, have been widely used for both research and policy analysis concerning older adults. The data base began in 1984 with the baseline SOA I and the LSOA I study (1984-1990). There continues to be follow-up information reported from this first seminal study of older adults. This study and its aftermath have greatly increased knowledge of the aging process as well as the interaction of demographic variables with health, functioning, finances, social support, living arrangements and care use. SOA II and LSOA II have continued adding to the knowledge base about older adults, at a time when the goal of good health is both a personal life style goal as well as a national social, political and economic imperative.

The LSOA II is a joint project of the National Center for Health Statistics and the National Institute on Aging (National Center for Health Statistics, 2002). In the baseline SOA II geographic indicators consist of the 50 states and the District of Columbia. It includes the four major census regions: Northeast, Midwest, South, and West. Data was collected in personal interviews as part of the 1994 National Health Interview Survey core interview, which used a stratified multistage probability design and oversampled families of black and Hispanic persons. The baseline interview was administered face-to-face in the home by U.S. Census Bureau interviewers.

#### *Goals of the SOA II*

First, duplicate SOA I to find if disability changes have occurred among older persons from 1984 to the mid-1990s.

Second, get information on the causes and relationships in health and functioning for older Americans. This includes demographic characteristics, health behaviors and beliefs, pre-existing illness, and also social and environmental support.

Third, describe increasing health needs of older adults as they age. This includes care and service utilization as well as how care strategies are utilized and made available for impaired older adults.

Fourth, serve as the baseline for a second national longitudinal study on older Americans, the LSOA II (National Center for Health Statistics, 2002).

### Sample

The LSOA II sample is a prospective study with a nationally representative sample of 9,447 civilian non-institutionalized persons, aged 70 years and over at the time of their 1994 SOA II interview. The LSOA II Survivor data file contains information from a number of sources, including the 1994 NHIS Core Questionnaire, the 1994 Family Resources Supplement, Phase I of the 1994 National Health Interview Survey on Disability, the SOA II (baseline interview), and the LSOA II follow-up interviews.

This research will use the SOA II baseline data for a cross-sectional study. A few of the interview questions for the SOA II have been taken from the 1994 NHIS Core Questionnaire, as respondents were not given the opportunity to respond a second time in the SOA II. Though the respondents were all 70 years and over at the time of the SOA II interview, some were under 70 at the time they were first interviewed.

## Research Variables

### *Variables: Definitions and Coding*

The dependent variable, *depression*, is an ordinal variable which has been recoded from SF1742: “How often felt sad or depressed in past 12 months?” (1 = “all of the time,” 2 = “some of the time,” 3 = “a little of the time” and 4 = “none of the time”). The recode, DEPRS12, is also an ordinal variable with “all of the time” and “some of the time” collapsed into one category. The resulting categories are: 1 = “a little of the time,” 2 = “all or some of the time,” and 3 = “none of the time” (the reference group).

The main independent variable is *vision impairment*, a nominal variable. Vision impairment is defined most generically as having trouble seeing even with glasses. Therefore SF1655, “Trouble seeing even with glasses (one/both eyes)” was used; 1 = “yes” and 2 = “no”. This was recoded into VI with 1 = “yes” and 0 = “no”.

Control variables are used for *age*, *race* and *sex*. SF30 is itself an ordinal age recode (Age Recode #2) as part of the NHIS Core Questionnaire with 8 = “65 - 74 years” and 9 = “75 years and over”. There are no respondents in the categories from 0 through 7 (from under 6 years of age through 55 – 64 years of age). Because of a time lag, these respondents were interviewed for the SOA II and LSOA II, when they were all 70 years or older. This variable has been recoded into AGE, where 0 = “70 - 74 years” and 1 = “75 years and over”.

Although a number of racial variables were inserted into the regression analysis (black and Hispanics were inserted separately), none were statistically significant. SF43, included for theoretical reasons, is a nominal variable where “1 = white” (8,235 respondents), “2 = black” (1,009 respondents) and “3 = other” (203 respondents). This variable has been recoded into

NONWHITE with 0 = “white” and 1 = “nonwhite” (“black” and “other”). As can be seen, most nonwhites are actually black.

Finally, SF25, a nominal variable for sex (1 = “male” and 2 = “female”), has been recoded into MALE with 1 = “male” and 0 = “female”.

Included in health variables are *falls*, *difficulty functioning* and *self-health* status. SF1085 is a nominal variable, “Have you fallen in the last 12 months?” (1 = “yes” and 2 = “no”). This has been recoded into FALL with 1 = “yes” and 0 = “no”.

Difficulty functioning, SF1072, is an ordinal recode of ADLs (activities of daily living) and IADLs (instrumental activities of daily living), a “summary of ADL and IADL difficulty” (1 = “difficulty with 1 + ADL and 1 + IADL,” 2 = “difficulty with 1 + ADL only,” 3 = “difficulty with 1 + IADL only” and 4 = “no difficulty with ADLs or IADLs”). This has been recoded into DIFCN10 with 0 = “no difficulty/unknown difficulty or difficulty with 1 + IADL” and 1 = “difficulty with 1 + ADL or difficulty with 1 + ADL and 1 + IADL”.

Lastly, self-rated health, SF1741, is an ordinal variable with 1 = “excellent,” 2 = “very good,” 3 = “good,” 4 = “fair” and 5 = “poor”. This has been recoded into SLFHETH10 with 0 = “poor” or “fair” and 1 = “good, very good, or excellent”.

The next category of mediating variables is financial resources, which includes *income*, *college education* and *having only public health insurance* (no private health insurance). Income is an ordinal variable, SF57, “family income \$20,000 or more,” with 1 = “under \$20,000” and 2 = “\$20,000 or over”. This has been recoded into INCOME so that 0 = “under \$20,000” and 1 = “\$20,000 or over”.

SF53 is an ordinal recode, “education of individual recode,” where 0 = “none; kindergarten only,” 1 = “1-8 years (elementary),” 2 = “9-11 years (high school),”



3 = “12 years (high school graduate),” 4 = “1-3 years (college),” 5 = “4 years (college graduate),” 6 = “5+ years (post-college)”. SF53 has been recoded into EDCOLL where 0 = “no college” and 1 = “1 or more years college”.

SF594, public and/or private health insurance is a nominal variable where 0 = “not covered by government or private health insurance”; 1 = “covered by government health programs only” (2,240 respondents); 2 = “covered by private programs only”; 3 = “covered by both government and private health insurance” (6,914 respondents); 4 = “covered by government, unknown if covered by private health insurance”; 5 = “covered by private, unknown if covered by government health insurance”; 6 = “not covered by government, unknown if covered by private health insurance”; and 7 = “not covered by private, unknown if covered by government health insurance”. Most respondents fell into either category 1 or 3. This was represented by the recode PBINONLY, “having only public health insurance”, with 0 = “no” and 1 = “yes”.

The last category of mediating variables is social support which is divided into *marital status*, *lacking social activities* (numbers), *having the wrong intensity of social activities* (too much or want more), *not having a living child* and *living alone*. Marital status, SF48, is a nominal variable where 0 = “under 14 years”; 1 = “married-spouse in household”; 2 = “married-spouse not in household”; 3 = “widowed”; 4 = “divorced”; 5 = “separated”; 6 = “never married”; and 7 = “unknown”. This has been recoded into MARRIED where 0 = “not married” and 1 = “married”.

SF497 – 503 variables are nominal social activities engaged in during the past two weeks. SF497: “Get together with friends or neighbors”; SF498: “Talk on telephone with friends or neighbors”; SF499: “Get together with relatives”; SF500: “Talk on telephone with relatives”;

SF501: “Go to church or temple services”; SF502: “Go to movies, sports events, etc.”; SF503: “Go out to eat at restaurant”. These variables have been recoded into an index, with one point for each social activity. This was then made into the variable LKSOC10, “lack social activities”, where 0 = “lacking 0 to 3 social activities during the past two weeks” and 1 = “lacking 4 to 7 social activities during the past two weeks”.

The variable SF506 is a nominal variable: “Present social activities are enough, too much, or want more,” where 1 = “about enough”; 2 = “too much”; 3 = “would like to do more”. This variable has been recoded into the nominal variable NGACTION, “no good activities amount”, where 0 = “enough” and 1 = “too much or want more”.

The next social support variable is the nominal variable SF1592, “any living sons/daughters”, where 0 = “no living sons or daughters”; 1 = “living sons only”; 2 = “living daughters only”; 3 = “both living sons and daughters”; and 9 = “unknown if living sons/daughters”. This has been recoded into NLIVCHID, “no living child” where 0 = “no, has living child” and 1 = “yes, does not have living child”.

The last social support variable is SF1585, “general household composition”, a nominal variable, where 1 = “alone”; 2 = “with spouse only”; 3 = “with spouse and other relatives”; 4 = “with other relatives only”; 5 = “with non-relatives only” and 9 = “unknown”. This has been recoded into ALONEH, “alone at home” (living alone), where 0 = “no” and 1 = “yes”.

*Other variables tested.* Other variables have been tested for the regression analyses but have had too many missing variables (variables SF1595-1615, family relationship and communication variables with the older respondent), have not been significant (variables SF504 - 505, “days left house in the last two weeks”), or have had multicollinearity issues (as using both the variable FALLS and the interaction variable FALLS times MALE).

Table 1  
*U.S. Older Adults, SOA II, 1994 – 1996, Variables in Study (N = 9,447)*

VARIABLE TYPE	NAME	CODING
<i>Dependent Variable</i>		
depression	SF1742, “sad/depressed in last 12 months” recoded into DEPRSS12	2 = some or all 1 = a little 3 = none (3 used because SPSS makes top number reference category for multinomial logistic regression)
<i>Main Independent Variable</i>		
vision impairment	SF1655, “trouble seeing even w/glasses (one/both eyes)” recoded into VI	1 = yes 0 = no
<i>Controls</i>		
1. age	SF30, age recode #2, “65 – 74 years” and “75 years and over” recoded into OLDEROLD (at time of SOA II interview all 70 years and over)	0 = 70 - 74 years (younger-old adults) 1 = 75 years and over (older-old adults)
2. race	SF43, “white”, “black”, “other” recoded into NONWHITE	0 = white 1 = nonwhite (black, other)
3. sex	SF25, “male” and “female” recoded into MALE	1 = male 0 = female
<i>Health</i>		
1. falls	SF1085, “Have you fallen in the last 12 months?” recoded into FALLS	1 = yes 0 = no
		(table continues)

Table 1 (continues)		
VARIABLE TYPE	NAME	CODING
<i>Health</i>		
2. difficulty functioning	SF1072, “difficulty with 1 + ADL and 1 + IADL”; “difficulty with 1 + ADL only”; “difficulty with 1 + IADL only”; “no difficulty with ADLs or IADLs”; “unknown difficulty for all ADLs and IADLs”, “unknown difficulty for all ADLs and IADLs”; recoded into difficulty functioning (DIFCN10)	0 = no diff./unknown/diff. w/1 + IADL 1 = diff. w/ 1 + ADL or diff. w/1 +ADL & 1 + IADL (IADL stands for instrumental activities of daily living; ADL stands for activities of daily living)
3. self-health status	SF1741, “excellent”, “very good”, “good”, “fair”, and “poor” recoded into SLFHETH	0 = poor, fair 1 = good, very good, excellent
<i>Financial Resources</i>		
1. income	SF57 recoded into INCOME	0 = < \$20,000 1 = > or = \$20,000
2. college education	SF53 recode, “education of individual”, “none; kindergarten only”; “1 – 8 years”; “9 – 11 years”; “12 years”; “1 – 3 years (college)”; “4 years (college graduate)”; “5+ years (post college)”, recoded into EDCOLL	0 = no college 1 = 1 or > years college
3. public health insurance only	SF594 recode, “public or private health insurance” (7 categories; see p. 49), recoded into PBINONLY	0 = no 1 = yes
(table continues)		

Table 1 (continued)		
VARIABLE TYPE	NAME	CODING
<i>Social Support</i>		
1. lack social activities	SF497-503 social activities past 2 weeks recoded into index: LKSOC: * “get together w/friends or neighbors” * “talk on telephone w/friends or neighbors” * “get together w/relatives” * “talk on telephone w/relatives” * “go to church/temple services” * “go to movies, sports events, etc.” * “go out to eat at restaurant”	lack activities: 0 = 0 to 3 activities 1 = 4 to 7 activities
2. too much or want more activities	SF506, “about enough”; “too much”; “would like to do more” recoded into NGACTAMT	0 = enough 1 = too much or want more
3. marital status	SF 48, “married-spouse in household”; “married-spouse not in household”; “widowed”; “divorced”; “separated”; “never married”; recoded into MARRIED	0 = not married 1 = married
4. no living child	SF1592, any living sons/daughters recode: “no living sons or daughters”; “living sons only”; “both living sons and daughters”; recoded into NLIVCHID	0 = no 1 = yes
5. living alone	SF1585 , general household composition recode: “alone”; “with spouse only”; “with spouse and other relatives”; “with other relatives only”; “unknown”, recoded ALONEH	0 = no 1 = yes

### Percentages of Variables for Each Sample

Table 2 gives the percentages for depression, the dependent variable, from the sample of 8,176 respondents, aged 70 and over. Though more older adults are depressed none of the time (40%) in contrast to those depressed a little of the time (36%) or depressed some or all of the time (24%), when the two depression categories are added together, more older adults report some level of depression (60%) than not being depressed (40%). Among the older women 34% (versus 49% for older men) are depressed none of the time, while 28% of older women (versus only 18% for older men) are depressed some or all of the time.

Table 2  
*Percentages for Dependent Variable, Depression<sup>a</sup>*

		Whole Sample (N = 8,176)	Men-Only (n = 3,154)	Women-Only (n = 5,022)
Depressed, none	(3) <sup>b</sup>	40	49	34
Depressed, a little	(1)	36	33	38
Depressed, some or all	(2)	24	18	28

<sup>a</sup>Weighted. Numbers and percentages are rounded.

<sup>b</sup>“depressed none of the time” category remains 3 to make it the reference category and make SPSS NOMREG multinominal regression omit it from the regression results.

Table 3 gives percentages for the independent variables in the sample of 8,176 respondents, as well as for men-only (3,154) and women-only (5,022) samples. While 14% of respondents in the whole sample indicated that they were vision-impaired, 15% in the women-only sample were vision-impaired. In the whole sample there were about 48% of younger-old respondents, those aged 70 to 74, and about 52% who were older-old respondents, aged 75 and over; in the gender samples there were 52% of males under age

75, but only 45% of females were under age 75. The race variable was similar for all three samples; about 90% were listed as white and 10% nonwhite, a combination of black and other.

In terms of health mediating variables, about a quarter (24%) of the adult respondents felt they had either poor or fair health. This is similar to those who fell in the last year (21%) and those who had the highest levels of difficulty functioning (26%). Older men had substantively lower rate of falls (18% versus 23%) and difficulty functioning (20% versus 29%) than older women.

The financial resource mediating variables are income, college education and having only public health insurance. While 74% of older respondents have not had any college education, 54% of respondents have a family income of less than \$20,000 a year; only about 21% have public health insurance as their sole health insurance. Older women have far fewer financial resources than older men: 44% of older men (versus 57% of older women) have incomes of under \$20,000; 31% of older men (versus only 23% of older women) have had some college; 20% of older men (versus 22% of older women) have only public health insurance.

There are five social support mediating variables: marital status, lacking social activities, too much or wanting more social activities, living alone and having no living child. While about 47% of the sample is not married at this time, only 37% live alone; this is 20% of older men versus 48% of older women. Only 11% of older men have no living child in contrast to 15% of older women. About a quarter of respondents have social activities that are lacking in number (24%) or a good amount of intensity (27%). This breaks down to more older men (26%) than older women (22%) lacking social

activities in number and fewer older men (26%) than older women (28%) having too much or wanting more activities.



Table 3  
*Percentages for Independent Variables<sup>a</sup>, Whole and Gender Samples*

Variable	Whole Sample (N = 8,176)	Male-Only (n = 3,154)	Woman-Only (n = 5,022)
vision impairment			
yes (1)	14	12	15
no (0)	84	88	85
age			
age 74 and under (0)	48	52	45
age 75 and over (1)	52	48	55
race			
nonwhite (1)	10	9	10
white (0)	90	91	90
sex			
male (1)	39		
female (0)	61		
falls			
yes (1)	21	18	23
no (0)	79	82	77
difficulty functioning			
1+ ADL & 1+IADL or (1)	26	20	29
1+ADL only			
1+ IADL only or (0)	74	79	71
no ADL/IADL/unknown			
self-rated health			
excellent (1)	76	78	76
very good			
good			
fair (0)	24	22	24
poor			
income			
> \$20,000 (1)	46	56	38
< \$20,000 (0)	54	44	57
some college education			
yes (1)	26	31	23
no (0)	74	69	77
public health insurance only			
yes (1)	21	20	22
no (0)	79	80	78
marital status			
married (1)	53	76	38
not married (0)	47	24	62
lack social activities index			
4 – 7 (1)	24	26	22
0 – 3 (0)	76	74	78
too much or too little activities			
too much, wanting more (1)	27	26	28
enough (0)	73	74	72
living alone			
yes (1)	37	20	48
no (0)	63	80	52
no living child			
no living child (1)	13	11	14
yes living child (0)	87	89	86

Weighted Percentages are rounded<sup>a</sup>

In summary, in the SOA II sample of older adults, aged 70 and over, 24% are depressed some or all of the time but 60% has some depression level. While 14% report having vision impairment, only 12% of these are older men, while 15% are older white women who are aged 75 and over. Regarding financial resources, while 74% have had not gone to college, 54% have family incomes of under \$20,000, and only 21% have public health insurance as their sole health insurance. Older women are far more likely to have less education and lower family incomes. Finally, the results of older adults' social support statistics indicate that while 47% are not married, only 37% live alone, with a far higher proportion of older women (48%) than older men (20%) living alone. About a quarter of older adults have lacked social activities during the past two weeks or report having too much or wanting more social activities. This about the same amount as report poorer health through self-report, falls or difficulty functioning. More older women report falling in the past twelve months and having difficulty functioning than older men. More older women have no living child than older men.

### Research Hypotheses

*1. Older adults who have a significant vision impairment will also be significantly more likely to be depressed than older adults without a significant vision impairment, all things being equal.*

Depression in older adults is a significant mental health issue, often undiagnosed and untreated. There are many reasons for this oversight, including a fragmented health care system, believing depression is normal to aging, self-medication with alcohol and other drugs, social isolation, difficulty accessing care because of socioeconomic barriers,

confusing depression with physical ailments as well as the stigma of mental illness for an older population that is not used to professional help for such concerns (Birrer, 1998).

The pathways between disability and depression also indicate that depression affects disability outcomes as well as being affected by disability (Reynolds, 1995). Both depression and disability are associated with vision impairment (Rovner & Ganguli, 1998; Williams et al., 1998). Vision impairment is listed as one of the seven chronic health conditions in middle to later life. By later life, vision impairment, along with arthritis, has a functional limitation impact that is equivalent to fatal health conditions (Verbrugge & Patrick, 1995). Vision impairment is associated with the loss of everyday ADL abilities (Branch, Horowitz & Carr, 1989) and is an independent sensory risk factor for future functional disability (Rudberg, Furner, Dunn, & Cassel, 1993). Older persons are the fastest growing cohort for vision impairment in industrial societies (Watson, 2001).

*1a. Sex will be used as a control variable for this relationship, since women are more likely to be depressed than men.*

In the literature, women are more likely than men to be depressed at any age. Women are two to three times as likely to have major depression (Baker, 1996). As men and women enter adulthood in divergent and often unequal roles, the gender gap for depression widens, with women having increasing depression throughout the life course (Mirowsky, 1996). Women are also more likely to have several of the most common types of vision impairment diseases, including cataracts, diabetic retinopathy and age-related macular degeneration, the last being the leading cause of irreversible vision impairment in the older person (Desai et al., 2001).

*1b. Race will be used as a control variable for this relationship, since many minorities, as blacks, who have on average poorer health and fewer financial resources, are more likely to be depressed than whites.*

Blacks are more likely than whites to have disadvantaged socioeconomic factors which lead to poorer health (Cockerham, 2004; Shea, Miles & Hayward, 1996). The Baltimore Eye Survey determined that socioeconomic status is an important factor in vision impairment (Tielsch, Sommer, Katz, Quigley & Ezrine, 1991). Blacks in this survey were also more likely than whites to have un-operated cataracts or glaucoma, an irreversible eye disease (Sommer et al., 1991). The depression rate for blacks is not clear since there are socio-economic and cultural barriers as well as methodological problems with present surveys (Aetna IntelliHealth Inc., n.d.).

*1c. Age will be used as a control variable for this relationship, since older-old respondents (aged 75 years old and over), having more age-related health challenges, are more likely to be depressed than younger-old respondents (aged 70 to 74 years old).*

According to Mirowsky and Ross (1992), depression is lowest for the middle aged, at about age 45. They find that depression then rises from life-cycle changes in marriage, employment and finances resulting in increased losses as one ages. Depression is highest in adults 80 years and over because of physical and functional losses on top of other losses.

*2. Additionally, the effect of vision impairment on depression will be decreased, all things being equal, by better health as reported in a. lower levels of falls; b. lower levels of difficulty functioning; and c. higher levels of self-reported health.*

Multiple indicators of health have been found to be important in measuring health from a physical and social perspective. Functioning and self-health reports are common ways to assess individual health (Aday, 1993; Cockerham, 2003). In addition, falling in older age has grave implications for both disability and mortality. The First Longitudinal Study on Aging studied the relationship between falls and both mortality and function. It found that the risk for death within two years was greater for those who fell once as well as those who fell a number of times. Those who fell a number of times were more likely to have poorer functional abilities (Dunn, Rudberg, Furner, & Cassel, 1992).

*2a. The effect of vision impairment on depression will be decreased, all things being equal by better health as reported in lower levels of falls.*

Accidents are a leading cause of death in the United States, often resulting from a fall. As adults age they are more likely to have both poor vision and an increase in falls (Daubs, 1973). Vision impairments can lead to being at risk for balance problems and hip fractures from falls (Gerson, Jarjoura, & McCord, 1989; Felson et al., 1989).

*2b. The effect of vision impairment on depression will be decreased, all things being equal by lower levels of difficulty functioning.*

Functional ability is usually conceptualized as the ability to perform ADLs and IADLs or Nagi functional activities. Functional difficulty is related to depression, even without having a specific disease (Zeiss, Lewinsohn, Rohde & Seeley, 1996). Depression, and social support, are factors in the older adult's functional ability (Hays, Saunders, Flint, Kaplan & Blazer, 1997). In a review of the literature, Lenze et al. (2001) found that depression disorders relate to higher disability in a two way direction, both affecting disability and being affected by disability.

Vision impairment is one of nine medical conditions that negatively affect IADL disability. Like strokes and self-reported health status, vision impairment affects half to two thirds of IADL disabilities (Furner, Rudberg & Cassel, 1995) and also affects ADL functional disability (Horowitz, 1994). In a review of the literature, Stuck et al. (1999) found that vision impairment was included among variables giving the greatest evidence for an increased risk in functional decline.

*2c. The effect of vision impairment on depression will be decreased, all things being equal, by higher levels of self-reported health.*

Self-health appraisals have been shown to be more reliable for future health and living than the objective state of one's health (Chipperfield, 1993; Idler and Kasl, 1991). Self-rated health assessments are able to predict later changes in health for both white and black adults. Black adults' self-rated health assessment declined at a faster rate than that of whites. There seems to be a cumulative disadvantage over the life course for black health (Ferraro, Farmer & Wybraniec, 1997).

*3. Additionally, the effect of vision impairment on depression will be decreased, all things being equal, by more financial resources (Aday, 1993; Aneshensel & Phelan, 1999; Cockerham, 2003) as reported in higher levels of a. college education and b. higher income and c. lower levels of having only public health insurance.*

Both education and income separately predict better health outcomes for those with higher socioeconomic status. In time, social stratification of resources affects the health outcomes for the older adult. There is a greater exposure for those with lower SES to many psychosocial risk factors to health throughout the life course, especially in middle and early old age. These risk factors have a greater effect on health as one ages

(House et al., 1994). The Beaver Dam Eye Study studied 4926 adults from 43 to 86 years of age. They found that a lower education and income was associated with cataracts, cataract surgery, and vision impairment (Klein, Klein, Jensen, Moss & Cruickshanks, 1994). Those with higher education levels also look at their health more positively than those with less education (Johnson & Wolinsky, 1993)

There is a gap between self-reported health, functioning and well-being among people of different educational levels that increases as one gets older, becoming a cumulative advantage for those with higher education (Ross & Wu, 1996). On the other hand, a lifetime of traumatic stress results in a cumulative deficit in mental health, which is most apparent as one ages (Turner & Lloyd, 1995). Such traumatic stress experiences are more likely when one is at a lower SES level. The stress process model accounts for the social distribution of depression in terms of lower SES. Those at the lowest SES level are more likely to be depressed (Turner & Lloyd, 1999).

Those with vision impairment are more likely not to have private health insurance (The Lighthouse, Inc., 1995). Having only public health insurance is an indicator of having lower SES, since those with higher SES would have, in addition to Medicare, Medigap or some other private health insurance. Having private health insurance pay for some part of care allows more choices and quality in treatment, as well as access to care itself.

*4. Additionally, the effect of vision impairment on depression will be decreased, all things being equal, by more social support.*

Social support has been found to be an important mediator against depression. A community sample of older adults was studied to see how negative life events, as

bereavement, were buffered by social support (Krause, 1986). Social support also buffered mortality rates for older adults (Blazer, 1982). Dean, Kolody & Wood (1990) report that adult social support can decrease depression, with the strongest effect from spouses, friends and adult children.

Social support can mediate functional status and life quality in the older person (Hays, Saunders, Flint, Kaplan & Blazer, 1997; Krause, 1986, Newsom & Schulz, 1996). Vision impairment has been associated with lower social relationships, making visually-impaired older adults at risk for depression (Carabellese et al., 1993; Hersen et al., 1995).

*3a. The effect of vision impairment on depression will be decreased, all things being equal, by higher levels of being married.*

There is a longevity advantage of the married over those not married, with the greatest advantage being for men. In a study using the First Longitudinal Study of Aging, Goldman et al. (1995) found that marital status has also been related to health and survival outcomes for the oldest adults, though the mortality outcomes are small. Those widowed also are more likely to have poorer health and mortality outcomes.

*3b. and 3c. The effect of vision impairment on depression will be decreased, all things being equal, by lower levels of lacking social activities (numbers) and higher levels of having enough (intensity) of social activities.*

Social activities help the older person integrate into the larger community as part of a social network. Social activities are a medium through which social networks function, as actions taken as part of a social network of family, friends, acquaintances and long time professional advisors. These activities offer the older adult continuity in roles and a window on the outside world in terms of the function and structure of social



support (House & Kahn, 1985). They also act as a kind of bank account that can be used in times of stress (Thoits, 1995). Because this study is a secondary analysis, the number and intensity of social activities can be measured but not the quality.

*3d. The effect of vision impairment on depression will be decreased, all things being equal, by lower levels of not having a living child.*

Older adults in this study, who were born from about 1924 or earlier, have a more traditional understanding of families and social roles than those younger. Having children has traditionally been a central, if not the main purpose, of marriage; most older adults having been married at one time. Therefore having a living child may provide role identity and continuity as well as buffer against aging losses and needs. Krause (1994) found that the most salient social roles are that of spouse, parent and grandparent.

*3e. The effect of vision impairment on depression will be decreased, all things being equal, by lower levels of living alone.*

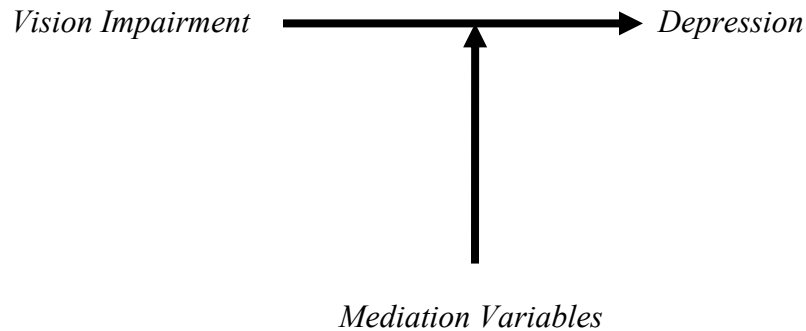
*The Lighthouse National Survey on Vision Loss* (1995) has found that the typical profile of an older vision-impaired person is that of one who lives alone. Living alone may more socially isolate the older adult than living with others, though Chappell and Badger (1989) rightly point out that the emotional quality of social interactions must be taken into consideration. But for the older vision impaired adult it may not be enough to have close confidants by phone or even personal visits if daily needs are not being met. Living with others as spouse, family, friends or even acquaintance may be an important instrumental source of aid. It must also be remembered that vision impairment services are most often either unavailable or unknown to those who need such services (Crews,

2000). Informally, family, friends and even neighbors must take up the slack; living with others is a basic way to get consistent aid when it is needed.

### *Hypotheses Model*

Figure 3 depicts the relationships between the independent variable, vision impairment (stressor), and the dependent variable, depression (stress outcome). The control variables used in the regression are sex, race and age. There are three types of mediation variables which influence the outcome of depression: health (falls, functional difficulty, and self-rated health), financial resources (income, college education, and having public health insurance only) and social support (marital, lack social activities, too much or wanting more social activities, living alone, and having no living child).

Figure 3. Hypotheses Model



*Health:* falls, functional difficulty, self-rated health

*Financial Resources:* income, college education, public health insurance only

*Social Support:* marital, lack social activities, too much or wanting more social activities, living alone, having no living child

*Control Variables:* sex, race, age

#### *Disability Model as a Conceptual Model*

Disability is a social designation which is determined by stressors in the context of a person's cumulative life course perspective (individual biography in relationship to gender, age, and race), social roles, as well as personal and social history. Stressors are mediated through health, financial resources and social support variables. The possible depression that results may lead to a disability outcome. Disability can be the outcome for any age, but as one ages it often becomes more difficult to do everyday activities that one used to take for granted.

When vision impairment is the stressor, there are a number of ways to view the resulting stress. It can be understood as a life event, as when the doctor gives you the diagnosis of vision impairment; it may also be understood as a chronic stress, since there are no cures for many types of vision impairments. In addition, vision impairments may

even sometimes fluctuate from day to day in intensity and are often progressive limitations. Stress from vision impairment can also be understood as a traumatic stress, when a person's life satisfaction dramatically decreases. Finally, stress from vision impairment can be understood as a daily hassle, as when day after day it is difficult to care for yourself: as dressing, eating, and bathing. In order for disability not to be the outcome of depression there needs to be a higher quality of life in terms of health, financial resources and social support variables.

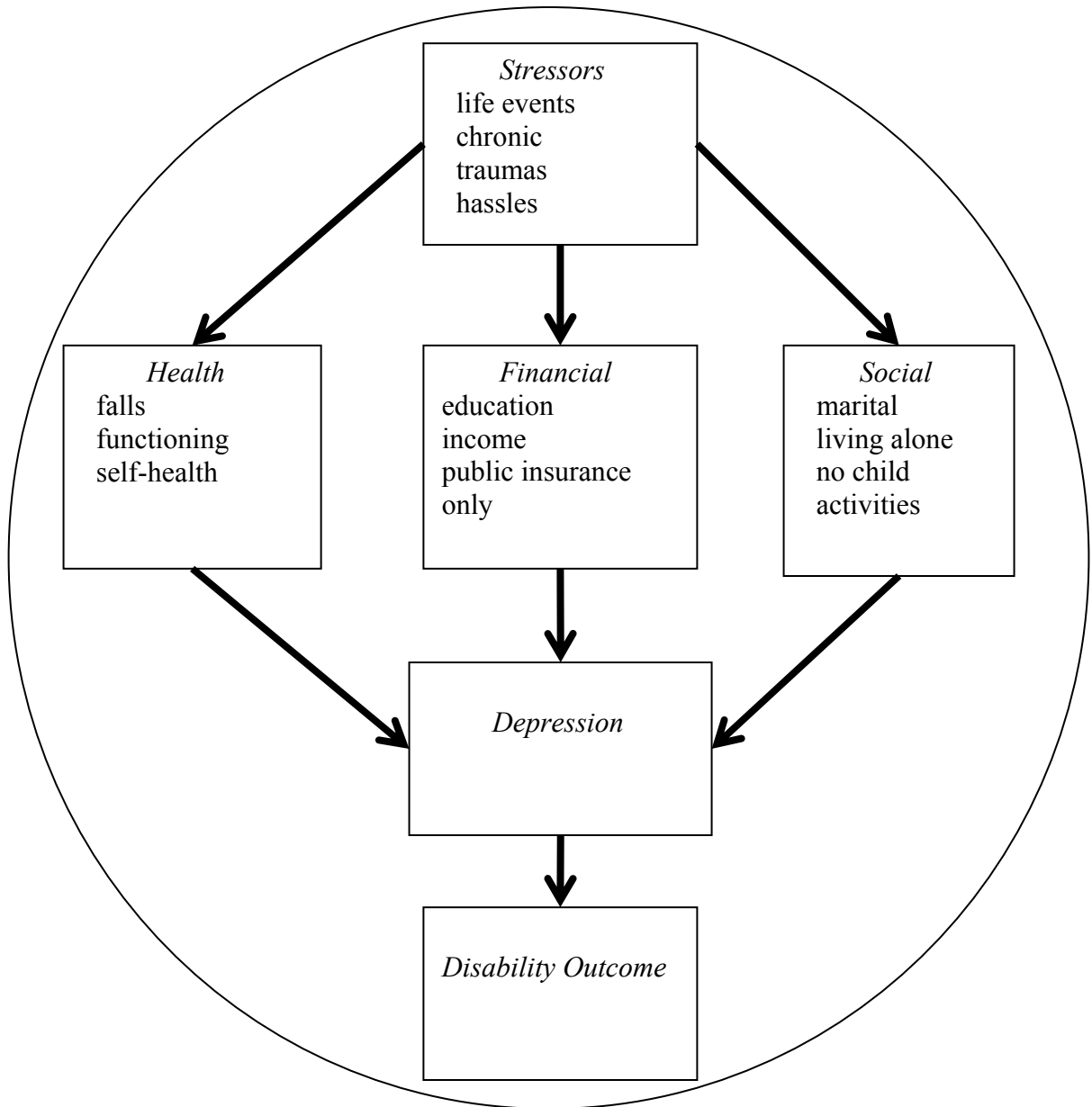
The quality and quantity of health, financial resources and social support variables are dependent on the whole life course, the resources that have been built up and saved through the years as well as any present resources that are added to overcome a stressor. Figure 3 depicts the Disability model, a conceptual model, which can be both a generic disability model as well as a model to explain the impact of vision impairment as a stressor.

Figure 4. Disability model.

*Stressor:* Vision Impairment

*Context:* Cumulative Life Course Perspective:

1. individual biography: gender, age, race
2. roles
3. personal and social history



## Statistical Procedures and Research Design

Bivariate tables have also been made for all the categories of the dependent variable with each independent variable (Healey, 1999). In order to create bivariate tables, the dependent variable, depression, was measured at the ordinal level as a dummy variable with the categories depressed none of the time (reference category), depressed a little of the time and the two smallest depression categories collapsed into depressed some or all of the time. The results indicate the strength of a relationship between the category of depression and a particular independent variable. Bivariate tables have been made for the whole sample as well as the male-only and female-only samples.

*Multicollinearity testing.* In order to test for multicollinearity, a correlation matrix has been made of all the independent variables (see Appendix, Table A1, p. 140). Since none of the variables are correlated above .80 and this is a large data set, there does not appear to be a multicollinearity problem (Allison, 1999).

### *Regression Procedures*

Logistic regression procedures were used for the three samples (whole sample, men-only and women-only samples) in order to determine the effect of vision impairment on depression, while accounting for the mediating variables. Logistic regression can be used for all levels of variables while an OLS (Ordinary Least Squares) regression is usually best used for interval or ratio level variables. Logistic regression is also more flexible than other statistical procedures; it makes no assumptions about the distributions of the independent variables, which do not have to be normally distributed, linear or have an equal variance within each group (Tabachnick & Fidell, 2001).

Other advantages of logistic regression are that it has many analogies to OLS regression since 1. coefficients are like  $b$  coefficients in the logistic regression equation; 2. the standardized logit coefficients correspond to beta weights; 3. there is a pseudo  $R^2$  statistic to summarize the amount of variation explained by the independent variables on the dependent variable categories (Tabachnick & Fidell, 2001; Garson, 2004).

Because the dependent variable, depression, is ordinal an ordinal logistic regression procedure was attempted. When this procedure did not pass the parallel lines test, a multinomial logistic regression was used. In addition, an OLS regression was done in order to compare with the two logistic regressions, since no one regression approach was without some statistical limitation. The resulting outputs from the three regressions are described in the next chapter.

In order to weigh the data to make it a more representative sample, the weight variable SF201 was divided by the mean of SF201 for the number of respondents on which the regression was performed (whole sample, male-only and female-only samples). This follows the recommendation of Tsao and Glynn (2003) at the Center for Social and Demographic Analysis. They note that the SPSS weight procedure does not normalize the weights on its own. The mean of the weights has to be adjusted so that it is 1.

### Summary

This study used data from the Second Supplement on Aging, 1994 - 1996 (SOA II), the baseline for the Second Longitudinal Study on Aging (1994 – 2000). It is a prospective study with a nationally representative sample of 9,447 civilian non-institutionalized persons, aged 70 years and over. Among older adults, aged 70 and over, 60% report some level of depression with 24% reporting being depressed some or all of

the time; 14% report being vision impaired. This sample is mostly white (90%), female (61%) and married (53%) without a college education (74%) with family incomes of under \$20,000 (51%). In terms of their health, about a quarter of the sample rate their health as either fair or poor, have difficulty functioning or have fallen during the past 12 months. About the same percentage lack social activities or report having too much or want more social activities.

Bivariate tables were made for the whole sample, as well as for the men-only and women-only samples. The dependent variable, depression, the possible stress outcome, has three categories: depressed none of the time, depressed a little of the time and depressed some or all of the time. The main independent variable, the stressor, is vision impairment, which has two categories: yes and no. There are three control variables: sex, race and age. The mediating variables are divided into three main types: health (falls, difficulty functioning and self-health), financial resources (income, college education, and having public health insurance only) and social support (marital, lacking social activities, too much or wanting more social activities, no living child and living alone). It does not appear that there is a multicollinearity problem.

The data fit the use of a logistic regression procedure. Because the dependent variable, depression, is at the ordinal level of measurement, an ordinal logistic regression procedure was attempted, but all the models failed the parallel lines test. Therefore, a multinomial logistic regression procedure was implemented. All data were weighted in order to make it a more representative sample. An OLS regression was also made for the whole sample in order to test for the robustness of the results with ordinal and multinomial regression procedures. All three regressions give similar results.



## CHAPTER 3

### FINDINGS

#### Whole Sample

##### *Bivariate Analysis*

Table 4 examines the relationship for all of the respondents among three categories of the dependent variable: never depressed, depressed a little of the time and depressed some or all of the time and each independent variable. There are 40% (3,267) who report being never depressed, 36% (2,955) report being depressed a little of the time and 24% (1,953) report being depressed some or all of the time. The percentages for each depression category are higher when vision impairment is cross-tabulated with depression, especially for those depressed some or all of the time (36% vision-impaired versus 24% who are not vision-impaired), while only 27% of those vision-impaired are never depressed (versus 40% vision-impaired who are not vision-impaired) ( $p < .001$ ).

Sex, age and race are the three control variables used in this study. Both sex and race (nonwhite) are also significant ( $p < .001$ ). Women are less likely to be never depressed than men (34% women versus 49% for men), but more likely to be both depressed a little of the time (38% women versus 33% for men) and depressed some or all of the time (28% women versus 18% for men). Both those who are nonwhite and white report similar depression amounts for those never depressed (38% nonwhites versus 40% whites) or being depressed a little of the time (33% nonwhites versus 36% whites). However, nonwhites reported being depressed some or all of the time at a much higher rate than whites (30% nonwhites versus 23% whites).

The three health variables (self-health, difficulty functioning and falls), are significant at the same level ( $p < .001$ ). Respondents who report being in better health (excellent, very good or good) are more likely to also report being never depressed. Respondents who report being in worse health (fair to poor) are more likely to report being increasingly more depressed as the severity of the depression category increases (from depressed a little of the time to depressed some or all of the time). Thus, while only 16% of those in poor health report being never depressed, 23% report being depressed a little of the time and 61% report being depressed some or all of the time. This progression is reversed when health is excellent, so that the highest percentages are now never depressed (57%), with 32% depressed a little of the time and the lowest percentages are depressed some or all of the time (11%). There is the same progression in functioning; those who have the most difficulty functioning also report more depression at the some or all of the time category (43%). This is in contrast to those having less difficulty functioning who are depressed some or all of the time (17%). Those who report having fallen in the last twelve months, also are more likely to have a depression category (68%) than those who have a depression category but not fallen in the past twelve months (58%).

The three financial resources variables (income, some college education and public health insurance only) are also significant ( $p < .001$ ). Regarding family income, those with the higher incomes report lower depression levels. For those with incomes over \$20,000 a year, 44% report being never depressed and 19% reporting being depressed some or all of the time. However, for those with a family income of \$20,000 or under, only 36% report being never depressed, while 28% report being depressed some or

all of the time. Among those with some college education, 45% report being never depressed, in comparison to 38% being depressed a little of the time, and only 17% being depressed some or all of the time. Among those with no college education there are fewer who are never depressed (38%) and more who are depressed some or all of the time (28%). Finally, those who have only public health insurance are more likely to be depressed some or all of the time (32%) than are those with other forms of health insurance (22%).

Among the five social support variables (marital status, living alone, no living child, lack social activities and too much or wanting more activities) all, except the no living child variable, are at the  $p > .001$  significance level. A much higher percentage of those married report being never depressed (44%) than those not married (35%). More respondents who live with others report being never depressed (43%) in contrast to those who live alone (35%). At the highest depression level, a higher percentage of those who live alone report being depressed some or all of the time (27%) than those who live with others (22%).

The relationship between those who do not have a living child and depression is insignificant in the bivariate output. This brings into doubt the importance of this variable at the bivariate level of analysis; though in the later multinomial logistic regression it is significant for females who are more likely to be depressed when they have a living child.

Both those who lack social activities and those who have too much or wanting more social activities are more likely to report depression, especially at the depressed some or all of the time category. Only 36% of those lacking social activities at the highest level are never depressed, while 44% of those lacking the fewest social activities are not

depressed. While only 28% of those with the wrong intensity of social activities (too much or wanting more) are not depressed, 45 % of those with enough social activities are not depressed.

Table 4

*Frequencies and Percentages of Depression Categories by Independent Variables, Whole Sample (N = 8,176)<sup>a</sup>*

Variables	Depressed		
	Never	A Little	Some or All
depressed	3,267 (40)	2,955 (36)	1,953 (24)
vision impairment***			
yes (1)	300 (27)	409 (37)	404 (36)
no (0)	2,912 (42)	2,491 (36)	1,481 (22)
sex***			
male (1)	1,565 (49)	1,046 (33)	572 (18)
female (0)	1,702 (34)	1,909 (38)	1,382 (28)
age			
age 65 – 74 (0)	1,559 (40)	1,450 (37)	901 (23)
age 75+ (1)	1,708 (40)	1,506 (35)	1,053 (25)
race***			
nonwhite (1)	300 (38)	259 (33)	234 (30)
white (0)	2,967 (40)	2,696 (36)	1,719 (23)
self-health***			
excellent (4)	632 (57)	359 (32)	120 (11)
very good (3)	1,004 (46)	829 (38)	324 (15)
good (2)	1,156 (39)	1,128 (38)	686 (23)
fair (1)	395 (27)	531 (36)	539 (37)
poor (0)	75 (16)	103 (23)	276 (61)
difficulty functioning***			
1+ ADL & 1+ IADL (3)	392 (25)	492 (32)	670 (43)
1+ ADL only (2)	209 (35)	239 (40)	147 (25)
1+ IADL only (1)	258 (31)	32 (40)	240 (29)
no ADL/IADL/unknown (0)	2,409 (46)	1,899 (36)	896 (17)
falls***			
yes (1)	545 (32)	631 (37)	537 (31)
no (0)	2,712 (42)	2,317 (36)	1,409 (22)
income***			
>\$20,000 (1)	1,579 (44)	1,330 (37)	665 (19)
<\$20,000 (0)	1,500 (36)	1,492 (36)	1,174 (28)
some college education***			
yes (1)	960 (45)	827 (38)	360 (17)
no (0)	2,307 (38)	2,129 (35)	1,593 (26)
public health Insurance only**			
yes (1)	635 (36)	546 (31)	564 (32)
no (0)	2,632 (41)	2,409 (38)	1,390 (22)
marital status***			
yes (1)	1,903 (44)	1,497 (35)	906 (21)
no (0)	1,364 (35)	1,458 (38)	1,048 (27)
living alone***			
yes (1)	1,045 (35)	1,158 (39)	800 (27)
no (0)	2,222 (43)	1,797 (35)	1,154 (22)
no living child			
no living child (1)	436 (42)	357 (34)	249 (24)
yes living child (0)	2,820 (40)	2,591 (36)	1,696 (24)

(table continues)

Table 4 (continued)  
*Frequencies and Percentages (%) of Depression by Independent Variables (N = 8,176)<sup>a</sup>*

<u>Variables</u>	<u>Depressed</u>		
	<u>Never</u>	<u>A Little</u>	<u>Some or All</u>
lack social activities index***			
lack 6 – 7 activities (3)	127 (36)	94 (27)	127 (36)
lack 4 – 5 activities (2)	534 (34)	494 (32)	527 (34)
lack 2 – 3 activities (1)	1,265 (40)	1,172 (37)	757 (24)
lack 0 – 1 activities (0)	1,307 (44)	1,172 (39)	520 (17)
over/under activities***			
too much, want more (1)	614 (28)	790 (36)	766 (35)
enough (0)	2,629 (45)	2,124 (36)	1,148 (20)

<sup>a</sup>Total may not equal 100% due to rounding. Weighted.  
 \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$  (significance for Pearson  $\chi^2$ )

In summary, for the bivariate table, all the independent variables are correlated with the three categories of the dependent variable, depression, ( $p < .001$ ) except age and no living child. Women are more likely to be depressed than men at both levels of depression. Nonwhites have a higher percentage of being depressed some or all of the time than whites. Vision impairment, sex, race, health, financial resources and most of the social activities variables (marital status, living alone, lacking social activities and too much or wanting more social activities) correlate with a depression category. Those reporting being depressed a little of the time, and especially depressed some or all of the time are more likely to have fewer social capital resources

#### *Ordinal Logistic Regression and the Parallel Lines Test*

Ordinal logistic regression is a procedure that tests different models of variables that are used when there are several categories of an ordinal dependent variable. It is often used as an alternative to an OLS regression which is normally used when the dependent variable is at an interval or ratio level of measurement. An ordinal variable may not approximate a normal distribution; biased results are likely using OLS

regression. In addition, the distances between categories may not be constant, as in variables that are at least at the interval level of measurement. Because of such concerns, it is better to use a regression technique that is designed for dependent ordinal variables, such as ordinal logistic regression (Hoffman, 2004).

The SPSS PLUM procedure for ordinal regression was followed, which can calculate logistic regression models for ordinal dependent variables. It uses a cumulative logistic model for the dependent variable which assumes that the coefficient, known as the *b* or the slope, for each independent variable does not change in the different models (understood as parallel slopes or lines). In this understanding, only the intercept is different for each model with the effects of the independent variables constant in each comparison model, giving the same odds ratio (Menard, 2002).

It is important to test the null hypothesis that the odds ratios for each category are not significantly different from one another. SPSS can be used to test the parallel lines assumption of ordinal logistic regression, which is based on a chi square distribution. When the parallel lines test is calculated for each model, the null hypothesis fails for each model ( $p < .000$ ). According to the parallel lines test, in order to use ordinal regression, the odds ratios for each category cannot be assumed to be significantly different from one another. Therefore, a statistical procedure that does not assume parallel slopes would be more appropriate (Hoffman, 2004; Menard, 2002). The results of the parallel lines test indicate that all of the models failed the test (see Appendix, Table A2, p.141).

According to Fry and Harris (1998), though data may fail the parallel lines test, it may still have some empirical validity. Some aspects of the ordinal regression procedure therefore may still be valid, since the parallel lines assumptions may be too restrictive.

They suggest using more than one statistical procedure to determine whether there is a conflict of inference.

A multinomial logistic regression was used as well, as it is a possible alternative to ordinal logistic regression when the parallel lines test fails (Menard, 2002). Like the ordinal regression, it is also based on logistic regression, but at the nominal level. Each dependent category is deemed separate from the others and cannot be rank ordered. The ordinal logistic regression outputs (see Appendix, Table A3, p.142) are similar to that of both the multinomial logistic regression and an OLS regression that was also done (see Appendix, Table A4, p.143).

In all three regressions (using the depressed some or all of the time category in the multinomial regression), all the variables are significant except race, public insurance only and marital status. In all three regressions the same variables are also substantively significant: vision impairment, sex, age, the two social activities variables and all three health variables. Since all three regressions are similar, the results can be said to be robust, even though each regression method had some weaknesses to it. The multinomial logistic regression procedure was also used for the men-only and women-only samples.

#### *Interpreting Multinomial Statistics*

There are a number of methods used to evaluate statistically the contribution of an independent variable to a dependent variable in a model. One type is the goodness-of-fit test, which compares observed with expected frequencies for each model. The Likelihood Ratio test, one variety of such tests, is thought to be more accurate than alternative statistical procedures (Menard, 2002). In this study each model's contribution to the whole model was assessed using the Likelihood Ratio test, a maximum-likelihood



method. In logistic regression rather than looking for the increase or decrease in the  $R^2$  as variables are added or removed from a model, one can look for the change in the  $-2 \log$ -likelihood. Here the logistic regression procedure is calculated with and without the variable being tested, using a chi-squared distribution.

Two models, one the smaller restricted model and the other the nested model, are compared. All the variables of the smaller model have to be in the larger model. The two models are compared by computing the difference in their log-likelihoods and using the chi-square statistic. The likelihood ratio =  $-2LL$  (reduced model) -  $[2LL$  (full model)]. In the chi-square distribution there are  $k$  degrees of freedom, where  $k$  is the difference between the number of parameters in the two models. The null hypothesis for the likelihood ratio is that the coefficients are 0 of the terms that are left out from the full model. Usually, as independent variables are added, the log-likelihood decreases.

However, for the multinomial logistic regression models used in this study the log-likelihood did not decrease in succeeding models. The Log Likelihood test, therefore, cannot affirm an adequate goodness-of-fit model, perhaps because of the very large sample used for this study. Tabachnick and Fidell (2001) point out that when the “sample size is very large, almost any difference between models is likely to be reliable (statistically significant) even if it has no practical importance” (p.537). Though the multinomial logistic regression models do not pass the Likelihood Ratio test, this may not indicate a poor model fit.

Two other goodness-of-fit tests were also used, the Pearson and the Deviance tests. In both tests, when the statistics are significant, the null hypothesis, that the model fits the data, can be rejected (see Appendix, Table A5, p. 144). The Pearson test passes

models one, three and four ( $p < .05$ ) while the Deviance test passes model one only. Since the Deviance test is based on the  $-2 \log$  likelihood (Menard, 2002), and the Log Likelihood test did not pass as a statistical test of model fit, it is not surprising that the Deviance test also fails as a statistical model fit test. Only the Pearson test passes model four, the full model ( $p < .05$ ).

Another way to test for model fit is by adding predictor variables, which improves the outcome from model one through model four. In OLS regression, the  $R^2$  statistic is used to show how much of the variance is accounted for by the independent variables in each model. In logistic regression the Nagelkerke statistic is often used as a pseudo  $R^2$  to determine the goodness-of-fit of the model.

When the results of the pseudo  $R^2$  statistic are analyzed for the multinomial logistic regression output, there is an improvement in the goodness-of-fit as each set of predictor variables is added. The Nagelkerke statistic ranges from 0 to 1, with the higher the number, the better the model fit. The values in logistic regression are typically much smaller than in linear regression and harder to interpret (Norusis, 2000).

It is also more difficult to interpret logistic regression coefficients than OLS coefficients. Logistic regression procedures estimate log-odds in order to measure the association between the dependent variable and the independent variable, controlling for the other independent variables. Odds ratios are calculated by taking the anti-log (exponential) of the parameter ( $B$ ). Odds ratios are easier to interpret and understand than log-odds. Odds ratios give the change in the likelihood of being depressed for each one-unit change in a given independent variable, when all other variables are held constant. An odds ratio greater than 1 indicates that the odds of being depressed increases when the

independent variable increases. An odds ratio of less than 1 indicates that the odds of being depressed decreases when the independent variable increases. To clarify the findings, the percentage change in odds is calculated. The odds ratio contains the same information as the logistic regression coefficient or the probability. It is simply a different way to present the information.

Generally, the independent variables have two values, 1 (the group being compared to the reference group) and 0 (the reference group). The antilog  $\text{Exp}(b)$  is tabulated and is called the odds ratio here. The formula for calculating the percentage change in odds between the group signified by 1 and the reference group (group 0) is:  $100(\text{odds ratio} - 1)$ . Therefore, if the odds ratio is 1.20, then the percent change in odds is  $100(1.20 - 1) = 100(.20) = 20\%$ . A *one* value of the independent variable increases the odds of being depressed by 20%, over the reference group, all other things being equal.

A corresponding formula for calculating the percentage of the reference group (0) compared to the group one is  $100(\text{one divided by the odds ratio, minus } 1)$ . Therefore, if the odds ratio is 1.20, that percent change in odds is  $100(1/1.20 - 1) = -17\%$ . This means that the reference group is 17% less than group one.

To summarize, four goodness-of-fit tests were used to assess model fit: the Likelihood Ratio test (failed to pass); the Deviance test (failed to pass model four); the Pearson test, which alone passed model four, the full model. In addition, a pseudo  $R^2$  (Nagelkerke) was used as a goodness-of-fit statistic, which will be analyzed in the next section. Logistic regression coefficients are more difficult to analyze than coefficients in

OLS regressions. Calculating the odds ratio from the anti-log of the parameter, offers an easier interpretation of logistic regression coefficients.

*Results of Multinomial Logistic Regression for the Whole Sample*

The model chi-square is significant for each of the four models ( $p < .001$ ). In model four, the full model, the pseudo  $R^2$  increases to .141 for the weighted sample. The results of the multinomial logistic regression are tabulated for the main predictor, vision impairment, and the control variables on the three depression categories. As can be seen, both vision impairment and sex are significant ( $p < .001$ ) for both depression levels. Those who are vision impaired have 1.58 times the odds of reporting having depression a little of the time and are 2.58 times as likely to be depressed some or all of the time ( $p < .001$ ). Female respondents are 2.16 times more likely than male respondents to be depressed some or all of the time ( $p < .001$ ). The only time race is significant for any of the models is for model one, where those who are nonwhite (black or other) are 1.34 times more likely to be depressed some or all of the time ( $p < .01$ ).

In model two, for both depression categories, older adults with vision impairment are more likely to have a depression category (be depressed either a little of the time or depressed some or all of the time), be a younger-old woman, aged 70 to 74. The three health variables (falls, difficulty functioning and self-health report) produce the highest increase in the pseudo  $R^2$  which increases from .047 in model one to .111 in model two. This indicates the importance of the health variables in the relationship between vision impairment and depression. The three health variables are all highly significant for both depression levels, but especially at the higher level. Those who have fallen in the last twelve months are 1.35 times as likely to be depressed some or all of the time.

Respondents, who have more difficulty functioning, are 1.75 times as likely to be depressed some or all of the time. Finally, respondents who have worse self-health assessments (fair to poor) are 3.16 times as likely to be depressed some or all of the time.

In model three the financial resources variables (family income, some college education and having only public health insurance) are added. This only slightly increases the pseudo  $R^2$  to .122. Again, vision impairment, gender and age, as well as the three health variables, continue to be very significant. The three financial resources variables make a difference for the older adult at the higher depression level. Older vision impaired adults with a family income of equal to or over \$20,000 are 20% less likely to be depressed some or all of the time ( $p<.001$ ). Those with at least some college education are 25% less likely to be depressed some or all of the time ( $p<.001$ ). Respondents who have only public health insurance, rather than either only private health insurance or a mix of public and private health insurance, are 1.21 times as likely to be depressed some or all of the time ( $p<.05$ ).

In model four the pseudo  $R^2$  increases almost .02 points to .141, with the addition of the five social support variables (marital status, living alone, having no living child, lacking social activities and having too much or wanting more social activities). The greatest impact is found at the depression category of depressed some or all of the time. Those with vision impairment are 1.82 times as likely to be depressed some or all of the time ( $p<.001$ ); women are 2.02 times more likely to be depressed some or all of the time ( $p<.001$ ); younger-old respondents, aged 70-74 years of age, are 1.21 times as likely to be depressed some or all of the time than older-old respondents, aged 75 and over ( $p<.01$ ).

Among the health variables, self-health reports continues to be very significant ( $p<.001$ ) for both depression levels. The other two variables, falls and difficulty functioning, are also highly significant ( $p<.001$ ) in the depressed some or all of the time category.

The financial resources variables are only significant at the depressed some or all of the time category. Income and education also have the most importance for those at the depressed some or all of the time category. Among financial resources variables, for those with a family income of \$20,000 a year or more, there is a 17% decrease in the likelihood of feeling depressed some or all of the time ( $p<.05$ ). For those with some college education there is a 23% decrease in feeling depressed some or all of the time ( $p<.001$ ).

At the depressed a little of the time category, three social support variables are significant: no living child, living alone and having too much or wanting more social activities. At the depressed some or all of the time category, all the social support variables are significant except being married. Those having no living child are 16% less likely to be depressed a little of the time ( $p<.05$ ) and 21% less likely to be depressed some or all of the time. Respondents having too many or too few social activities are 1.48 times as likely to be depressed a little of the time ( $p<.001$ ) but 2.06 times as likely to be depressed some or all of the time ( $p<.001$ ) than those who have enough social activities. Those who live alone are about 1.25 times more likely to be depressed either a little of the time; some or all of the time ( $p<.05$ ). Those who lack more social activities are 1.45 times as likely to be depressed some or all of the time ( $p<.001$ ) than those who have more social activities.

In conclusion, the main predictor, vision impairment, is significant for both depression categories in all four models, as is the sex variable. Women are more likely to be depressed when vision impaired in both depression categories, as they are throughout the life course even without impaired vision. Race is not significant, which may be because of the small number of nonwhites (black and other) in the sample, about 10%. Race, however, has been a factor in other studies on vision impairment. Those who are younger-old adults, 70 to 74 years of age, are more likely to be depressed in both depression categories than the older-old adults, 75 years and over, when they are vision impaired. The age finding is the opposite of the hypothesis, which states that the older-old vision-impaired adult will be more likely to be depressed.

The health variables increase the pseudo  $R^2$  factor from .047 in model one to .111 in model two, which is the greatest increase for any of the four models. Falls and self-health are especially significant for both depression categories. For those depressed in the some or all of the time category, all three health variables show substantive importance to the depression outcomes. Of the financial resources variables, the most significance occurs for the depressed some or all of the time category for both income and education. Both income and education have been found repeatedly in other studies to be important factors in health.

At the depressed a little of the time category, three social support variables are significant: no living child, living alone and having too many or wanting more social activities. At the depressed some or all of the time category all the variables are significant except the married variable. Interestingly, having no living child decreases depression at the depressed some or all of the time category, which is the opposite of the

hypothesis. While marriage is insignificant for depression, living with others decreases depression for both depression categories. Social activities, in terms of both numbers and intensity are very significant at the depressed some or all of the time category. The intensity of social activities is also very significant at the depressed a little of the time category. In addition, these other variables do not explain away the relationship between vision impairment and depression.



Table 5

*Multinomial Logistic Regressions of Depression Categories: None of the Time (Reference), A Little of the Time, Some or All of the Time, Indicating Odds Ratio<sup>a</sup>*  
(N = 8,176)

Depression: A Little of the Time (n = 2,955)				
	Model 1	Model 2	Model 3	Model 4
vision impairment	1.584*** (.082)	1.451*** (.083)	1.414*** (.086)	1.417*** (.087)
male	.597*** (.053)	.599*** (.053)	.597*** (.055)	.630*** (.060)
age (75+)	.897* (.052)	.873** (.053)	.860** (.054)	.842** (.056)
nonwhite	.952 (.091)	.923 (.092)	.961 (.097)	.982 (.099)
falls		1.213** (.068)	1.198** (.070)	1.164* (.071)
difficulty functioning		1.180* (.069)	1.200** (.071)	1.147 (.073)
self-health		.681*** (.073)	.671*** (.075)	.695*** (.077)
income			.918 (.058)	.962 (.063)
education			1.041 (.062)	1.014 (.064)
public health insurance only			.857* (.072)	.874 (.074)
marital status				.976 (.092)
living alone				1.236* (.095)
no living child				.837* (.084)
lack social activities				.940 (.071)
too much or want more activities				1.483*** (.066)
Depression: Some or All of the Time (n = 1,953)				
	Model 1	Model 2	Model 3	Model 4
vision impairment	2.581*** (.084)	1.816*** (.089)	1.805*** (.092)	1.823*** (.094)
male	.463*** (.062)	.471*** (.065)	.496*** (.068)	.494*** (.074)
age (75+)	.963 (.060)	.879* (.062)	.854* (.065)	.827** (.067)
nonwhite	1.340** (.096)	1.127 (.101)	.982 (.108)	1.037 (.110)
falls		1.350*** (.076)	1.348*** (.078)	1.321*** (.080)
difficulty functioning		1.753*** (.075)	1.741*** (.077)	1.466*** (.081)
self- health		.316*** (.075)	.333*** (.078)	.372*** (.081)
income			.800*** (.069)	.827* (.076)
education			.748*** (.081)	.768*** (.083)
public health insurance only			1.206* (.079)	1.140 (.083)
marital status				1.063 (.107)
living alone				1.254* (.110)
no living child				.791* (.099)
lack social activities				1.446*** (.078)
too much or want more activities				2.065*** (.074)
Model -2 log likelihood	196.013	1,006.431	2,985.419	7,656.013
Model Chi-square	341.362***	821.884***	858.751***	978.210***
pseudo R <sup>2</sup>	.047	.111	.122	.141
df	8	14	20	30

<sup>a</sup> Odds Ratios shown, with standard errors in parentheses. Weighted and rounded. An odds ratio of <1 indicates a negative *B*.

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

### *Whole Sample Summary*

In the bivariate table (Table 4, p. 75), vision impairment and most of the mediating variables correlate with depression (exceptions are age and having no living child). Women are more likely to be depressed than men for both depression categories. Nonwhites are more likely to be depressed at the higher depression category than whites. Those who are depressed are more likely to have fewer social capital resources.

The results of the multinomial logistic regression predict that vision impairment is highly significant in all models for both older adults who are depressed a little of the time and those depressed some or all of the time. The control variables (age; sex), the health variables (falls; self-health assessment); the social support variables (having no living child; too much or wanting more social activities), are highly significant for both categories of depression. Race is insignificant for either depression category.

All three health variables and financial resources variables, especially education, are significant for those depressed some or all of the time. None of the financial resources variables are important for those depressed a little of the time. The social support variables are more important for those depressed some or all of the time; all are significant at the higher depression category except marital status. For those depressed a little of the time, having no living child, living alone and having too much or wanting more social activities are significant.

The multinomial regression predicts that the older adult who is vision impaired and depressed some or all of the time is likely to be a 70 to 74 year old woman with a history of falls in the last twelve months; difficulty with at least one ADL; and a fair to poor self-health assessment. She is likely to have an income of less than \$20,000; no

college education; live alone but have a living child; and social activities which are either lacking in number or of the wrong intensity.

In contrast, the older adult who is vision impaired and depressed a little of the time is likely to also be a 70 to 74 year old woman with some history of falls in the last twelve months; a fair to poor self-health assessment; but no difficulty functioning. Financial resource variables are not significant. Three of the social support variables are significant: no living child, living alone and the intensity of social activities (too much or wanting more). It may be that having difficulty functioning as well as lacking both financial resources and social activities are important indicators of being more depressed when vision impaired. However, since this is not an ordinal regression, all that can be said using multinomial logistic regression is that more respondents self-report these differences and also choose the label of depressed some or all of the time.

### Gender Samples

#### *Bivariate Analysis*

Table 6 examines the relationship for the male and female respondents among the three depression categories of the independent variable. Older men, in comparison to older women, are more likely to not be depressed when vision impaired. When depressed, they are more likely to be depressed a little of the time. Among older men who are vision impaired, 40% (in comparison to 35% for older women) are depressed a little of the time, 27% (in comparison to 40% for older women) are depressed some or all of the time and 33% (in comparison to 24% for older women) are depressed none of the time ( $p < .001$ ). Race is correlated at the  $p < .05$  level with small numbers for each category of depression. Nonwhite older men are less likely to be depressed at either depression

category than nonwhite older women. Both older nonwhite men and older nonwhite women are more likely to be depressed than older whites of either gender. Age does not seem to make a difference in the depression level for either gender.

All health variables (self-health, difficulty functioning and falls) are significant for both genders ( $p < .001$ ). Older women are more likely than older men to be depressed at the higher depression category when they have health problems. Older men in poor health (falls, difficulty functioning or self-health report) are more likely to report being depressed a little of the time than older women in poor health. As in the whole sample, older respondents in both gender samples who are in better health have higher percentages of being never depressed than those in worse health.

Those in worse health for both genders have higher percentages of depression, especially depressed some or all of the time. Among older men who report excellent health, 66% report being never depressed (in comparison to 50% for older women), 27% report being depressed a little of the time (in comparison to 36% for older women) and 7% report being depressed some or all of the time (in comparison to 14% for older women). In contrast, among those who report poor health, somewhat fewer females than males report being never depressed. Both older males and females in poor health have higher percentages also reporting being depressed some or all of the time. 53% of males and 66% of females in poor health are depressed at the higher depression category.

At the highest difficulty functioning level (1 + ADL & 1 + IADL) the percentage of older men reporting being depressed some or all of the time (37%) is higher than those reporting being either never depressed (34%) or depressed a little of the time (29%). Older women at the highest difficulty of functioning level also report a higher percentage

at the depressed some or all of the time category than either of the other two categories. A higher percentage of older men and women who have fallen in the last twelve months also report being depressed at the higher depression category. While 25% of older women who have fallen in the last 12 months are depressed at the higher depression category, only 16% of those who have not fallen report this higher depression category (for older men the percentages are 34% and 26% respectively).

Among the financial resource variables (income, some college education, and having only public health insurance), each is significant for respondents of both genders ( $p<.001$ ). For both genders, among those who are depressed some or all of the time, there are higher percentages of financial resource challenges (lower family incomes, less education, and having only public health insurance). Among older men who have a family income of \$20,000 or more, 14% report being depressed some or all of the time, while 22% who have a family income of under \$20,000 are depressed at this same category. Those, in both gender samples reporting being depressed some or all of the time, are also more likely to have only public health insurance. Among older women who have some college education, 19% report being depressed some or all of the time, but 30% who have not gone to college report being depressed at this level. When there is depression reported, most older male and female adults who have some college education report being depressed at the lower depression category.

Among the social support variables, having a living child is not significant for either gender. Marital status is significant ( $p<.001$ ) for older men. For older married male respondents, 51% report being never depressed and 16% are depressed some or all of the time. For older unmarried male respondents, 44% are never depressed but 23% are

depressed some or all of the time. Living alone is also significant only for older men ( $p < .001$ ). Of older men reporting living alone, 24 % are depressed some or all of the time, while for older men reporting living with others, only 17% are depressed some or all of the time. Both older men and older women who are depressed at the higher depression category are more likely to lack more social activities, so that 57% of older men who lack more social activities are also depressed some or all of the time (and 45% of older women).

Table 6  
*Gender Frequencies and Percentages (%) of Depression by Independent Variable*  
(N = 8,176) <sup>a</sup>

Variables	Depressed					
	Never		A Little		Some or All	
	M	F	M	F	M	F
vision impairment***						
yes (1)	125 (33)	181 (24)	150 (40)	261 (35)	104 (27)	301 (40)
no (0)	1,403 (52)	1,506 (36)	848 (31)	1,626 (39)	450 (17)	1,037 (25)
age						
age to 74 (0)	785 (49)	764 (34)	537 (34)	892 (39)	277 (17)	621 (27)
age 75+ (1)	778 (50)	948 (34)	484 (31)	1,028 (38)	293 (19)	768 (28)
race*						
nonwhite (1)	171 (47)	165 (33)	108 (30)	170 (34)	86 (24)	164 (33)
white (0)	1,391 (50)	1,547 (34)	913 (33)	1,750 (39)	484 (17)	1,226 (27)
self-health***						
excellent (4)	303 (66)	322 (50)	123 (27)	231 (36)	32 (7)	89 (14)
very good (3)	461 (59)	536 (39)	242 (31)	585 (43)	77 (10)	244 (18)
good (2)	563 (48)	604 (34)	414 (35)	710 (40)	208 (18)	472 (26)
fair (1)	206 (36)	196 (22)	197 (35)	335 (37)	166 (29)	378 (42)
poor (0)	29 (19)	48 (16)	44 (28)	56 (18)	83 (53)	200 (66)
dif.funct.***						
1+ ADL & 1+ IADL (3)	136 (34)	261 (22)	118 (29)	376 (32)	151 (37)	527 (45)
1+ ADL only (2)	118 (43)	98 (30)	94 (34)	141 (43)	61 (22)	87 (27)
1+ IADL only (1)	79 (41)	185 (29)	73 (38)	252 (39)	40 (21)	203 (32)
no ADL/IADL/unk. (0)	1,230 (54)	1,169 (40)	736 (32)	1,152 (40)	318 (14)	572 (20)
falls***						
yes (1)	234 (40)	316 (28)	204 (35)	431 (38)	146 (25)	392 (34)
no (0)	1,323 (52)	1,391 (36)	814 (32)	1,484 (38)	423 (16)	992 (26)
income***						
>\$20,000 (1)	868 (53)	684 (34)	529 (32)	773 (41)	235 (14)	424 (22)
<\$20,000 (0)	612 (45)	919 (32)	447 (33)	1,058 (37)	305 (22)	880 (31)
some col. ed.***						
yes (1)	494 (52)	454 (39)	330 (35)	482 (42)	123 (13)	226 (19)
no (0)	1,069 (48)	1,258 (33)	691 (31)	1,438 (37)	447 (20)	1,163 (30)
pub. health ins.***						
yes (1)	273 (43)	375 (33)	197 (31)	352 (31)	170 (27)	404 (36)
no (0)	1,290 (51)	1,337 (34)	824 (33)	1,569 (40)	400 (16)	986 (25)
marital status <sup>b</sup>						
yes (1)	1,226 (51)	673 (36)	775 (32)	710 (37)	394 (16)	513 (27)
no (0)	337 (44)	1,039 (33)	246 (32)	1,210 (39)	176 (23)	876 (28)
living alone <sup>c</sup>						
yes (1)	270 (44)	782 (33)	195 (32)	957 (40)	143 (24)	654 (27)
no (0)	1,293 (51)	930 (35)	826 (32)	963 (37)	427 (17)	735 (28)
no living child						
no living child (1)	179 (52)	263 (37)	99 (29)	258 (37)	68 (20)	182 (26)
yes living child (0)	1,380 (49)	1,442 (34)	921 (33)	1,657 (38)	501 (18)	1,201 (28)

(table continues)

Table 6 (continued)

*Gender Frequencies and Percentages (%) of Depression by Independent Variable*  
(N = 8, 176)<sup>a</sup>

Variables	Depressed					
	Never		A Little		Some or All	
	M	F	M	F	M	F
lack soc. act. ***						
lack 6 – 7 act. (3)	86 (46)	45 (28)	42 (23)	45 (28)	57 (31)	73 (45)
lack 4 – 5 act. (2)	277 (43)	262 (28)	198 (31)	295 (32)	169 (26)	362 (39)
lack 2 – 3 act. (1)	630 (51)	645 (33)	397 (32)	776 (39)	208 (17)	555 (28)
lack 0 – 1 act. (0)	547 (52)	746 (39)	374 (36)	789 (41)	129 (12)	384 (23)
too much or want more activities***						
too much, wanting (1)	291 (38)	319 (23)	265 (34)	511 (37)	218 (28)	547 (40)
enough (0)	1,258 (54)	1,381 (38)	739 (32)	1,391 (39)	341 (15)	813 (23)

<sup>a</sup> Total may not equal 100% due to rounding. Weighted.

<sup>b</sup> Marital Status: males\*\*\*; females: not statistically significant

<sup>c</sup> Living Alone: males\*\*\*; females: not statistically significant

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$  (significance for Pearson  $\chi^2$ )

### *Results of Multinomial Logistic Regressions for Gender*

*Males: Depressed a little of the time.* Table 7 gives the odds ratio for each variable in the male sample for the category, depressed a little of the time regressed on vision impairment, sex, age, and race. Model one passes the Pearson goodness-of-fit test. Male respondents who have vision impairment are 2.04 times as likely to be depressed a little of the time ( $p < .001$ ). Neither age nor race is significant.

The only other model that passes the Pearson test is model three; here the three health variables (falls, difficulty functioning and self health report) plus the three financial resources variables (income, education and having only public health insurance) are added. Male respondents who have vision impairment are more likely to be depressed a little of the time ( $p < .001$ ). Male respondents aged 75 and over continue to be less likely



to be depressed a little of the time ( $p < .05$ ). Race continues to be insignificant. Self-health assessment is the only health variable that is significant. None of the financial resources (income, some college education or having only public health insurance) is significant. The Pearson test is not passed when the five social support variables are added in model four.

*Males: Depressed some or all of the time.* The first model passes the Pearson test; here the three depression categories are regressed on the main variable, vision impairment, and the control variables: sex, age and race. Male respondents who are vision impaired are 2.72 times as likely to also be depressed some or all of the time ( $p < .001$ ). Nonwhite (black, other) male respondents are 1.53 times as likely as white male respondents to be depressed some or all of the time ( $p < .01$ ).

The only other model that passes the Pearson goodness-of-fit test is model three. Male respondents who are vision impaired continue to be more likely to be depressed some or all of the time. Health variables are significant for falls, difficulty functioning and self-health assessment, at least at the  $p < .001$  level. Financial resource variables have been added: male respondents with incomes under \$20,000 are 1.32 times more likely to be depressed some or all of the time ( $p < .05$ ). Those who only have public health insurance are 1.36 times as likely to be depressed some or all of the time ( $p < .05$ ).

Table 7

*Male Multinomial Logistic Regressions of Depression Categories: None of the Time (reference), A Little of the Time, Some or All of the Time, Indicating Odds Ratio<sup>a</sup>*  
(n = 3,154)

A Little of the Time (n = 1,036)				
	Model 1	Model 2	Model 3	Model 4
vision impairment	2.045*** (.131)	1.868*** (.133)	1.782*** (.136)	1.786*** (.138)
age (75+)	.867 (.082)	.837* (.083)	.814* (.085)	.791** (.088)
nonwhite	1.018 (.145)	.977 (.147)	.989 (.154)	.983 (.158)
falls		1.245 (.112)	1.239 (.115)	1.199 (.118)
difficulty functioning		1.127 (.114)	1.135 (.118)	1.110 (.121)
self-health		.596*** (.110)	.589*** (.114)	.621*** (.118)
income			.854 (.093)	.867 (.097)
education			1.185 (.095)	1.172 (.097)
public health insurance only			1.026 (.115)	1.077 (.119)
marital status				.871 (.179)
living alone				1.049 (.194)
no living child				.808 (.146)
lack social activities				.948 (.106)
too much or want more activities				1.533*** (.103)
Some or All of the Time (n = 567)				
	Model 1	Model 2	Model 3	Model 4
vision impairment	2.721*** (.146)	2.017*** (.154)	1.902*** (.158)	1.918*** (.162)
age (75+)	.999 (.101)	.898 (.105)	.869 (.109)	.796* (.113)
nonwhite	1.529** (.160)	1.314 (.168)	1.188 (.177)	1.214 (.182)
falls		1.501** (.132)	1.539*** (.135)	1.548** (.140)
diff. functioning		1.690*** (.129)	1.653*** (.133)	1.398* (.139)
self-health		.301*** (.122)	.317*** (.127)	.359*** (.132)
income			.760* (.117)	.823 (.124)
education			.884 (.129)	.898 (.134)
public health insurance only			1.363* (.134)	1.281 (.141)
marital status				.993 (.223)
living alone				1.507 (.238)
no living child				.816 (.178)
lack social activities				1.502*** (.124)
too much or want more activities				2.115*** (.123)
Model -2 log likelihood	89.969	463.523	1,342.030	2,981.468
Model Chi-square	66.331***	243.947***	263.261***	322.068***
pseudo R <sup>2</sup>	.024	.088	.099	.123
df	6	12	18	28

<sup>a</sup> Odds Ratios shown, with standard errors in parentheses. Weighted and rounded. An odds ratio of <1 indicates a negative B.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

In summary, for male respondents at either depression category, only models 1 and 3 pass the Pearson goodness-of-fit test. Vision impairment for both models is substantively significant for both depression categories, as is self-health reports. At the depressed some or all of the time category, race is significant in model one, while all three health variables are substantively significant in model three.

*Females: Depressed a little of the time.* The Pearson goodness-of-fit test passes all four models, while the Deviance goodness-of-fit test passes only models one, two and three. Table 8 gives the odds ratio for each variable in the female weighted sample for the category depressed a little of the time. The variables used in model one are the main variable, vision impairment ( $p < .01$ ), and the control variables: sex, age and race. Female respondents who are depressed a little of the time are 1.35 times as likely as male respondents to be vision impaired. Neither age nor race is significant.

In model two vision impairment is significant, but at a reduced level ( $p < .05$ ). Again, neither age nor race is significant. Falls and difficulty functioning are both significant ( $p < .05$ ), as is self-health assessment ( $p < .01$ ). Female respondents who are depressed a little of the time are 1.19 times as likely to have fallen in the last 12 months and they are 1.23 times as likely to have difficulty functioning. They have a 1.33 times greater chance of having a lower self-health assessment (fair to poor).

Model three adds financial resources and model four adds social support to the other variables. While vision impairment for both models is no longer significant, self-health reports continue to be significant for both depression categories. At the depressed some or all of the time category all three health variables are significant, as are three of the five social support variables (no living child, lacking social activities and having too

much or wanting more activities). Older women who have poor health variables and lack social activities (numbers and intensity) are more likely to be depressed.

*Females: Depressed some or all of the time.* Table 8 gives the results of the female multinomial logistic regression for depressed some or all of the time. In all four models vision impairment is significant ( $p < .001$ ) but the control variables (age and race) are not significant. In model two all of the added health variables are significant (falls,  $p < .01$ ; difficulty functioning and assessment of self-health,  $p < .001$ ). Female respondents who are depressed some or all of the time are 1.28 times as likely to have fallen in the past twelve months, 1.80 times as likely to have more difficulty functioning and 3.01 times as likely to have a fair to poor self-health assessment.

In model three the financial resources variables have been added. Female respondents, who are depressed some or all of the time are 17% less likely to have a family income of \$20,000 or over and are 44% less likely to have had some college education. Having only public health insurance is not significant. The three health variables continue to be significant.

When the five social support variables are added in model four, vision impairment, the three health variables, education and three of the social support variables are significant. Not having a living child, lacking social activities and having too many or wanting more social activities are the significant social support variables. Female respondents, who are depressed some or all of the time are 1.30 times more likely to have a living child, 1.41 times as likely to lack social activities and 2.02 times as likely to have too many or too few social activities.

Table 8

*Female Multinomial Logistic Regressions of Depression Categories: None of the Time (Reference), A Little of the Time, Some or All of the Time, indicating Odds Ratio<sup>a</sup>*  
(N = 5,022)

Depression: A Little of the Time (n = 1,920)				
	Model 1	Model 2	Model 3	Model 4
vision impairment	1.351** (.104)	1.235* (.106)	1.212 (.111)	1.218 (.112)
age (75+)	.914 (.068)	.891 (.068)	.894 (.071)	.882 (.074)
nonwhite	.902 (.116)	.881 (.117)	.944 (.125)	.986 (.128)
falls		1.186* (.086)	1.164 (.088)	1.127 (.089)
difficulty funct.		1.230* (.087)	1.264** (.090)	1.195 (.093)
self-health		.751** (.097)	.741** (.100)	.756** (.103)
income			.973 (.075)	1.047 (.083)
education			.929 (.083)	.896 (.085)
public health			.755** (.093)	.759** (.095)
insurance only				.996 (.108)
marital status				1.292* (.111)
living alone				.846 (.102)
no living child				.923 (.098)
lack social activities				
too much or want more activities				1.458*** (.087)
Depression: Some or All of the Time (n = 1,390)				
	Model 1	Model 2	Model 3	Model 4
vision impairment	2.427*** (.103)	1.661*** (.110)	1.687*** (.114)	1.704*** (.116)
age (75+)	.949 (.075)	.871 (.078)	.855 (.082)	.864 (.085)
nonwhite	1.239 (.119)	1.034 (.126)	.893 (.135)	.967 (.139)
falls		1.281** (.093)	1.263* (.096)	1.232* (.099)
diff. functioning		1.805*** (.092)	1.814*** (.096)	1.525*** (.100)
self-health		.332*** (.097)	.351*** (.101)	.389*** (.104)
income			.834* (.087)	.839 (.097)
education			.660*** (.104)	.684*** (.106)
public health			1.106 (.099)	1.037 (.103)
insurance only				
marital status				1.109 (.123)
living alone				1.181 (.125)
no living child				.769* (.120)
lack social activities				1.409*** (.102)
too much or want more activities				2.020*** (.093)
Model -2 log likelihood	97.631	530.277	1,617.397	4,640.597
Model Chi-Square	89.443***	396.975***	434.530***	511.077***
pseudo R <sup>2</sup>	.020	.088	.102	.121
df	6	12	18	28

<sup>a</sup> Odds Ratios shown, with standard errors in parentheses. Weighted and rounded. An odds ratio of <1 indicates a negative B.

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

### *Interpretation of Gender Multinomial Logistic Regressions*

The gender multinomial logistic regression models for both the male-only and female-only samples do not have log likelihoods that decrease in succeeding models. Therefore the Log Likelihood test cannot affirm an adequate goodness of fit. The Pearson and Deviance tests were also used as goodness-of-fit tests. The male-only sample passed the Pearson test only for models one and three; the Deviance test passed only model one. The female-only sample passed the Pearson test for all four models, but passed the Deviance test only for models one, two and three. In addition, another goodness-of-fit test for both gender samples is the pseudo  $R^2$  which does increase when variables are added; while model one has a pseudo  $R^2$  of .02 for both gender samples, model four is about .12. Both gender samples show an increased pseudo  $R^2$  for each model, through the full model, model four (see Appendix, Table A6, p. 145).

### *Gender Samples Summary*

The bivariate results indicate that for each gender sample, as in the whole sample, there is a correlation with depression, vision impairment, a health variable or some social support variable. The older male-only sample does not pass the Pearson goodness-of-fit test for model four. For the women-only sample the Pearson test is passed for all four models, but only models one, two and three for the Deviance test. For older females aged 70 and over who are depressed a little of the time vision impairment is not statistically significant. Older female respondents aged 70 and over, are, however, substantively more likely to report being depressed some or all of the time when they are also vision impaired. They are more likely to have poorer health, as defined by falling in the past twelve months, having more difficulty functioning and having poorer self-health

assessments. They are more likely to have less education when they report being depressed some or all of the time. They are also more likely to lack or have the wrong intensity of social activities and have a living child.

### Hypothesis Testing Results

Vision impairment is defined as having trouble seeing even with glasses in one or both eyes. Depression is defined as being sad or depressed in the last twelve months. There are three categories of depression: never depressed (reference category), depressed a little of the time and depressed some or all of the time. The older respondents self-assessed their mental and physical health. Controls to test the hypotheses are sex, age and race.

Mediating variables used to influence vision impairment on depression are health variables (falls, difficulty functioning and self-health assessment), financial resources variables (income, education and having only public health insurance) and social support variables (marital status, living alone, no living child, lacking social activities and too much or wanting more social activities). Multinomial logistic regression was done on these variables for the whole sample, for the men-only and for the women-only samples. Both the whole sample and the women-only sample passed the Pearson goodness-of-fit test for all four models but the men-only sample did not.

*Hypothesis 1: Older adults who have significant vision impairment will also be significantly more likely to be depressed than older adults without vision impairment, all things being equal.*

This hypothesis is supported by the multinomial logistic regression for the whole sample for each of the depression categories: depressed a little of the time and depressed

some or all of the time. Vision impairment is highly significant in all the whole sample models for older adults in both depression categories ( $p < .001$ ). Older adults who have vision impairment are 1.417 times as likely to be depressed a little of the time (model four) and 1.823 times as likely to be depressed some or all of the time (model four). Older adults with vision impairment are therefore even more likely to be depressed some or all of the time than depressed a little of the time. Hypothesis 1 is supported.

*1 a. Sex will be used as a control variable for this relationship, since women are more likely to be depressed than men.*

For the whole sample, older women are more likely than older men to have a level of depression when they are vision impaired, all things being equal. Older women are 1.59 times as likely as older men to be depressed a little of the time (model four;  $p < .001$ ) and 2.02 times as likely as older men to be depressed some or all of the time (model four;  $p < .001$ ).

When only older women are included in the sample, they are more likely to have a category of depression when they are also vision impaired. Older women in the women-only sample are 1.70 times as likely to be depressed some or all of the time when they are vision impaired (model four,  $p < .001$ ). However, older women in the women-only sample are likely to be more depressed a little of the time at an insignificant level (model four,  $p > .05$ ). Hypothesis 1a. is supported at the depressed some or all of the time category, for the whole sample and also for the women-only sample. Hypothesis 1a. is partially supported for the whole sample, at the depressed a little of the time level. Older men-only are not considered since this sample did not pass the Pearson goodness-of-fit test.



*1b. Race will be used as a control variable for this relationship, since minorities are more likely to be depressed than whites.*

Race is defined as nonwhite (black and other) or white. Race is significant only for the whole and for the men-only samples, depression at the some or all of the time category, in model one (vision impairment, sex, age and race). Older vision-impaired nonwhite men for the whole sample are 1.34 times as likely as older vision-impaired white men to be depressed some or all of the time ( $p < .01$ ). When health, financial resources and social support variables are added, race is insignificant at both categories of depression. Hypothesis 1b. is partially supported for the whole sample, but only before mediating variables are added to the models. It is not supported for model four for any of the three samples.

*1 c. Age will be used as a control variable for this relationship, since older-old respondents are more likely to be depressed than younger-old respondents.*

Older-old respondents, those aged 75 and over, are 17% less likely than younger-old respondents, aged 70 to 74, to be depressed some or all of the time when they are vision impaired (model four,  $p < .01$ ). Older-old respondents are 16% less likely than younger-old respondents to be depressed a little of the time when they are vision impaired (model four,  $p < .01$ ).

For the women-only sample, age is not significant for any model at either depression category. Hypothesis 1c. is not supported since younger-old respondents are significantly more depressed than older-old respondents when they have vision impairment (whole sample).

Surprisingly, in all three samples, those who are in the older-old group, aged 75 years and over, are less depressed than those aged 70 to 74 years. Some prior research supports more depression in older ages (Mirowsky, 1996; Mirowsky & Ross, 1992). Johnson and Wolinsky (1993) studied the interrelationships among the constructs of disease, functional limitation and self-rated health using the First Longitudinal Study of Aging. They found that older-old adults think of themselves as healthier than younger older adults with similar health problems. It may be that younger-old adults are having more difficulty adjusting to a newly diagnosed vision impairment than older-old adults. The diagnosis of vision impairment in our visually media driven society can be extremely devastating (The Lighthouse, Inc., 1995).

Hypothesis 2: *Additionally, the effect of vision impairment on depression will be decreased, all things being equal, by better health as reported in a. lower levels of falls; b. lower levels of difficulty functioning; and c. higher levels of self-reported health.*

In the whole sample, those who have fallen in the past twelve months are significantly more likely to be both depressed a little of the time (model four,  $p < .05$ ) and depressed some or all of the time (model four,  $p < .001$ ). Older vision-impaired adults, aged 70 and over (model four), who have not fallen in the past twelve months are 14% less likely to be depressed a little of the time, all things being equal. Older vision-impaired adults, aged 70 and over (model four), who have not fallen in the past 12 months are 24% less likely to be depressed some or all of the time, all things being equal.

In the older women-only sample, being depressed a little of the time is not significant in model four. However, the older women-only sample is more likely to report being depressed some or all of the time at significant levels when the mediating variables

are added in model four. Older vision-impaired women aged 70 and over, who have not fallen in the past twelve months are 19% less likely to be depressed some or all of the time. Hypothesis 2a. is supported for the whole sample and partially supported for the women-only sample, but only at the higher depression level.

Older vision-impaired adults in the whole sample who have difficulty functioning are not more likely to be depressed a little of the time (model four,  $p > .05$ ). However, older adults in the whole sample who have difficulty functioning are significantly more likely to be depressed some or all of the time (model four,  $p < .001$ ). Therefore, older vision-impaired adults in the whole sample aged 70 and over, who do not have difficulty functioning are 32% less likely to be depressed some or all of the time, all things being equal.

Older women in the women-only sample who have difficulty functioning are not significantly more likely to be depressed a little of the time for model four. They are significantly more likely, however, to be depressed some or all of the time. Older women in the women-only, vision-impaired and aged 70 and over, who do not have difficulty functioning are 34% less likely to be depressed some or all of the time (model four,  $p < .001$ ; all the models are significant at this level). Hypothesis 2b. is partially supported at the depressed some or all of the time level for the whole sample and women-only sample. It is not supported for model four for any of the samples at the depressed a little of the time category.

Self-reported health has been changed into a binary variable where the top three levels (excellent, very good and good) are 1 and the bottom two levels (fair and poor) are 0. For the whole sample of older adults, for all models, self-reported health is

substantively significant for all categories of depression ( $p < .001$ ). Older vision impaired adults in the whole sample who report better health (excellent, very good or good) are 1.44 times less likely to be depressed a little of the time (model four). Older vision impaired adults in the whole sample who report better health are 2.69 times less likely to be depressed some or all of the time (model four).

Among the women-only sample, self-reported health is again substantively significant (at least  $p < .01$ ) for all models and all depression categories of. Older women who are vision impaired, and have higher self-health assessments, are 24% less likely to be depressed a little of the time and 61% less likely to be depressed some or all of the time. Hypothesis 2c. is supported for the whole adult sample, as well as the women-only sample. Self-reported health is a substantively significant variable for the depression outcome among vision impaired older adults.

Hypothesis 3: *Additionally, the effect of vision impairment on depression will be decreased, all things being equal, by more financial resources as reported in higher levels of a. college education and b. higher income and c. lower levels of having only public health insurance.*

For the whole adult sample, having some college education is not statistically significant for those who are depressed a little of the time. It is, however, very significant for those depressed some or all of the time (for all models,  $p < .001$ ). Older vision impaired adults, aged 70 and over, who have some college education, are 23% less likely to be depressed some or all of the time, all things being equal.

For older women depressed some or all of the time, having some college education is important in lessening depression ( $p < .001$ , for both models three and four).

Older vision-impaired women, aged 70 and over, who have some college education are 32% less likely to be depressed some or all of the time. Hypothesis 3a. is supported at the level of depressed some or all of the time for the whole sample as well as in the women-only sample.

The probability of older vision-impaired adults, aged 70 and over, who have family incomes of over \$20,000 to be depressed a little of the time is insignificant. But it is significant when the older vision-impaired adult is depressed some or all of the time ( $p < .05$ , model four). Older vision-impaired adults who have family incomes of over \$20,000 are 17% less likely to be depressed some or all of the time, all things being equal. Hypothesis 3b. is partially supported for the whole adult sample, for those depressed some or all of the time (model four), but not for the woman-only sample.

The probability that older vision-impaired adults, aged 70 and over, who have only public health insurance will be depressed a little of the time or depressed some or all of the time is significant for model three ( $p < .05$ ) but insignificant for model four when social support variables are added. Older vision-impaired women who have only public health insurance in model four ( $p < .01$ ) are 24% less likely to be depressed a little of the time. Hypothesis 3c. is partially supported; it is also supported for the women-only sample who are depressed a little of the time.

At the higher depression level in the whole sample, education and income were significant in the full model; in the women-only sample education was also significant at the higher depression level. However, the pseudo  $R^2$  was small for all samples when financial resources variables, were added, indicating that not much has been explained by this mediating category.

Hypothesis 4: *Additionally, the effect of vision impairment on depression will be decreased, all things being equal, through more social support as reported in: a. being married; b. lower levels of lacking social activities; c. higher levels of having too many or too little social activities; d. having a living child; e. lower levels of living alone.*

Among older vision-impaired adults for the whole sample, as well as for the women-only sample, marital status is insignificant both for those depressed a little of the time and those depressed some or all of the time. Though a study using the First Longitudinal Study of Aging found that marital status related to health and survival outcomes for the oldest adults, the mortality outcomes are small (Godlman, Korenman, & Winstein, 1995). Hypothesis 4a. is not supported.

The effect of lacking social activities is insignificant for older visually-impaired adults and for the women-only samples who are depressed a little of the time; it is however, significant for both samples for those who are depressed some or all of the time (model four,  $p < .001$ ). Older visually-impaired adults who have more social activities report being 31% less depressed some or all of the time. Older visually-impaired women who have more social activities are 29% less likely to report being depressed some or all of the time. Hypothesis 4b. is supported at the higher depression category for the older adults and the women-only samples.

Older vision-impaired adults in the whole sample as well as the older women-only sample are both significantly less likely to report being either depressed a little of the time or some or all of the time when they have the right intensity of social activities ( $p < .001$ ). Older vision-impaired women are 32% less likely to report being depressed a

little of the time and 50% less likely to report being depressed some or all of the time.

Hypothesis 4c. is supported for both depression levels and for both samples.

The older adult in the whole sample who is vision-impaired, and does not have a living child, is 16% less likely to be depressed a little of the time and 21% less likely to be depressed some or all of the time. Not having a living child is statistically insignificant for the women-only sample who report being depressed a little of the time. Older women in the women-only sample, however, are 23% less likely to be depressed some or all of the time when they do not have a living child.

In a study using the first Longitudinal Study of Aging, Goldman, Korenman & Weinstein (1995) found that single women have better health outcomes than their married peers. Older women without family responsibilities have a lifetime to develop roles outside the home, while older widowed women have an often difficult role change at a time of other age-related losses. Women become less depressed as their work and family responsibilities become more like that of men (Lennon & Rosenfield, 1992). Hypothesis 4d. is partially supported at both depression levels for the whole sample and at the higher depression level for the women-only sample.

It is statistically significant that older vision-impaired adults who live alone report being depressed at both depression categories; older vision-impaired adults who live with others are 20% less likely to be depressed some or all of the time. In the women-only sample, there is no statistical significance at the higher depression level. It is, however, significant when the older women-only sample report being depressed a little of the time ( $p < .05$ ). Older vision-impaired women are 1.29 times as likely to be depressed a little of the time when they live alone.

Living alone may isolate the older adult and also be a problem when one is vision-impaired, especially if one is male. Older women, who are more likely to live alone than older men, may be more able to adapt when they start to lose their vision through long-time connections to community and family. Older men may have to create such connections, which have traditionally been a women's job. But when the older vision-impaired adult is depressed at the higher category, living alone may not be helpful for either sex. Hypothesis 4e. is supported for the older adult sample in both depression categories; for the women-only sample at the lower category only, depressed a little of the time.

#### Hypotheses Summary

Vision impairment, the stressor, is defined as having trouble seeing even with glasses in one or both eyes. Depression, the stress outcome, is defined as being sad or depressed in the last twelve months. Hypothesis 1 is supported: Older adults who have significant vision impairment will also be significantly more likely to be depressed than older adults without vision impairment, all things being equal.

*Controls.* Regarding gender, in the whole sample, older women are more likely to have some category of depression than older men. Race as a control variable is significant only before the mediating variables are added. Age is significant for the whole sample in model four, the full model, for both depression levels. However, it is younger-old adults rather than older-old adults who are more depressed at either depression category.



*Health.* Hypothesis 2 states that additionally among older adults who have vision impairment, the effect of vision impairment on depression will be decreased, all things being equal, through better health. Older vision-impaired adults, especially older women, are more likely to have fallen in the past twelve months and have difficulty functioning when they are depressed. Self-reported health is substantively significant for both categories of depression. This outcome is significant for both samples: the whole sample and the women-only sample. Older vision-impaired adults, especially older women, are more likely to report the lower health category, poor to fair, when depressed.

*Financial Resources.* Hypothesis 3 posits that additionally among older adults who have vision impairment, the effect of vision impairment on depression will be decreased, all things being equal, through more financial resources. This hypothesis is supported for education at the higher depression category both for the whole adult sample and for the women-only sample. The hypothesis is supported for income in the whole sample at the higher depression category. Those with incomes of over \$20,000 a year are less likely to be depressed some or all of the time. Finally, older women, depressed a little of the time, are more likely to have public health insurance but not private health insurance.

*Social Support.* The last hypothesis is that additionally among older adults who have vision impairment the effect of vision impairment on depression will be decreased, all things being equal, through more social support. This hypothesis is not supported for the marital variable at either depression category for any of the samples. Lacking social activities is significant for all three samples only at the higher depression category. Having the right intensity of social activities is significant at both depression categories

for both samples: the whole sample and the women-only sample. Not having a living child in both samples lowers depression at the higher depression category. In the whole sample not having a living child also decreases depression a little of the time. Finally, in the whole sample, older adults who live alone are more likely to have both categories of depression. Older women in the women-only sample are more likely to be depressed a little of the time.

A typical profile of a vision-impaired older adult, depressed a little of the time, would be a younger-old (70 to 74 year old) woman who has fallen in the past twelve months; has a poor to fair self-health report; has a living child; has the wrong intensity of social activities (too much or wanting more activities). In contrast, a typical profile of a vision-impaired older adult, depressed some or all of the time, would be a younger-old (70 to 74 year old) woman who has fallen in the past twelve months; has difficulty with one or more ADLs or with both one or more ADLs and IADLs; a poor to fair self-health report; a family income under \$20,000; a high school or less education; lives alone; has a living child; lacks social activities in number and the right intensity.

Table 9 summarizes the depression outcomes for the whole sample, when vision impairment is the stressor, controlling for gender, race and age with the three mediators of health, financial resources and social support.

Table 9  
*Whole Sample Multinomial Statistical Significance Results, Two Depression Categories<sup>a</sup>*  
 (N=8,176)

	Controls	Health	Financial Res.	Social Support											
H vi sex age race falls funct health ed income pubins marital lack intensity nochd alone															
H <sup>1</sup>															
l	x	x	x	o											
h	x	x	o	x											
H <sup>2</sup>															
l	x	x	x	o	x	x	x								
h	x	x	x	o	x	x	x								
H <sup>3</sup>															
l	x	x	x	o	x	x	x	o	o	x					
h	x	x	x	o	x	x	x	x	x	x					
H <sup>4</sup>															
l	x	x	x	o	x	o	x	o	o	o	o	o	x	x	x
h	x	x	x	o	x	x	x	x	x	o	o	x	x	x	x

<sup>a</sup>p < .05 to <.001

Key:

vi (vision impairment), sex, age, race, falls, funct. (health: functioning), self-health, ed (college education), income, pubins (public insurance only), marital (status), lack (lack social activities), intensity (not too many or too little), nochd (no living child), alone (living alone)

H (hypotheses), H<sup>1</sup> through H<sup>4</sup> (hypothesis 1 through hypothesis 4)

l (lower depression: a little of the time), h (higher depression: some or all of the time)

x (variable is significant), o (variable is insignificant).

Since the men-only sample did not pass the Pearson-goodness-of-fit test, this table is tabulated in Table A7 (Appendix, p. 146). At the depression level of depressed a little of the time, model four, a typical profile would be a vision-impaired younger-old (70 to 74 years old) man; with a poor to fair self-health report; the wrong intensity of social activities (too much or wanting more). For the depressed some or all of the time, model four, a typical profile would be a vision-impaired younger-old (70 to 74 years old) man; who has fallen in the past twelve months; has difficulty with one or more ADLs or with one or more ADLs and IADLs; has a poor to fair self-health report; too few and the wrong intensity of social activities.

Table 10, the women-only sample, shows the significance of each depression category for every variable. At the depression category of depressed a little of the time, model four, vision impairment is not significant. Therefore a typical profile would be an woman, aged 70 and above; with a poor to fair self-health report; having only public health insurance for all her health needs; living alone; having the wrong intensity of social activities (too much or wanting more).

For the depressed some or all of the time, model four, a typical profile would be a vision-impaired older woman, aged 70 and above, who has fallen in the past twelve months; has difficulty with one or more ADLs or with one or more ADLs and IADLs; has a poor to fair self-health report; has a high school or less education; has a living child; has social activities that are lacking in number and of the wrong intensity.

Table 10  
*Women-Only Samples Multinomial Statistical Significance Results, Two Depression Categories<sup>a</sup> (N=5,022)*

	Controls			Health		Financial Res.			Social Support						
H	vi	sex	age	race	falls	func	health	ed	income	pubins	marital	lack	intensity	nochd	alone
<hr/>															
H <sup>1</sup>															
l	x	--	o	o											
h	x	--	o	o											
<hr/>															
H <sup>2</sup>															
l	x	--	o	o	x	x	x								
h	x	--	o	o	x	x	x								
<hr/>															
H <sup>3</sup>															
l	o	--	o	o	o	x	x	o	o	x					
h	x	--	o	o	x	x	x	x	x	o					
<hr/>															
H <sup>4</sup>															
l	o	--	o	o	o	o	x	o	o	x	o	o	x	o	x
h	x	--	o	o	x	x	x	x	o	o	o	x	x	x	o

<sup>a</sup>*p* = <.05 to <.001

Key:

vi (vision impairment), sex, race, age, falls, func. (health: functioning), self-health, ed (college education), income, pubins (public insurance only), marital (status), lack (lack social activities), intensity(not too many or too little), nochd (no living child), alone (living alone)

H (hypotheses), H<sup>1</sup> through H<sup>4</sup> (hypothesis 1 through hypothesis 4)

l (lower depression: a little of the time), h (higher depression: some or all of the time)

x (variable is significant), o (variable is insignificant).

It appears that while health, financial resources and social support all add to the model's goodness-of-fit, the health and social support variables add the most to explaining the model. Important aspects of the financial variables may not be being accessed since this is a secondary data research project. There are, for instance, far more missing data from the income variable for family incomes (561 missing) than missing from the rest of the data. It could also be that the survey questions on financial resources themselves are not adequate to get at the impact financial resources can have on stress for the visually-impaired older adult.

Financial resources do offer some limited explanation, however, for the Disability model when vision impairment is the stressor. When the financial resources variables are added to the control variables, the  $R^2$  is .067, while the financial resources variables alone account for a  $R^2$  of .029. In contrast, when the social support variables are added to the control variables, the  $R^2$  is .095, while the social support variables alone account for a  $R^2$  of .063 (see Appendix, Table A8, p. 147).

## CHAPTER 4

### DISCUSSION AND CONCLUSION

#### Typical Profiles of an Older Adult

A typical profile of an older adult in the whole sample would be an older single white woman without vision impairment; with a living child; who would likely have some category of depression; have at least a good level of self-rated health with no falls or functional difficulties; have less than \$20,000 family income; no college education; has health insurance other than public insurance; and social activities adequate in number and intensity.

In contrast, a typical profile of an older vision-impaired adult would be a depressed (a little of the time) older white woman; aged 70 to 74; living alone but who has a living child; has fallen in the past twelve months; reports poor to fair self-health; and the wrong intensity of social activities. The profile of an older vision-impaired adult depressed some or all of the time would add to the above profile one who also has difficulty functioning; a family income of under \$20,000; less than a high school education; and lacks social activities.

#### Study in the Context of Social Theory

A life course perspective looks at the changes one goes through from birth to death in the context of social structure, social institutions and culture (George, 1999). As one ages there are transitions, often status transitions, as life events transform the older adult personally, relationally and in the context of the larger society. Pivotal status transitions are loss through disability or death of the older generation, as grandparents

and parents; loss of peer relationships, especially that of spouses, siblings and friends; loss of younger generations, as children and grandchildren.

But even more basic to one's personal identity may be the loss of integral aspects of oneself through aging and disease. Getting the diagnosis of vision impairment, especially irreversible vision impairment where the prognosis is poor, is a life event that also signals a status transition for the older adult. At the very least, getting the professional verdict that you need cataract surgery indicates that your body is not a smoothly functioning machine, if it ever were. Getting the diagnosis of age-related macular degeneration or glaucoma, both irreversible eye diseases, may well be a wake up call to the fragility of life itself.

Coming out of a doctor's office with the label of some vision impairment may be the transition point where one becomes labeled socially as less physically competent, perhaps even less mentally competent by society. A pattern of such physical and emotional threats to one's personhood may be repeatedly experienced over time through a variety of other personal and relationship losses.

A life course trajectory is the life pattern over time of such life defining events, which includes a number of such status transitions. As such life-defining events are repeated, the older adult must scramble to replace losses in abilities, relationships, and social roles. Even as the older adult gets used to impaired vision abilities, then, he or she needs to recalibrate other basic areas of life, which are now in flux, either because of the vision impairment, other diseases or as part of the life course itself.

Finally, a life course perspective looks at the interdependence of lives in relation to social networks, how informal and formal social support systems interact with the



aging adult. The need for interdependence is most directly recognized when one gets older, but in our very independent, post-industrial society, interdependence is often seen as dependence, reverting to an earlier developmental time, as childhood and even infancy.

There is a paradigmatic alliance (Pearlin & Skaff, 1996) between the life course perspective and the stress process model. Each theory is concerned with how lives change in time, though the life course is more of a macro social approach while the stress process model is more micro. But each takes into consideration socioeconomic status, social support, stressors and health outcomes at its respective level of analysis.

As researchers better understand life course status transitions and trajectory patterns, they become more able to understand how people restructure their lives in the face of aging stressors like vision impairment. The stress process model can be a tool to clarify life course historical and social constructs both between and within cohorts. It can also give a framework for the timing and sequencing of life transitions, which can measure both life satisfaction and successful aging constructs.

Demographers report that in about fifteen years older adults will outnumber those under 18 years of age, both because of expanded life spans as well as the sheer number of baby boomers entering their older years (Hooyman & Kiyak, 2005). There are many ways to view the coming age revolution. We certainly can perceive of it as a war between the generations, as current policy in Washington would have it. But we could also look at the last third of life as a model for all ages, becoming more interdependent, as Durkheim (1984) envisioned, through an organic division of labor.

Durkheim (1984) was concerned that in Western societies there can be an anomic division of labor where there is less solidarity because of too much occupational specialization. He saw this as a special problem of a rapidly expanding modern economy (Morrison, 1998). Work is splintered among competing groups, lowering the ties among the groups. Each group tends to treat the other as an adversary rather than as part of a bigger whole.

In our post-industrial society, there has been a great fragmentation of work among a variety of employers and types of employees. With the rise of the internet more work is done at home or at other non-traditional work sites. There is less community among employees in many organizations, especially with downsizing and other personnel threats. There is also the threat that work will go overseas to other parts of the global market with a resulting loss of jobs here in the United States.

Durkheim (1984) advocated for reform of this anomic division of labor. He postulated that we can paradoxically become more individualistic through the very process of social integration. In this way society, through a collective consciousness, can help the individual reach more of his or her potential. Durkheim looked to a modern version of the collective conscience of traditional societies, finding the sacred in the individual rather than an organized religion. Therefore, mistreating older adults or misunderstanding their worth should be sanctioned by society since the individual is made in society's image. More than that, society itself can only develop as the individual develops.

Theodore Roszak, the historian, finds that there will be great opportunities in coming years as American society matures, perhaps both figuratively as well as

demographically. With the increases in health and longevity, one third of life may be lived in coming years in what was formally labeled old age. What can we learn from this aging frontier that will give us the energy to encourage the independent aspirations of all individuals in society? In *America the Wise*, Rozak (1998) offers some insights toward that future, a future where a new society can be based not on a Darwinism survival of the fittest but rather on the moral qualities of wisdom, compassion and gentleness. This is a society that is manifestly interdependent with one another and is able to develop a richer society from the interchange.

This much is certain: human society has always been a blending of energy and wisdom—alas! More often too much of the first, too little of the latter. The young provide the energy to get things done, but it takes the wisdom of more experienced heads to know how best to use that energy. Industrialism has vastly expanded the energy of the youthful Western world, but it has contributed nothing to our wisdom. Machines have no souls....For the whole of the modern period, we have thought of the future as the cultural property of youth. But when it comes to the deep future...it may be the old, precisely because they have fewer years ahead of them, whose wisdom has the most to offer (p. 248).

In summary, a life course perspective focuses on individual changes from birth to death in the context of social structure, social institutions and culture. As one ages, there are transitions, especially status transitions through life events, which transform the older adult personally and relationally, in the context of larger social structures. In contrast, life course trajectories are the patterns that result from a number of transitions. Over time the older adult must scramble at times to replace losses in abilities, relationships and social

roles. A life course perspective also looks at the interdependence of lives in relation to social networks.

Interdependence is central to social integration in a modern division of labor which is specialized. Durkheim (1984) found that by being more dependent on one another for products and services, one could be paradoxically more independent. He was concerned that Western societies tended to produce an anomic division of labor, where there is less solidarity because of too much specialization. Rather than working together, each group becomes adversarial, acting independently out of self-interest rather than interdependently for the group.

Older adults are often compelled to follow the adversarial role model of independence. Vision impairment becomes a disability when it becomes a social impediment. There is a paradigmatic alliance between the life course perspective and the stress process model. Each theory is concerned with how lives change in time in the context of the surrounding environment. Older adults may be more able to model social integration through a sense of interdependence with others. Even as their energies may wane, they offering society badly needed wisdom, care and sharing.

#### *Revisiting the Disability Model*

The Disability model is a model that makes use of the paradigmatic alliance between the life course perspective and the stress process model as it diagrams the conditions of possible depression and social disability outcomes. In this study the stressor is vision impairment which is mediated through health, financial and social support variables which may lead to depression and a disability outcome. Health and social support variables have been found to be especially significant for this study, although

education for women is also an important variable. The Disability model offers a social construction approach to disability in that disability is a social designation and is not inevitable based on pathology, impairments or limitations. Health, financial resources and social support variables can be influenced by processes of social integration, as alternative communities and technologies which can make the impaired person's life easier and more connected with the rest of society.

### Alternative Communities and Technologies

Older vision-impaired adults might find better financial resources and social support in a number of alternative community concepts (sustainable communities; the Eden Alternative), alternative technologies (smart houses) as well as computer technologies to ease movement and increase communication and safety.

#### *Alternative Communities*

In 1987 the United Nation's World Commission on Environment and Development created a report, *Our Common Future*, which defined sustainable development as development that seeks to enrich the present without depleting future generations (*Austin City Connection*, 2001). Sustainability is based on the interrelationships among the environment, economy and equity or social justice. It is concerned about world resources which are finite, as well as the resources of people themselves, to create solutions to the depletion and misuse of resources. The goal is to find meaningful ways to live together in a healthy community where each person has an opportunity to improve with others the quality of life. In a sustainable community each member, each age group, or each interest group is needed to define and contribute to the whole community life. The older adult, even when vision-impaired, has a role to play in

relationship to the rest of the community. That role may be related to traditional production and consumption of services and product; but it may also be beyond such work and use. The older adult in a sustainable community may be needed as guardian of past wisdom, needed in the present moment in order to guide the community into the future. Since the goal of the sustainable community is interdependence, the older adult may also have need of support in order to care for personal and social needs.

One such group of older adults that is in need of support is that of older minority women who have often poor retirement finances, even after a lifetime of minimum wage labor. Though the poverty rate of older adults has decreased in recent years, four out of ten single black older women and almost five out of ten single Hispanic women live in poverty; this is twice the rate of older white women (*Communities by Choice*, 2005). Older poorer women are also more likely to be vision-impaired. According to the sustainable community agenda, by working with these deprived older adults, we can enrich not only their lives but also our own and that of the future.

Another alternative community is that of the Eden Alternative, developed by the medical doctor, Williams H. Thomas. The Eden Alternative takes the ideas of the sustainable community to nursing facilities and other long term retirement homes, where for many older adults there has been more of an emphasis on warehousing and medicating than on creating a living environment. A large proportion of older adults in such institutions are depressed; many also have some kind of sensory impairment, as vision impairment, as well as other disabilities (*The Foundation for Health in Aging*, 2005).

The vision of the Eden Alternative is to create habitats for people: for the residents and their families as well as for the staff themselves. Through the use of plants, animals, children and other inter-generational experiences, as well as other homelike emphases, this approach attempts to create a home out of an institution. There is more emphasis on spontaneity and less on programming; more emphasis on community caring and less on physical and medical restraints; more emphasis on staff teamwork and less emphasis on organizational hierarchy. The Eden Alternative can be costly and is not reimbursed by Medicaid and Medicare; volunteers are vital to its success.

There have been a few studies regarding the outcomes of the Eden Alternative. In one study of a number of nursing homes there has been some support for this concept, including a decrease in the amount of anti-anxiety and anti-depression medications needed as well as a decrease in nursing assistant turnover (Chevremont, Fuchsberger & Miller, 1999). In addition, the Texas Long Term Care Institute at Texas State University in San Marcus has two studies on the Eden Alternative. The first one, *Impact of the Eden Alternative on Texas Nursing Home Residents' Quality of Life: A Psychosocial Perspective* (Wylie, 2002), was the first study in the nation to look at older adults' quality of life from a psychosocial perspective. In the second study, *Eden Alternative: The Texas Project* (Texas Long Term Care Institute & Ransom, 2000), six Texas facilities participated. Both studies show some promising results in raising the quality of life for nursing home residents.

Thomas, the founder of the Eden Alternative, is now at work on community living for older adults who have been institutionalized in nursing homes. He is creating intentional communities, called Green Houses. These are small group homes for older

adults that are mainstreamed into residential neighborhoods where older adults can maintain their community status with their neighbors (Thomas, 2005).

### *Smart Houses and Other Technologies*

These houses have an electronic network, linking together appliances and heating, cooling, lighting systems which can be controlled centrally, sometimes even outside the home. Smart technologies can be used for support of daily living, surveillance and protection, and as communication techniques for conversation as well as for emergencies (Roe, 2005; Edge, Taylor, & Dewsbury, 2000). At present few homes have been fitted with smart technology. The prices are high and for many it can be too complex to manipulate the program systems. Both costs and complexity are present barriers to the use of smart houses for the vision-impaired but this may change in the future, especially since there is an emphasis on smart houses and smart technology for the disabled. Smart technologies may also be found in smart wheelchairs which can be controlled by hand or even through voice recognition. In the future cell phones will also be able to control remote systems through voice recognition, a special aid for the visually-impaired (Fruchterman, 2003).

The International Conference on Smart Homes and Health Telematics is interested in improving vision-impaired devices. Its third international conference was hosted by Canadians in Sherbrooke (International Conference On Smart homes and health Telematic, ICOST, 2005). The word telematics comes from the words *telecommunications* and *informatik* (German for computer science). Telematics is a merging of the two industries. Telematics combines the possibilities of wireless communications with the internet global networking systems (Worthman, 2000). Health



telematics is a technological revolution using remote control patient monitoring, assessment, surgical techniques and independence in recovery and at home. Telematics as a tool can help to create communication and community for the older vision-impaired adult. Though at present this is more hope than reality, as cost and complexity are controlled, there will be more reality to the hope in smart technologies for those with limitations like vision impairment.

### Research, Policy Implications and Recommendations

#### *Research and Policy Implication*

Because research and policy overlap, they will be looked at together. It would seem that too often they are not studied together to the detriment of each. It is not enough to study a social science subject that can affect so many people without also being concerned about its application to social policy. At same time, it is not enough to apply a policy that has little empirical validity.

Research on vision impairment is in need of extensive work, as the knowledge base is limited. There are many public policy issues but as yet there is no comprehensive national policy (Crews, 2000). Providers are often uninformed about vision impairment and create services based on provider needs rather than that of the vision impaired older adult. Often providers are poorly trained to understand or evaluate individual or family needs. There may be inadequate case management of services for community and institutionalized older adults with vision impairment. Insurance providers need to be reimbursed for vision impairment services, especially case management which may include working with the family as well as the individual older adult.

There are a number of other research and policy considerations. Vision impairment should be looked at in the context of social theory, in relationship to the life course perspective and the stress process model. Gender differences are important, especially since more women than men are vision impaired. There needs to be better education for providers, the older adult community, and families. Social support variables need to be further studied in terms of number, intensity, and quality (the last of which could not be studied in this research).

The effects of depression on vision impairment are poorly understood. According to The Lighthouse, Inc. (1995) only about 1% of older adults needing rehabilitation services get such services. Often older adults and their families, as well as the providers themselves, believe that vision impairment and depression are results of aging and therefore there is no remedy. There have been some national studies on vision impairment but they do not clarify the effects of vision impairment on depression, though The Lighthouse, Inc. is in process of such a national study (2003).

In addition, recently legislation was passed in the 108<sup>th</sup> Congress which called for a five year demonstration project of vision rehabilitation services under Medicare. This includes services of vision rehabilitation therapy not only in the office or clinic but also in the patient's home. States are soon to be selected for participation with the expectation that the demonstration project will begin later in this year (L. Lidoff, Director, *National Vision Rehabilitation Association*, e-mail, May 2005). It will be important for this project to be evaluated for research insights as well as its effectiveness.

There continues to be a need for an expanded emphasis on vision impairment research which will take into account the increasing numbers of older adults experiencing

vision impairment and disability. Most vision impairment studies, until recently, have been done on the younger impaired population. Most older adult vision impairment studies on depression are small exploratory studies rather than national studies with representative samples. It is often not clear what the criteria are for defining vision impairment. As a result it is also not clear how many older people are impaired, but the numbers seem to be rising with the increase in the older population.

There needs to be more research into the effectiveness of sustainable communities for those who are vision-impaired. Both sustainable communities in general, and the Eden Alternative in particular, would be good areas for such research since they are attempting to either maintain or re-integrate the older impaired adult back into society.

The world of telematics and smart houses and technologies is also an area filled with potential, but as yet has not been adequately researched. It will be difficult to formulate policy initiatives for the older vision-impaired adult until more research is done in these areas. However, it may be possible to use more general research on sustainable communities and Eden Alternative type communities to encourage further funding and programming for the older adult based on the need for all in a community to become more socially integrated.

The older adult who is vision-impaired is in need of more social integration than those who are more able bodied. It is common for the older adult who has physical limitations to also be depressed, have worse functional abilities and an increased mortality risk. Vision impairment is a common concern in older adults and affected by depression. The stratifications of race, class, gender and age have been found to affect

both depression and the disability outcome, having a cumulative negative effect over time.

A life course perspective in the context of the stress process model offers a framework to better understand vision impairment in the older adult. This study on a representative national sample adds to the knowledge base concerning vision impairment leading to depression outcomes:

- 60% of older adults in this sample report a depression category. 50% of older men report being depressed and 66% of older women.
- Older vision-impaired women are significantly more likely to report being depressed some or all of the time.
- Older adults' self-health reports at the higher depression level have substantive significance, as do the inter-relationships among the three health variables (falls, difficulty functioning and self-health reports).
- Social activities of the wrong intensity significantly increase depression.
- It is important to pursue fears that younger-old adults may have about vision impairment since they report being more depressed than older-old respondents.
- It is more important to live with others, whether married or single, when one is vision-impaired.
- Having a living child for older vision impaired-women seems to increase depression; but it is unclear why this is so. It is important to study this effect further in order to better understand the implications of life roles for older women.
- Having higher education is especially important in lowering depression for older vision-impaired women at the higher depression category.

The Lighthouse, Inc. (1995) has similar outcomes for a number of the mediating variables in this study: older vision-impaired adults are more likely to be women, poor, living alone, having less education, in poor to fair health and lacking health insurance. This study does find that the health variables (falls, difficulty functioning and self-health reports) together substantively influence the depression outcome for those who are vision impaired. With the exception of education, especially for older women, the financial variables do not seem to make that much of a difference in the depression outcomes for those vision impaired. Social support variables seem to have the most effect in the two social activities variables (number and intensity) and living with others, especially at the higher depression category, depressed some or all of the time. Finally, older vision-impaired women without a living child are found in this study to be less depressed than those with a living child, which seems to be a somewhat surprising outcome.

### *Recommendations*

Vision impairment research should be looked upon in relationship to social theory. The life course perspective in alliance with the stress process model offers a social theory that is able to integrate the specific environmental variables that mediate depression and the disability outcome. Possible cumulative environmental and biological effects over time make social histories of the older adult an important qualitative addition to further research. Further conceptual development of the Disability model for specific diseases or conditions in the older adult would also be welcomed as would research based on this model or an amended model. The social implications of disability throughout the life course continue to be an especially good area for medical sociologists to study. The aging of the population adds an important focus to disability issues.

Gender differences are important in vision impairment, as more women are vision-impaired than men for a number of eye diseases, including age-related macular degeneration, the leading eye disease of older adults. This study, for instance, concludes that vision-impaired women are more likely to be depressed than men, more likely to be depressed when they have a living child and perhaps more traditional family roles and more likely to have been positively affected by education. In contrast, men are less likely to be affected by financial resources as education and income. The health variables (falls, functioning and self-health reports) are also important predictors of the relationship between vision-impairment and depression in the older adult for each depression category and also for each gender. These are variables that are easy to report both in clinics and as part of a research survey. Social activities in number and intensity are important for both older men and older women. Visits and phone calls by family, relatives and friends, as well as the ability to visit in the community are important for both sexes. It is also important to have the right amount of such activities, neither too much, nor wanting more.

Education is an important variable, especially for women. As a whole, older women have less education than older men, yet education is a mediating variable for older women but not older men who are vision-impaired and depressed. Practical problem-solving approaches should be part of case management strategies for all older vision-impaired adults to give them more of a sense of control over their lives. There is a need for community education and support for those who are younger-older adults (aged 70 to 74 years of age) concerning fears about eyesight loss. Providers also need to be educated, both those directly involved in services to the older vision-impaired adult as

well as all those working with older adults in general. There is also a need to educate and support families of the vision-impaired through programs, counseling and case management services.

There should be governmental support and money for vision impairment programs and rehabilitation. At present public funding of vision impairment services is quite limited but a five year Medicare demonstration project is to begin later this year. This program needs to be supported, as well as further vision-impairment research, both applied and basic.

If a vision-impaired older adult lives alone, what are the resources needed for help and socialization? This is an issue for community agencies and clinics as well as funding sources. Leadership from the sustainable community agenda could also be helpful in getting more governmental funding. The Eden Alternative shows some promising results with the very limited research that had been done on this concept for nursing facility communities. There is also a need to work more closely with the smart technology professionals. More research needs to be funded; aspects that are found to have a beneficial impact on social welfare and integration could then be applied to those most at risk for vision impairment as older adults.

#### Limitations

This study uses the Second Supplement on Aging, 1994 – 1996. Only variables included in this data set can be used. Variables have to be used as the survey originally defined as they have been self-reported either by the respondent or a proxy. The definitions of vision impairment, depression, various controls, health challenges, health

status, education, income, and various social support variables are limited to the variable information of this data set.

In addition, there are a number of other limitations in this study, due to both secondary analysis limitations as well as limitations in the subject matter as presently understood. First, the concept vision impairment is itself not clearly defined in the SOA II data set. Often for the non-medical professional, as those in rehabilitation, the designation of vision impairment has been called *low vision*, which is defined as having difficulty seeing, even with prescribed corrective lenses (Corn & Koenig, 1996). There is one variable which covers this designation: (SF 1655, *trouble seeing even w/glasses -- one or both eyes*). There are also variables for some vision impairments (SF1651, *Cataracts*; SF1652, *Glaucoma*; SF 1653, *Blindness in both eyes*; SF 1654, *Blindness in one eye*). Other vision impairments, as macular degeneration and diabetic retinopathy, are not included among vision variables in the SOA II data set.

Second, there is no one way to conceptualize vision impairment in the literature. There are a number of ways of describing the older adult's vision limitation: by a specific diagnosis, by the number of diagnoses, the length of time the older adult has had functional limitations because of vision loss, and the degree of vision impairment. Because eye diagnoses are not mutually exclusive, often older adults can have more than one age-related vision impairment.

Third, this is a cross-sectional study. There is a need to replicate the study with another national representative sample, as well as with a longitudinal study based on the LSOA II (1994- 2000) or another national data set.



Fourth, it would be helpful to augment this study with a qualitative study that explored some of the more prominent substantive mediators, especially by gender. Older adults' understanding of the three health variables (falls, function and self-health) as well as the various social activities could be expanded. It would also be helpful to learn more about women's understanding of having living children when they are older adults. Also, since education is especially important for older vision-impaired women, what is it about having more education that makes one less depressed when they are vision impaired?

Fifth, social activities as part of social support can only be measured in this study in terms of the number and intensity of activities. There needs to be further work on the quality of social activities as well as how social support itself is part of a broader social network.

Sixth, Johnson and Wolinsky (1993) found that the ADL and IADL scales in the LSOA I need a clearer emphasis on cognitive function. They have reworked these scales with an added cognitive function scale. The present study is not able to differentiate cognitive functioning from the ADL and IADL scales. As a result, the researcher of this secondary data is left to wonder if the respondents understand what is being asked.

Seventh, the relationship between vision impairment and depression, as mediated by health, financial resources and social support variables is most likely a two-way relationship of cause and effect. The regressions used in the study can only clarify a one-way relationship. Perhaps a structural equation model might be helpful to explore in more detail the inter-relationships among these variables.

## Conclusion

Older adults experience many stressors in the form of losses. Personal abilities as well as relationships with family and friends are lost or reduced at this stage in the life course. Vision impairment is a common loss or limitation at this stage of life, often increasing disability and mortality rates for the older adult. Depressive symptoms may result from vision impairment, turning a physical impairment into a social disability. With the aging of the huge baby boomer cohort there is a great need to find ways to slow the rate of physical impairments becoming social disabilities.

Vision impairment is among the common medical problems associated with depressive symptoms. It is a common ailment, increasing with age, affecting one in four older adults, aged 75 and over (The Lighthouse, Inc., 1995). When depression is treated, vision impairment may become less of a social disability (Horowitz, 1995; Horowitz, Reinhardt, McInerney & Balistreri, 1994; Rovner & Ganguli, 1998).

There have been few studies of vision impairment using a representative sample. Even fewer are the studies that have been done, even with small samples, of the relationships among depression, vision impairment and social support. The mainly small studies point to the importance of social support as a buffer against depressive symptoms for the older vision impaired adult.

The purpose of this study has been to add to the knowledge base of depression in relationship to vision impairment and social support. The Supplement on Aging (1994 – 1996) has been studied cross-sectionally, using multinomial logistic regression analysis to determine how depression in visually-impaired older adults is mediated by health, financial resources and social support variables.

Vision impairment is a stressor that may result in a depression outcome. The stress process model, in the context of a life course perspective, is a sociological approach to conceptualizing stress. Stress is the outcome of an environmental situation or process that pushes one beyond normal limits. The outcome of stress may be depression and disability, but this outcome can be mediated by demographic, health, financial resources and social support variables.

This research supports previous studies that find that older vision-impaired adults are often depressed. At the higher depression category for the whole sample, the most important mediators of depression are better health (fewer falls, better functioning and better self-health reports) and social supports (especially the two social activities variables). Higher education is most important for older women. Older-old vision-impaired adults in the whole sample continue to be less depressed than younger-old vision-impaired adults. Among women, those who do not have a living child are less depressed some or all of the time.

This study needs to be seen through a social theory of aging that looks at impairment as a social disability. When vision impairment leads to depression, it becomes a social disability. The context of social stress is best understood through a life course perspective. In coming years there will be a great increase in older adults who could add to our social capital as role models for living. Durkheim (1984) sought a more balanced division of labor in modern society. The aging of the baby boomers offers our society a way toward such a balance, if we look at the last third of life as a time of opportunity to become more interdependent with one another. The Disability model can be utilized both for vision-impairment as a stressor as well as in the context of other

stressors affecting the older adult and leading to depression and possible disability outcomes. There is a need to expand disability concepts in terms of social disability as well as to be more inclusive of older adults who often find themselves severely limited at a time in the life course when they have fewer resources to cope with such losses.

APPENDIX

SUPPLEMENTAL TABLES

Table A.1  
*Correlations for Variables in the Multinomial Logistic Regression*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	1.000														
(2)	-.064	1.000													
(3)	.012	.033	1.000												
(4)	-.004	-.008	-.019	1.000											
(5)	-.044	-.050	.027	.014	1.000										
(6)	-.130	-.058	-.003	.049	-.148	1.000									
(7)	.072	-.015	.050	.036	.034	.270	1.000								
(8)	.004	.056	.055	-.043	-.002	.025	-.066	1.000							
(9)	-.019	.021	.018	-.056	-.019	-.007	-.058	-.263	1.000						
(10)	-.022	.035	-.235	-.029	-.006	-.029	.041	.123	.074	1.000					
(11)	.012	.062	.099	-.245	.006	.042	.006	.059	-.043	.108	1.000				
(12)	-.010	-.065	-.004	-.111	.025	-.100	.096	.048	.071	-.102	.064	1.000			
(13)	.005	.010	.010	-.008	-.049	-.136	.083	-.002	.004	.006	.015	-.036	1.000		
(14)	.022	-.028	-.036	-.013	-.023	-.006	-.005	-.005	-.022	-.001	.065	-.091	-.005	1.000	
(15)	-.004	-.049	.098	-.023	-.013	.018	-.026	.285	-.088	.061	.721	.079	.033	-.061	1.00

(1) vi (2) older-old (3) nonwhite (4) male (5) falls (6) difficulty functioning (7) self-health (8) income (9) education (10) public insurance only (11) married (12) lack social activities (13) too much or want more activities (14) no living child (15) alone

Table A.2

*Parallel Lines Test Results for Ordinal Regression, Whole Sample, Weighted*  
(N = 8,176)

Model	-2 Log Likelihood	$X^2$	<i>df</i>	Significance
Model 1	205.736	12.187	4	.016
Model 2	1,002.104	33.476	7	.000
Model 3	2,980.275	69.993	10	.000
Model 4	7,647.284	85.197	15	.000

Table A.3  
*Ordinal Regression Estimates for Determinants of Depression, Whole Sample<sup>a</sup>*  
(N = 8,176)

Variable	Model 1	Model 2	Model 3	Model 4
<i>Dependent</i>				
depression (none)	-.551*** (.038)	-1.167*** (.064)	-1.242*** (.071)	-.972*** (.100)
depression (a little)	1.077*** (.040)	.544*** (.063)	.493*** (.069)	.794*** (.099)
<i>Independent</i>				
vision impairment	.696*** (.060)	.431*** (.063)	.427*** (.065)	.435*** (.066)
<i>Controls</i>				
male	-.586*** (.043)	-.569*** (.044)	-.538*** (.046)	-.528*** (.050)
older-old	-.046 (.042)	-.114** (.043)	-.135** (.044)	-.159*** (.046)
nonwhite	.189** (.070)	.068 (.072)	-.020 (.076)	.021 (.078)
<i>Health</i>				
falls		.220*** (.053)	.217*** (.055)	.198*** (.056)
difficulty funct.		.398*** (.053)	.392*** (.055)	.272*** (.057)
self-health		-.848*** (.054)	-.816*** (.056)	-.730*** (.058)
<i>Financial Resources</i>				
income			-.144** (.047)	-.120* (.052)
education			-.134* (.053)	-.124* (.054)
public health			.119* (.057)	.080 (.058)
insurance only				
<i>Social Supports</i>				
married				.020 (.074)
living alone				.156* (.076)
no living child				-.168* (.068)
lack soc. act.				.243*** (.056)
too much or want more activities				
-2 Log Likelihood	205.736	1,035.580	3,050.267	7,732.481
$\chi^2$	331.639***	792.735***	793.902***	901.742
<i>df</i>	4	7	10	15
Nagelkerke	.046	.107	.113	.131
<i>N</i>	8,176	8,176	8,176	8,176

<sup>a</sup>Weighted

\* $p \leq .05$

\*\* $p \leq .01$

\*\*\* $p \leq .001$

Note: Standard errors are in parentheses.



Table A.4

*OLS Regression Coefficient for Determinants of Depression, U.S. Adults, Age 70 and over, SOA II (1994 – 1996)<sup>a</sup>*

Predictor	Model 1	Model 2	Model 3	Model 4
<i>Constant</i>	.886*** (.015)	1.114*** (.025)	1.139*** (.027)	1.021*** (.038)
<i>Main Variable</i>				
vision impairment	.288*** (.025)	.171*** (.025)	.169*** (.025)	.168*** (.025)
<i>Controls</i>				
male	-.235*** (.018)	-.219*** (.017)	-.204*** (.018)	-.198*** (.019)
older-old	-.016 (.017)	-.040* (.017)	-.048** (.017)	-.057*** (.018)
nonwhite	.081** (.029)	.029 (.028)	-.005 (.030)	.010 (.030)
<i>Health</i>				
falls		.086*** (.021)	.084*** (.021)	.076*** (.022)
difficulty funct.		.161*** (.021)	.158*** (.022)	.109*** (.022)
self-health		-.340*** (.021)	-.324*** (.022)	-.286*** (.023)
<i>Financial Resources</i>				
income			-.058** (.019)	-.047* (.020)
education			-.058** (.020)	.054** (.021)
public health insurance only			.046* (.022)	.031 (.023)
<i>Social Support</i>				
marital status				.013 (.029)
living alone				.065* (.029)
no living child				-.068** (.026)
lack social activities				.095** (.022)
too many or too little activities				.203*** (.020)
<i>R</i> <sup>2</sup>	.040	.097	.102	.118
<i>F</i>	83.743***	121.280***	85.654***	65.198***
<i>N</i>	8,176	8,176	8,176	8,176

aWeighted, Unstandardized

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

Note: Standard errors are in parentheses.

Table A.5

*Whole Sample, Multinomial Pearson and Deviance Goodness-of-Fit Results. (N = 8,176)*

Model	Test	$X^2$	Significance
Model 1	Pearson	23.195	.391
	Deviance	22.931	.406
Model 2	Pearson	227.315	.018
	Deviance	287.217	.006
Model 3	Pearson	1,258.371	.352
	Deviance	1,382.265	.003
Model 4	Pearson	5,351.700	.075
	Deviance	5,689.167	.001

Table A.6  
*Gender Sample Multinomial Pearson and Deviance Goodness-of-Fit Results.*  
 (N = 8,176)

Model		Male $n = 3,154$		Female $n = 5,022$	
	Test	$X^2$	Sig.	$X^2$	Sig.
1	Pearson	8.357	.399	6.374	.605
	Deviance	8.089	.425	6.482	.593
2	Pearson	138.873	.013	127.017	.191
	Deviance	144.104	.006	130.726	.135
3	Pearson	618.033	.133	613.221	.787
	Deviance	688.340	.001	688.249	.229
4	Pearson	2,197.293	.030	3,086.242	.576
	Deviance	2,288.749	.001	3,366.059	.001

Table A. 7  
*Male Sample Multinomial Statistical Significance Results, Two Depression Categories<sup>a</sup>*  
 (N = 3,154)

	Controls			Health			Financial Res.			Social Support						
H	vi	sex	age	race	falls	func	health	ed	income	pubins	marital	lack	intensity	nochd	alone	
<hr/>																
H <sup>1</sup>																
l	x	--		o	o											
h	x	--		o	x											
<hr/>																
H <sup>2</sup>																
l	x	--	x	o		o	o	x								
h	x	--	o	o		x	x	x								
<hr/>																
H <sup>3</sup>																
l	x	--	x	o		o	o	x	o	o	o					
h	x	--	o	o		x	x	x	o	x	x					
<hr/>																
H <sup>4</sup>																
l	x	--	x	o		o	o	x	o	o	o	o	o	x	o	o
h	x	--	x	o		x	x	x	o	o	o	o	x	x	o	o

<sup>a</sup>  $p < .05$  to  $< .001$

Key: vi (vision impairment), sex, age, race, falls, func. (health: functioning), self-health, ed (college education), income, pubins (public insurance only), marital (status), lack (lack social activities), intensity, nochd (no living child), alone (living alone)

H (hypotheses), H<sup>1</sup> through H<sup>4</sup> (hypothesis 1 through hypothesis 4)

l (lower depression: a little of the time), h (higher depression: some or all of the time)

x (variable is significant), o (variable is insignificant).

Table A.8  
*R<sup>2</sup> Values Using Different Multinomial Logistic Regression Models*

Model	<i>R<sup>2</sup></i>
<u>Models in Study</u>	
1 (Control)	.047
2 (Control, Health)	.111
3 (Control, Health, Financial)	.122
4 (Control, Health, Financial, Support)	.141
<u>Other Possible Models</u>	
Health	.085
Financial	.029
Social	.063
Control, Financial	.067
Control, Support	.095
Health, Financial	.099
Health, Support	.113
Financial, Support	.077
Control, Financial, Support	.106
Control, Health, Support	.134
Health, Financial, Support	.122
Controls (sex, age, race)	
Health (falls, functioning, self-health)	
Financial (education, income, public insurance only)	
Social Support (marital, living alone, no living child, too many or too little activities, lacking social activities)	

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