



Published in final edited form as:

J Health Soc Behav. 2006 June ; 47(2): 126–141.

When Do Older Adults Become “Disabled”? Social and Health Antecedents of Perceived Disability in a Panel Study of the Oldest Old*

JESSICA A. KELLEY-MOORE and **JOHN G. SCHUMACHER**

University of Maryland, Baltimore County

EVA KAHANA

Case Western Reserve University

BOAZ KAHANA

Cleveland State University

Abstract

Disability carries negative social meaning, and little is known about when (or if), in the process of health decline, persons identify themselves as “disabled” We examine the social and health criteria that older adults use to subjectively rate their own disability status. Using a panel study of older adults (ages 72+), we estimate ordered probit and growth curve models of perceived disability over time. Total prevalent morbidity, functional limitations, and cognitive impairment are predictors of perceived disability. Cessation of driving and receipt of home health care also influence older adults’ perceptions of their own disability. A dense social network slowed the rate of labeling oneself disabled, while health anxiety accelerated the process over time, independent of health status. When considering perceived disability, the oldest old use multidimensional criteria capturing function, recent changes in health status and social networks, and anxiety about their health.

Health has long been identified as a marker of social status (Twaddle 1974), Persons who are viewed as vigorous and well are considered to have a higher capacity for fulfilling social expectations and obligations. Likewise, those who are seemingly ill or less healthy are often attributed a lower expectation in overall capacity and are thus assumed to have a diminished ability to participate fully in the social world (Parsons 1958). These social definitions of health

*This research was supported by an NIH/NIA Merit Award to the third author. The authors wish to thank Loretta Ayd-Simpson for helpful comments on an earlier draft of the manuscript, Loren Lovegreen for information on the sample, and Christiana Metzger for literature assistance. We also appreciate the ongoing efforts of Cathie King, Jane Brown, Sara Lynes, Amy Wisniewski, and the rest of the project team for collecting and maintaining the data.

Address correspondence to: Jessica A. Kelley-Moore, Sociology and Anthropology, University of Maryland Baltimore County, 1000 Hilltop Circle, Baltimore, MD 21250 (jkm@umbc.edu).

Jessica A. Kelley-Moore is Assistant Professor of Sociology and faculty affiliate of the Center for Aging Studies at the University of Maryland, Baltimore County. Her research interests include social influences on health over the life course, the impact of neighborhood and environment on health, racial/ethnic health disparities among older adults, and disability.

John G. Schumacher is an Assistant Professor of Sociology and faculty affiliate of the Center for Aging Studies at the University of Maryland, Baltimore County. His current research examines the intersection of medical sociology and social gerontology, with a focus on physician-patient interactions and the role of health care providers in long-term care.

Eva Kahana is Robson Professor of Humanities & Sociology and Director of the Elderly Care Research Center at Case Western Reserve University. Dr. Kahana has published extensively in the areas of stress, coping and adaptation among the aged, late-life migration, late-life sequelae of social stress, social organization of health care institutions, intergenerational family relationships, and environmental influences on older persons. Her most recent formulation focuses on health care partnerships and the role of preventive and corrective proactivity of older adults in shaping successful aging.

Boaz Kahana is Professor of Psychology at Cleveland State University, where he has also served as departmental chairperson and has directed the Center on Aging. He has been awarded NIH research grants dealing with stress and extreme stress among the elderly, and he has served on the editorial boards of *Psychology and Aging*, *Academic Psychology Bulletin*, and *Mental Health and Aging*. Dr. Kahana is author of numerous articles and chapters dealing with stress, coping, and adaptation among the elderly.

are strongly reinforced in the media, literature, and social institutions. Even in research, models of successful aging (e.g., Rowe and Kahn 1998) have often been predicated upon sustaining high physical and cognitive function, preventing disease, and maintaining social roles.

Juxtaposed against these ideals of health and vitality, disability is often considered a permanent state of illness (Susman 1994). Persons with physical or mental limitations that may require assistance, adaptive equipment, or simply more time to accomplish tasks are often viewed as disabled and thus less capable overall (Oliver 1996). Limitations that are easily detectable, such as a limp, use of a wheelchair, or vision impairment, may be stigmatizing for the individual because these are outward signs of supposed ill health (Goffman 1963). Popular definitions of independence, characterized as the ability to live, act, and travel without assistance, further fuel expectations of dependency for persons with disabilities. Such stereotypes and socially defined labels may diminish self-perceptions of one's own capacity to fulfill social roles (Iezzoni et al. 2000; Zola 1993, 1983).

According to *Healthy People 2010* (U.S. Department of Health and Human Services 2000), nearly 54 million Americans are disabled, with "disabled" defined as having difficulty with communication, self-care, mobility, learning, or behavior. In industrialized nations, older adults compose the largest portion of this group; Approximately 63 percent of disabled persons in the United States are over the age of 65 (US DHHS 2000). Importantly, a high proportion of older adults who are classified as disabled (defined as limitations in one or more "activities of daily living," hereafter ADLs) do not consider themselves disabled (Langlois et al. 1996). One possible explanation for this discrepancy is that older adults who develop physically limiting conditions later in life may attribute the process to normative aging (Williamson and Fried 1996). Thus, many who have been physically able for most of their lives may be slow to take on a label of "disabled," despite serious functional decrement.

Subjective assessments of disability among older adults, viewed in light of health decline, have received limited attention in the social science literature. Little is known about what influences some older adults to consider themselves disabled or about the timing and rate of acquiring such a disability label. Using a panel study of community-dwelling adults ages 72 and older at baseline, this research examines the social and health antecedents of perceiving oneself as disabled. While other studies have considered the static predictors of subjective disability, we estimate a dynamic model with latent growth curves to determine how changes in social networks, functional status, and overall health affect the rate of labeling oneself as disabled over time. We begin by exploring the criteria older adults use to subjectively evaluate their health and how this process may be similar when individuals assess their disability status. Next, we examine the social construction of disability and the personal and social influences on the perception of disability among older adults.

THEORY AND EVIDENCE

Subjective Assessments of Health

Scores of studies have examined individuals' subjective assessments of health, both as a predictor and as an outcome of physical health status, including disability (Fried et al. 2000; Hoeymans et al. 1997) and mortality (Ferraro and Kelley-Moore 2001; Idler and Benyamini 1997). Many of these studies have demonstrated a general relationship in which those with more health challenges, such as onset of chronic conditions, medication use, and pain, tend to rate their health as fair or poor (Benyamini, Leventhal, and Leventhal 2003; Idler 1993; Kaplan and Baron-Epel 2003; Reyes-Gibby, Aday, and Cleeland 2002; Smith, Shelley, and Dennerstein 1994). However, many persons in apparent poor health, as measured by external indicators, do not evaluate their own health as such. Notably, subjective health assessments often remain buoyed among the oldest old, independent of disease prevalence and poor

functional status (Ferraro 1980). Supposed discrepancies between existing health status and subjective ratings of health demonstrate that many persons, particularly older adults, consider the definition of health to be multidimensional, not dependent solely on the presence or absence of disease.

Three key findings in the research on subjective health ratings among older adults are directly related to our examination of perceived disability. First, the appraisal of one's own health would seem to be individualistic, yet it is actually a very social process. For example, some older adults consider the external evaluations of their health status from physicians, friends, or family in self-assessments of their own health (Borawski et al. 1996). Others recast the meaning of health away from specific symptoms or diseases, choosing to define good health as "going and doing something meaningful" (Bryant, Corbett, and Kutner 2001:932), which is linked to having viable social roles, being able to meet associated expectations, and having the resources to accomplish them. Having high levels of emotional support and a companion to call upon when in need also tend to elevate subjective evaluations of health (Ross and Mirowsky 2002). There are significant gender differences here, however. Women are more likely than men to consider relationships and social roles in their self-assessments of health (Denton and Walters 1999; Rennemark and Hagburg 1999).

Responses to subjective health questions also tend to include a reference group. When assessing general health status, older adults tend to compare themselves with same-age peers, which by definition includes a subjective ranking relative to others (Leinonen, Heikkinen, and Jylhä 2001). Perceived disability is also a subjective assessment of one's health and functional status. Like self-ratings of health, perceived disability may have a strong social component, integrating comparisons with peers, external appraisals of one's health, and the ability to fulfill social roles and expectations.

Second, recent health decline may affect subjective assessments of disability. Deteriorating function can be associated with reduced mobility, greater dependency, and even shrinking social networks. Thus, changes in the ability to "go and do" may become salient criteria in perceiving disability (Leinonen et al. 2001). While there are countless medical and service-based criteria to determine whether a person is disabled, it is unknown when in the process of health decline persons begin to define themselves as "disabled." One possibility is that older adults may be able to buffer the deleterious effects of progressively limiting function by compensating with resources such as strong support networks and adaptive equipment use (Kahana, Kahana, and Kercher 2003). It may be that seniors consider themselves disabled only when these buffers fail to help maintain previous levels of function and social engagement.

Finally, subjective evaluations of health and disability are greatly influenced by psychosocial orientations toward health. Persons who are pessimistic, anxious, or depressed tend to report poorer health independent of actual health status (Hong, Zarit, and Malmberg 2004; Schneider et al. 2004). Lower ratings of subjective health could also reflect anxiety or depression about the current state of physical health rather than long-term personality traits (Schneider et al. 2004). Negative health events such as a hospitalization, new diagnosis, or noticeable decline in functioning may spur concern in an older adult about his or her well-being. Indeed, empirical research has shown that health anxiety is associated with greater levels of disability and lower subjective well-being in later life (de Beurs et al. 1999).

Research on subjective health assessments helps place self-perceived disability in a multidimensional framework in which we expect that older adults rely not only on objective health indicators but also on perceptions of social networks and roles, recent health history, and psychosocial orientations toward current health. There is, however, another layer of complexity for subjective assessments of one's disability status. Disability has very specific

(and primarily negative) social definitions relative to more general definitions of health. We are aware of no research that has examined the impact of social and health indicators on older adults' willingness to take on the label of "disabled," particularly in light of significant health decline.

Labeling Oneself as Disabled

Disability is defined by the World Health Organization as "any restriction or lack of ability to perform an activity ... that results from an impairment" (Wood 1980). This definition clearly demarcates the difference between an impairment, which is a physical or mental limitation, and disability, which is the potential social exclusion that results from being unable to fully participate in society. Importantly, disability is not synonymous with illness or even poor health. However, social attributions of these characteristics to persons with detectable physical or mental impairments can result in lowered expectations of goal accomplishment, avoidance, and even discrimination (Susman 1994).

Older adults, as a population group, are at high risk of physical impairment. Twenty percent of all adults ages 65 or older in the United States have chronic disabling conditions, and about one-third have serious mobility limitations (Freedman, Martin, and Schoeni 2002). Among adults in this same age group who do not perceive themselves as disabled, 21 percent are unable to perform at least one "activity of daily living" (ADL), and another 40 percent have difficulty performing at least one ADL (Langlois et al. 1996). This discrepancy between the functional status of older adults and their subjective assessments of disability status has received little attention in the literature.

Onset of disability in late life tends to develop more slowly and is often the product of chronic illness or comorbidities (Ferrucci et al. 1996; Verbrugge and Jette 1994). Even catastrophic disabilities in older adulthood tend to be health-related, such as those resulting from stroke or accidental falling. Persons who experience impairments later in life may be less likely to develop a "disability-rooted" identity (Turnbull and Turnbull 1999; Zink 1992). This is because they have already experienced many life domains such as employment and parenthood as able-bodied persons and therefore may be less likely to orient their sense of self around the ability (or inability) to fulfill these social roles (Breitenbach 2001; Zink 1992).

Subjective assessments of disability are also influenced by perceived independence. Persons who have made recent disadvantageous shifts in what they perceive to be the ability to live and act independently often consider themselves disabled (Gignac and Cott 1998). Research has also indicated that mobility level is a strong indicator of self-perceived disability. In fact, compared with all other types of physical limitations, wheelchair users are the most likely to consider themselves disabled (Iezzoni et al. 2000). This may be related to the fact that the wheelchair is the universal sign for disability and is stereotypically associated with dependency (Iezzoni 2003; Oliver 1996).

Likewise, person-to-person interactions often reinforce the perceived negative difference of physical or mental impairment. For example, when interacting with disabled persons, "normals" often engage in shorter conversations, make less direct eye contact, and leave a wider berth in body space (Goffman 1963; Susman 1994). However, old age itself is a devalued status in Western society and likewise carries social assumptions about the ability to be productive in society (Palmore 2001). Persons who are both older and functionally limited may have a doubly diminished social status. This "multiple jeopardy" is characterized by stereotypes about the inability to contribute meaningfully, and it can lead to direct discrimination in services and care (Breitenbach 2001).

In general, very little is known about why some older adults perceive themselves as disabled and others do not, even when their health status is comparable. Likewise, there is little research describing when and if perceptions of disability appear in the process of health decline. Thus, this research addresses three questions. First, what social, health, and individual characteristics are associated with self-perceived disability in an older adult population? Second, how do changes in health status and social networks over four years affect perceived disability? Third, what health and social influences slow or accelerate the rate of acquiring the disability label over time?

METHOD

Sample

Data for this research are from an ongoing panel study of 1,000 residents from three retirement communities on the west coast of Florida. These are age-segregated, older adult communities where residents live independently and provide for their own care completely. Like other community-dwelling older adults, those who need intensive health care must make alternate arrangements such as home care or institutionalization. For this sample, eligible residents met three criteria: (1) they were age 72 or older, (2) they were currently living in Florida at least 9 months of the year, and (3) they were healthy enough to complete a 90-minute face-to-face interview.

Baseline data collection occurred in 1988, and respondents have been interviewed annually since then. After baseline, the study continued to follow respondents who moved out of the communities to any destination, including nursing homes and assisted living facilities. Proxy interviews were obtained for those who were unable to continue participating in the study. This sample is drawn from a small geographic region, and nearly all of the respondents are white, which limits the generalizability of our findings. However, it is one of the longest ongoing panel studies of the oldest old and has annual interviews, allowing us to observe the dynamics of health and aging in this population group.

This study utilizes data from the first eight interview waves (wave 1 to wave 8). Death is the greatest source of attrition. Mortality was determined and confirmed for nonrespondents each year of data collection through the National Death Index, kin, or a contact person predetermined by the respondent. The first measurement of perceived disability, the dependent variable, occurred at wave 4. Respondents had to survive until at least wave 4 to be included in the sample for analysis. Thus, the effective N is 662 older adults.

Measurement

All of the variables in the analyses are listed in Table 1 with their coding, mean, and standard deviation.¹ The dependent variable for these analyses is perceived disability. Beginning at the wave 4 interview, respondents were asked, "Do you consider yourself disabled?" Response categories range from not at all (1) to very much (5). This question was first asked at the fourth interview, and it has been asked in every subsequent interview; it is measured identically through the eighth interview (wave 8). The first stage of analysis uses just the wave 4 perceived disability measure. The second stage of analysis (latent growth models) estimates the trajectory of perceived disability over time, incorporating the repeated measures from wave 4 to wave 8.

Morbidity is measured in two ways. First, a total count of prevalent morbidities at baseline was calculated by summing the individual disease binary variables, with a potential range from 0 to 15. The health conditions include: arthritis, asthma, emphysema, heart trouble, cancer, stroke, Parkinson's disease, hypertension, diabetes, kidney disease, glaucoma, cataracts, osteoporosis, stomach or intestinal disorders, liver disease, and urinary tract disorders.²

Second, incident morbidity is measured as the total number of health conditions that developed between baseline and wave 4. Its potential range is 0 to 15, although the highest number of new health conditions in this sample was six.

Functional limitations at baseline are measured with a summary score of self-reported difficulty with ADL (Katz et al. 1963) and instrumental activities of daily living (hereafter IADL; Lawton and Brody 1969). For the former, respondents were asked about their level of difficulty performing five tasks: (1) washing and bathing, (2) dressing and putting on shoes, (3) getting to or using the toilet, (4) getting in or out of bed unassisted, and (5) eating without assistance. IADL limitations included difficulty performing six items: (1) getting from room to room, (2) going outdoors, (3) walking up or down stairs, (4) doing housework, (5) preparing meals, and (6) shopping for groceries. For all domains, response categories range from never having difficulty (0) to having difficulty all of the time (3). These eleven items were summed together, creating a single continuous measure ranging from no functional limitations (0) to having difficulty in all eleven domains all of the time (33).

Cognitive impairment at wave 1 was assessed using Pfeiffer's (1975) mental status questionnaire consisting of a series of ten questions, such as the current date and the current president of the United States. Incorrect answers were summed, creating a single measure ranging from 0 wrong answers to 10 wrong answers. Mildly impaired cognitive status was not a sufficient exclusionary criterion at the baseline interview. While most of the sample answered all of the questions correctly, 9 percent of the baseline sample had one error on Pfeiffer's scale, and just over 3 percent had two or more errors.

An indicator of self-rated health was included in these analyses as a predictor of perceived disability. At baseline, respondents were asked, "Compared to other people your age, would you say that your health is much better, better, about the same, worse, or much worse, over the past year?" Categories are coded from much better (5) to much worse (1).³

The social integration of respondents was measured with both objective and subjective indicators. For the first objective measure, respondents reported their total number of living children at wave 1, which ranges from 0 to 12. Second, those respondents who had been widowed at wave 1 were identified in a binary variable where 1 equals the name of the variable and 0 equals all others. Subjective evaluations of social integration include two indicators. First, subjects reported how often they feel that they have a companion to call upon at wave 2. Responses range from never (1) to all of the time (5). The second subjective measure of social integration is satisfaction with social life. At wave 1, respondents were asked, "Overall, how satisfied are you with your social life?" Categories range from very dissatisfied (1) to very satisfied (5). Change in both of these subjective social integration measures occurred over a period of one year (wave 2 to wave 3 for companion to call upon; wave 1 to wave 2 for satisfaction with social life).

Health anxiety is an indicator of personal orientation toward health appraisals. Beginning at wave 4, respondents were asked, "To what extent do your health problems make you feel anxious or depressed?" The response categories range from not at all (1) to very much (5). These analyses use the wave 4 measure of health anxiety. Baseline depressive symptoms were measured with the Center for Epidemiological Studies depression scale short form (Radloff 1977). Respondents were asked a series of questions about their feelings in the past month, such as whether they were happy or had the blues. Answer choices were coded 1 for yes and 0 for no. Three items were reverse-coded. All items were then summed to create a single score ranging from 0 to 11. Higher scores indicate more depressive symptoms.

A series of control variables was also included in these analyses. We identified two key indicators of general health decline: those who had stopped driving in the past two years and

those currently receiving home health care. For each binary variable, those with the attribute were coded as 1 and all others were coded as 0. Baseline age is measured in years and ranges from 72 to 98. Females are identified in a binary variable where 1 equals the name of the variable and 0 equals all others. Education level is a categorical variable that ranges from less than 12 years (coded 1) to a graduate degree (coded 6). Income has 14 categories. The lowest income category is less than \$2,500 (coded 1), and the highest is greater than \$50,000 (coded 14).

Analysis

To address our research questions, we estimate two types of models. The first set of models uses an ordered probit to estimate the levels of perceived disability at wave 4 with independent predictors in four stepwise models. In the first model, we include measures of demographic variables such as age, gender, education, and income, and health indicators of prevalent morbidity, physical function and cognitive impairment. Then, in model 2, four social network indicators are entered: (1) number of living children, (2) widowhood, (3) satisfaction with social life, and (4) frequency of having a companion to call upon. Health anxiety and depression are entered in model 3. Model 4 includes all of the static covariates and adds changes in four key covariates over the observation period: (1) change in physical function in past three years, (2) incident morbidity in past three years, (3) change in satisfaction with social life in previous year, and (4) change in frequency of having a companion to call upon in previous year.

There is significant attrition in this sample of older adults. Each model is adjusted for selection bias resulting from nonrandom attrition by using a hazard rate instrument based on the inverse Mills ratio expressing the likelihood of not remaining in the study for all eight waves (Heckman 1979). A probit equation estimates the likelihood of completing all eight waves of the study.⁴ Based on that likelihood, an inverse Mills ratio is calculated for each case so that high values indicate a strong likelihood of not completing the study. This variable is entered into the substantive model as a covariate (Berk 1983).

The second type of model we estimate is latent growth curve of perceived disability from wave 4 to wave 8. These estimate the impact of social and health variables on the rate of change in perceived disability over a four-year period. Structural equation models are used to estimate the initial level and trajectory of perceived disability from wave 4 to wave 8 (Bollen and Curran 2001; Meredith and Tisak 1990; Willett and Sayer 1994). These dependent variables are then regressed on the static and changing covariates noted above to determine the significant predictors of rate of change in perceived disability over time. Level is a latent construct of the initial level of perceived disability. Trajectory is a latent construct of the average rate of change in perceived disability over time. It has five indicators of perceived disability, one at each wave from wave 4 to wave 8. This model is ideal for multiwave data because it measures the rate of labeling oneself as disabled over time and whether the independent predictors accelerate or slow the process of labeling.⁵

RESULTS

The first stage of the analysis is presented in Table 2. Levels of perceived disability at wave 4 are estimated in three stepwise models with static covariates. In model 1, total prevalent morbidity at wave 1 is a significant and positive predictor of perceived disability, meaning that each additional health problem is associated with a higher likelihood of considering oneself disabled independent of actual physical or mental functional status. Greater ADL and IADL limitations at baseline lead to perceptions of greater disability, as do receiving home health care and having stopped driving in the past two years. None of the effects of demographic variables is significant.

In model 2, indicators of social networks and self-rated health compared with others are added. Those with more living children and those who have a stronger and more positive social network are significantly less likely to classify themselves as disabled, independent of actual functional status and existing health conditions. Widowhood at baseline and frequency with which the respondent can call upon a companion are not significant predictors. Persons who rate their health lower relative to others the same age are significantly more likely to consider themselves disabled. Total prevalent morbidity, functional limitations, and having stopped driving in the past two years continue to be predictors of greater levels of perceived disability.

In model 3, we added two psychological indicators: health anxiety and depression. Persons with greater anxiety about their health are more likely to consider themselves disabled independent of actual health status. Depression at baseline does not lead to perceived disability at wave 4. Functional limitations and total prevalent morbidity continue to be positive predictors of greater perceived disability, as does stopped driving. Two indicators of social networks continue to strongly predict lower levels of perceived disability: number of living children and satisfaction with social life. Lower self-rated health compared with others of the same age continues to predict greater levels of perceived disability.

Model 4 includes changes in health and social networks between waves 1 and 3. Persons who experience sharper increases in functional dependencies over four years are much more likely to perceive themselves as disabled. Baseline functional limitations continue to be a strong predictor of greater perceived disability as well. Total incident morbidity is positive and significant, indicating that those who developed more health problems between waves 1 and 4 were more likely to consider themselves disabled. Total prevalent morbidity at baseline continues to be significant as well.

Changes in social networks also contribute to perceptions of one's own disability. Persons who have fewer companions to call upon than they did in the previous year are much more likely to consider themselves disabled. Among the static covariates, persons with greater health anxiety and those with less satisfaction with social life are more likely to consider themselves disabled. In model 4, women were more likely to consider themselves disabled than men, independent of health status and social networks.

Table 3 presents the results of latent growth curve models of perceived disability over time predicted by static covariates (model 1) and changing covariates (model 2). Overall model fit of both models is excellent. For model 1, chi-square is 164.50 with 65 degrees of freedom. The goodness-of-fit index is .98, and the adjusted goodness-of-fit index is .93, which is near the perfect 1.00. The incremental fit index is .95. Finally, the root mean square error of approximation is .04, which approaches 0.

There are two outcomes in model 1: the initial level of perceived disability and the trajectory of perceived disability over four years. The predictors of the initial level of perceived disability will be discussed first. Consistent with the static models in Table 2, those with greater anxiety about their health and those with lower self-rated health relative to others their age have a higher average level of perceived disability. Currently receiving home health care and having stopped driving in the previous two years also predict higher levels of perceived disability. Among the indicators of mental and physical health, greater total prevalent morbidity and cognitive impairment lead to more perceived disability. There is a significant gender difference in this model: Women are more likely to perceive themselves as disabled. Finally, persons who frequently have a companion to call upon are less likely to consider themselves disabled.

The second outcome in model 1 is the trajectory of perceived disability over four years (waves 4 through 8). Many of the indicators of initial level of perceived disability—greater number of existing health conditions, greater cognitive impairment, greater health anxiety, and poorer

comparative self-rated health—are also associated with greater increases in perceived disability overtime. Women have steeper escalations than men in their perceived disability, independent of existing health status. Finally, those with higher incomes tend to label themselves as disabled more slowly over time than those with lower incomes.

Model 2 estimates the impact of health decline and changes in social networks on the initial level and trajectory of perceived, disability over time. Again, model estimates indicate a good fit with the data. Chi-square is 170.4 with 80 degrees of freedom. The goodness-of-fit index (GFI) is .98, and the adjusted GFI is .92. The incremental fit index is .96, and the root mean square error of approximation is .04, which is below the .05 threshold (Kelloway 1998).

The adjusted level of perceived disability is predicted by greater increases in functional limitations over four years. Two indicators of social networks are associated with lower levels of perceived disability: persons who are satisfied with their social life and those who have companions to call upon more frequently. Those who experienced declines in satisfaction with their social life in the previous year have higher levels of perceived disability. Compared to model 1, seven variables remain consistent predictors of higher levels of perceived disability: total prevalent morbidity, cognitive impairment, receiving home health care, stopped driving, greater health anxiety, lower self-rated health compared with others their age, and being female.

The second outcome in model 2 is the trajectory of perceived disability over a four-year period (waves 4 through 8). Persons who have greater baseline functional limitations or who experienced greater increases in functional limitations over three years are likely to label themselves as disabled more quickly than those who did not experience comparable decrements in functional status. Being less satisfied with one's social life and becoming less satisfied with that social life are associated with faster rates of labeling oneself as disabled over time. Higher income at baseline actually slows the trajectory of perceived disability over time. Several predictors of the trajectory of perceived disability over four years are consistent with other models: More prevalent health conditions, higher cognitive impairment, higher health anxiety, lower self-rated health, receiving home health care, and stopping driving accelerate the rate of perceiving oneself as disabled over time. Women are significantly more likely than men to perceive themselves as disabled over time, even after controlling for health problems, physical limitations, and social networks.

DISCUSSION

Social scientists have long demonstrated that health and illness are constructions of culture, social and physical environment, and personal orientations. Disability likewise is a product of attitudes and of the organization of our social world. Previous research has identified two common perceptions of disability: lack of independence and a permanent state of ill health (Iezzoni 2003; Oliver 1996; Zola 1983). Disability thus becomes a spoiled identity because it is not consistent with the images of wellness and vitality associated with good health and successful aging; When asked to subjectively rate their health, the oldest old are likely to rate their health as “excellent” or “very good” in the face of significant health problems, choosing instead to focus on broader definitions of well-being that include size of networks and social engagement (Borawski, Kinney, and Kahana 1996; Ferraro 1980). While subjective health assessments consist of relatively neutral questions, would these multidimensional criteria hold when the oldest old are asked to subjectively assess their own disability status? Specifically, what social or health circumstances influence the willingness to take on such a potentially stigmatizing label? This research followed a cohort of community-dwelling older adults and examined changes in their self-identification of being “disabled” over four years.

Persons in poorer health (more prevalent health conditions, greater functional limitations, cognitive impairment) were more likely to consider themselves disabled. In addition, negative changes in functional status accelerated the perceptions of disability over four years. Two other indicators of health decline significantly predicted perceived disability. Receiving home health care and driving cessation in the previous two years were two situations associated with not only higher levels of perceived disability but also with faster rates of acquiring the disability label over time. We also found that lower ratings of subjective health were associated with greater perceived disability, perhaps indicating a common underlying set of criteria for health evaluations among older adults.

Total prevalent morbidity and incident morbidity were positively associated with perceived disability, independent of actual functional limitations. Those individuals with more health conditions at baseline tended to rate themselves as more disabled. A possible explanation for this finding is that having multiple diagnosed health problems may be characterized by making more trips to the doctor, taking a greater number of medications, and having a wider variety of somatic complaints. Thus, older adults with more health conditions may be more likely to consider themselves disabled even when actual functional status is not compromised. Incident morbidity, a summary measure of newly developed health conditions between waves 1 and 4, was associated with higher levels of perceived disability at wave 4 but not with the long-term trajectory of acquiring the “disabled” label. This proximate relationship between new diagnoses and perceived disability may reflect a greater awareness and concern about health decline among the oldest old. Over time, however, it may not be the diagnosis of the conditions per se but proactive management of chronic conditions that affects one’s perceived disability status (Kahana and Kahana 2003).

A second important finding of this study is the degree to which factors other than physical health influence older adults’ perceptions of disability. Independent of health status, persons with more living children, those who are more satisfied with their social life, and those with more companions to call upon are much less likely to consider themselves disabled. This is consistent with previous studies of subjective health that found a positive relationship between stronger social networks and higher self-evaluations of health (Bryant et al. 2001; Ross and Mirowsky 2002).

The benefits of these social networks also influence health assessments years later. Over time, positive social integration provides a buffer against perceived disability because social networks actually *slowed* the rate of acquiring the disability label over four years, despite existing health problems and limitations. Family and friends may maintain and reinforce a nondisabled identity of the elder despite accumulating physical or mental limitations. Our findings are consistent with other research that has found that older adults who receive benefits from their social networks such as assistance, emotional support, and validation of social roles do not perceive themselves as disabled, even in light of serious functional decrements (Gignac and Cott 1998).

Further underscoring the important role of family and friends in subjective evaluations of health and disability, we found that negative changes in size or satisfaction with social network *accelerated* the process of labeling one-Self as disabled. The buffering effect of a positive social network is not only eliminated but reversed by even slight decrements in current social support. We suggest two possible explanations for this. First, among older adults, social network infrastructure tends to be less extensive, and the loss of just one person may have an adverse effect on health and well-being (Pearlin 1999). Alternatively, with advancing age there may be a normative expectation of higher mortality in friend and kinship networks, which may make the slightest change more noticeable, even when direct support is not affected (Kahn and Antonucci 1980).

While positive social networks may work to buffer or slow the labeling process, a negative health orientation *accelerates* perceptions of one's own disability over time. We found that those who are more anxious about their health are significantly more likely to perceive themselves as disabled over time. Health anxiety was a consistent indicator of perceived disability, even after controlling for existing health conditions, functional status, and quality of social networks. Such anxiety may reflect a generally negative disposition toward health across the life course. Indeed, personality traits such as pessimism, anxiety, and depression have been found to be related to lower subjective ratings of health independent of actual health status (Hong, Zarit, and Malmberg 2004; Schneider et al. 2004). This could affect an older adult's ability or willingness to develop proactive responses to stressors (Kahana and Kahana 1996).

Alternatively, health anxiety may be a situation-induced response to recent health decrements (Schneider et al. 2004). Slow health decline may allow older adults to adjust and invoke proactive adaptations, but rapid changes or acute health events may spark concern and anxiety over future ability to respond to such stressors. As a note, respondents in our sample were first asked about anxiety toward health at wave 4, the first wave to measure perceived disability. Thus, recent changes in physical functioning and morbidity measured in waves 1 through 4 occurred before our measurement of health anxiety, and these decrements may be captured in the psychosomatic question. Further research needs to consider the influence of psychological dimensions and internal coping resources on perceived health and disability among older adults.

Although a gender difference in perceived disability did not appear in the models with static covariates, the models with changing covariates showed a clear gender difference in perceived disability. Independent of health status, women were significantly more likely than men to consider themselves disabled, and they acquired the label of "disabled" at a faster rate than men over time. Findings from recent research may help explain this gender difference. First, older women are significantly more likely to be functionally limited compared to men, especially by nonfatal health conditions such as arthritis (Murtagh and Hubert 2004). Second, anxiety over health decline has been linked to accumulating disability over time in women but not in men (Brenes et al. 2005). Thus, women may be more likely to worry about their health or may be more attuned to changes in their bodies than men, resulting in poorer evaluations of health. Finally, among the oldest old, women tend to use a broader set of criteria when considering the state of their health, such as the quality of social relationships and ability to fulfill social roles (Rennemark and Hagburg 1999). The gender difference in perceived disability only appeared in the models, that accounted for changes in social and health domains, however, perhaps indicating that negative shifts in social engagement and health status have a greater impact on subjective evaluations of health among women.

Taken together, these findings contribute significantly to our understanding of the social construction of health and disability, especially in late life. The process of labeling, particularly related to spoiled identities, tends to be external to the individual; persons with potentially stigmatizing characteristics are ascribed a devalued status by the larger society (Albrecht, Walker, and Levy 1982; Goffman 1963). These socially constructed characteristics are, in turn, used by individuals to self-evaluate their social identity. Consistent with the stereotypes of disability in Western cultures, the oldest old in this sample considered markers of ill health to be salient criteria when assessing their own disability status, even when physical or mental function was not directly affected. These outward signs of poor health, such as prevalent health conditions, may cause one to *anticipate* functional decline and begin to label oneself as disabled. Normative expectations, of disability with advancing age may cause some older adults to perceive themselves as disabled long before serious functional decline occurs. Future

research should consider whether the expectation of recovery attenuates the relationship between ill health and perceived disability.

Some aspects of poor health may also signal a loss of independence to this older adult and larger society, which is another stereotype of disability (Zola 1993). Stopping driving and receiving home health care were strongly related to perceived disability in this sample. Both of these measures capture a wide range of health decrements such as cognitive impairment, low vision, and accumulating frailty, making them more comprehensive indicators of health decline than ADL or IADL scores. Perhaps more importantly, however, receiving home health care or stopping driving can result in fewer social outings and growing feelings of dependency (Iezzoni 2003). While both measures are indicative of poor health at any age, these changes in the ability to “go and do” may be especially detrimental to older adults’ self-evaluations because such decisions may seem permanent rather than temporary.

While medical researchers and practitioners tend to focus on clinical definitions of disability, social scientists have long advocated for a social model of disability that emphasizes the importance of social roles and relationships in maintaining one’s identity as a nondisabled person (Iezzoni 2003; Zola 1983). Our findings indicate that older adults who are less socially integrated tend to perceive themselves as disabled, independent of actual functional status, supporting the social model of disability. While diminished social networks may not be sufficient for self-labeled disability, it is clear that physical function is not the only criterion considered among these older adults. The relationship between perceived disability and social engagement needs further consideration.

The social construction of disability in older adulthood is an area of inquiry that requires more investigation. Researchers need to examine not only the predictors of perceived disability but the outcomes as well. Like other measures of subjective health, might perceived disability be a consistent indicator of mortality or future health decline? The consequences of perceived disability among older adults may also include differential use of assistive devices, adherence to medication and treatment regimens, and engaging in health-protective behaviors. It is also important to compare views of disability among older and younger adults. Perceived stigma associated with disability may vary by expected social roles over the life course. Likewise, how might disability compare with other potentially spoiled identities at any age?

A potential shortcoming of this study is that the sample is not representative of the oldest old in the United States. First, all respondents were living in age-segregated communities in Florida. Second, the sample is fairly homogeneous in terms of race and socioeconomic status. The majority of the respondents are white, representing more than thirty countries of origin. The highest degree earned was a high school diploma for nearly 28 percent of the sample, and one or two years of college for 35 percent of the sample. Half of the sample had gross incomes between \$15,000 and \$35,000 annually. Most residents lived in moderately priced condominiums that sold for less than \$30,000 in 1988, the baseline year of data collection. Thus, the results of this study may underestimate the impact of functional limitations and health problems on perceived disability because these “successful agers” are healthier and more affluent than the rest of the population. We expect that using a more representative sample of older adults in the United States would intensify many of the relationships found in this study. In addition, indicators of compromised health such as morbidity and functional limitations may be stronger predictors of perceived disability than seen in this study.

It is also important to note that we tested a lagged trajectory of perceived disability between waves 4 and 8. Because the question about perceived disability was not included in the interview until wave 4, we are unable to trace the trajectory for the entire study period. Thus, we used social and health variables that were temporally antecedent to the trajectory. This

design may limit the scope of these findings in two ways. First, the impact of social and health circumstances on perceived disability may be underestimated due to the lag between measurements. Second, the trajectory of perceived disability did not account for events that co-occurred in time and may have affected the trend over time.

We believe that this study still contributes significantly to our understanding of perceived disability for three key reasons. First, we examine the health and social dynamics of the oldest old using one of the longest ongoing panel studies of this age group available. While this sample is fairly homogeneous, there are few other data sources that would allow such a fine-grained analysis of health decline and subjective evaluations of disability over time. Second, the study design continued to follow the respondents as they moved to other living arrangements, including long-term care settings (e.g., assisted living facilities or nursing homes). Rather than examining only the community-dwelling respondents, the sample continued to include those at greatest risk of compromised health and perhaps greater perceived disability.

Finally, this sample is fairly healthy and ambulatory at baseline: 95 percent had no ADL limitations, and 79 percent had no IADL limitations at wave 1. Rather than being a detractor for this study, the sample's health and functionality are advantages. We follow persons through the process of health decline, allowing us to pinpoint the timing of labeling oneself as disabled. Accordingly, the older members of the sample do experience a tremendous amount of change in health status over time. By wave 4, 11 percent of the sample had one or more ADL limitations, and 43 percent had one or more IADL limitations. Incident morbidity and physical limitations are captured during the period of observation, allowing us to see how and when the process of self-labeling occurs.

Disability can carry significant negative social meaning, and little is known about when in the process of health decline persons take on the label of "disabled." This study helps us understand the diverse criteria that older adults use to subjectively rate their own disability status. For the oldest old, perceptions of disability tend to focus not only on functional limitations but also on a person's current and changing social network, health anxiety, and recent health decrements. Importantly, functional limitations and cognitive impairment are strong predictors of perceived disability, but broader indicators of health decline such as stopping driving and receiving home health care continue to color older adults' perceptions of their own disabilities independent of actual functional status.

NOTES

1. All covariates are measured at baseline (wave 1) except where noted. Some variables that were conceptually important to our models were not available at baseline, and we used those variables at their first wave of measurement. No independent predictor was measured after wave 4.
2. In preliminary analyses, we tested the individual prevalent and incident conditions as predictors of perceived disability. Due to the relatively small proportion of older adults who had some of the specified conditions, our models did not produce stable and consistent findings. Thus, we elected to measure just the total number of existing conditions and the total number of incident conditions. Once we collapsed prevalent morbidity into a count variable, the mixed results disappeared.
3. We tested two alternative measures of self-rated health: global rating of health and health compared to the previous year. We also tested the impact of change in self-rated health over time on perceived disability. None of these measures were significant, thus none were included in the final models.

4. Two separate hazard rate instruments were estimated: one predicting the likelihood of remaining in the study until wave 4 and a second predicting the likelihood of remaining in the study until wave 8. The former was used in ordered probit models. The latter was used in the latent growth (dynamic) models.
5. We handled the non-normality of the dependent variable by estimating an asymptotic covariance matrix based on polychoric and polyserial correlations. We also tested the robustness of our model across alternative estimation procedures (e.g., weighted least squares) and found that the maximum-likelihood estimates were the most efficient and produced the best-fitting model.

References

- Albrecht, Gary L.; Walker, Vivian G.; Levy, Judith A. Social Distance from the Stigmatized: A Test of Two Theories. *Social Science & Medicine* 1982;16:1319–27. [PubMed: 6214849]
- Benyamini, Yael; Leventhal, Elaine A.; Leventhal, Howard. Elderly People's Ratings of the Importance of Health-Related Factors to their Self-Assessments of Health. *Social Science and Medicine* 2003;56:1661–37. [PubMed: 12639583]
- Berk, Richard A. An Introduction to Sample Selection Bias in Sociological Data. *American Sociological Review* 1983;48:386–98.
- Bollen, Kenneth A.; Patrick, Curran. Latent Growth Curve Analysis. Department of Sociology, University of North Carolina; Chapel Hill, NC: 2001. Unpublished manuscript
- Borawski, Elaine A.; Kinney, Jennifer M.; Kahana, Eva. The Meaning of Older Adults' Health Appraisals: Congruence with Health Status and Determinant of Mortality. *Journal of Gerontology: Social Sciences* 1996;51B:S157–S170.
- Breitenbach, Nancy. Ageing with Intellectual Disabilities; Discovering Disability with Old Age: Same or Different?. In: Marie, Priestley, editor. *Disability and the Life Course: Global Perspectives*. Cambridge, MA: Cambridge University Press; 2001. p. 231-39.
- Brenes, Gretchen; Guralnik, Jack M.; Williamson, Jeff D.; Fried, Linda P.; Simpson, Crystal; Simonsik, Eleanor M.; Pennix, Brenda WJH. The Influence of Anxiety on the Progression of Disability. *Journal of the American Geriatrics Society* 2005;53:34–39. [PubMed: 15667373]
- Bryant, Lucinda L.; Corbett, Kitty K.; Kutner, Jean S. In Their Own Words: A Model of Healthy Aging. *Social Science and Medicine* 2001;53:927–41. [PubMed: 11522138]
- de Beurs E, Beekman Aartjan, van Balkom AJ, Deeg Dorly, van Dyck Richard, van Tilburg Willem. Consequences of Anxiety in Older Persons: Its Effect on Disability, Well-Being and Use of Health Services. *Psychological Medicine* 1999;29:583–93. [PubMed: 10405079]
- Denton, Margaret; Vivienne, Walters. Gender Differences in Structural and Behavioral Determinants of Health: An Analysis of the Social Production of Health. *Social Science and Medicine* 1999;48:1221–35. [PubMed: 10220021]
- Ferraro, Kenneth F. Self-Ratings of Health among the Old and the Old-Old. *Journal of Health and Social Behavior* 1980;21:377–83. [PubMed: 7204931]
- Ferraro, Kenneth F.; Kelley-Moore, Jessica A. Self-Rated Health and Mortality among Black and White Adults: Examining the Dynamic Evaluation Thesis. *Journal of Gerontology: Social Sciences* 2001;56B:S195–S205.
- Ferrucci, Luigi; Guralnik, Jack M.; Simonsick, Eleanor; Salive, Marcel E.; Corti, Chiara; Jean, Langlois. Progressive versus Catastrophic Disability: A Longitudinal View of the Disablement Process. *Journal of Gerontology: Medical Sciences* 1996;51A:M123–M130.
- Freedman, Vicki A.; Martin, Linda G.; Schoeni, Robert F. Recent Trends in Disability and Functioning among Older Adults in the United States. *Journal of the American Medical Association* 2002;288:3137–46. [PubMed: 12495394]
- Fried, Linda P.; Bandeen-Roche, Karen; Chaves, Paulo HM.; Johnson, Brent A. Preclinical Mobility Disability Predicts Incident Mobility Disability in Older Women. *Journal of Gerontology: Medical Sciences* 2000;55A:M43–M52.

- Gignac, Monique A M.; Cheryl, Cott. A Conceptual Model of Independence and Dependence for Adults with Chronic Physical Illness and Disability. *Social Science and Medicine* 1998;47:739–53. [PubMed: 9690821]
- Goffman, Eving. *Stigma; Notes on the Management of Spoiled Identity*. Englewood Cliffs, NJ: Prentice Hall; 1963.
- Heckman, James J. Sample Selection Bias as a Specification Error. *Econometrica* 1979;47:153–61.
- Hoeymans N, Feskens EJM, Kromhout D, Van Den Bos GAM. Ageing and the Relationship between Functional Status and Self-Rated Health in Elderly Men. *Social Science and Medicine* 1997;45:1527–36. [PubMed: 9351142]
- Hong, Tantina B.; Zarit, Steven H.; Malmberg, Bo. The Role of Health Congruence in functional Status and Depression. *Journal of Gerontology: Psychological Sciences* 2004;59B:P151–P157.
- Idler, Ellen L. Perceptions of Pain and Perceptions of Health. *Motivation and Emotion* 1993;17:205–24.
- Idler, Ellen L.; Yael, Benyamini. Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies. *Journal of Health and Social Behavior* 1997;38:21–37. [PubMed: 9097506]
- Iezzoni, Lisa I. *When Walking Fails: Mobility Problems of Adults with Chronic Conditions*. Berkeley: University of California Press; 2003.
- Iezzoni, Lisa I.; McCarthy, Ellen P.; Davis, Roger B.; Siebens, Hiliary. Mobility Problems and Perceptions of Disability by Self-Respondents and Proxy Respondents. *Medical Care* 2000;38:1051–57. [PubMed: 11021678]
- Kahana, Eva; Boaz, Kahana. Conceptual and Empirical Advances in Understanding Aging Well Through Proactive Adaptation. In: Bengtson, Vern L., editor. *Adulthood and Aging: Research on Continuities and Discontinuities*. New York: Springer Publishing Company; 1996. p. 18-40.
- Kahana, Eva; Boaz, Kahana. Contextualizing Successful Aging: New Directions in an Age-Old Search. In: Richard, Settersten, Jr, editor. *Invitation to the Life Course: A New Look at Old Age*. Amityville, NY: Baywood Publishing; 2003. p. 225-55.
- Kahana, Eva; Kahana, Boaz; Kercher, Kyle. Emerging Lifestyles and Proactive Options for Successful Ageing. *Ageing International* 2003;28:155–80.
- Kahn, Robert L.; Antonucci, Toni C. Convoys over the Life Course: Attachment, Roles, and Social Support. In: Baltes, PB.; Brim, OG., editors. *Life-Span Development and Behavior*. New York: Academic Press; 1980. p. 253-86.
- Kaplan, Giora; Qrna, Baron-Epel. What Lies behind the Subjective Evaluation of Health Status? *Social Science and Medicine* 2003;56:1669–76. [PubMed: 12639584]
- Katz, Sidney; Ford, Amassa B.; Moskowitz, Roland W.; Jackson, Beverly A.; Jaffee, Marjorie W. Studies of Illness in the Aged: The Index of ADL, a Standardized Measure of Biological and Psychological Function. *Journal of the American Medical Association* 1963;185:914–19. [PubMed: 14044222]
- Kevin, Kelloway E. *Using LISREL for Structural Equation Modeling*. Thousand Oaks, CA: Sage Publications; 1998.
- Langlois, Jean A.; Maggi, Stefania; Harris, Tamara; Simonsick, Eleanor M.; Ferrucci, Luigi; Pavan, Mara; Sartori, Leonardo; Enzi, Giuliano. Self-Report of Difficulty in Performing Functional Activities Identifies a Broad Range of Disability in Old Age. *Journal of the American Geriatrics Society* 1996;44:1421–28. [PubMed: 8951310]
- Lawton MP, Brody EM. Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living. *Gerontologist* 1969;9:179–86. [PubMed: 5349366]
- Leinonen, Raija; Heikkinen, Eino; Jylhä, Marja. Predictors of Decline in Self-Assessments of Health among Older People—a 5-Year Longitudinal Study. *Social Science and Medical* 2001;52:1329–41.
- Meredith W, Tisak J. Latent Curve Analysis. *Psychometrika* 1990;55:107–22.
- Murtagh, Kirsten Naumann; Hubert, Helen B. Gender Differences in Disability Among an Elderly Cohort. *American Journal of Public Health* 2004;94:1406–11. [PubMed: 15284051]
- Oliver, Michael. *Understanding Disability: From Theory to Practice*. New York: St. Martin's Press; 1996.
- Palmore, Erdman. The Ageism Survey: First Findings. *Gerontologist* 2001;41:572–80. [PubMed: 11574698]

- Parsons, Talcott. Definitions of Health and Illness in the Light of Americans' Values and Social Structure. In: Jaco, E Gartly, editor. *Patients, Physicians and Illness: A Sourcebook in Behavioral Science and Health*. Glencoe, IL: Free Press; 1958. p. 165-187.
- Pearlin, Leonard I. The Stress Process Revisited: Reflections on Concepts and Their Inter-Relationships. In: Aneshensel, CS.; Phelan, JC., editors. *Handbook of the Sociology of Mental Health*. New York: Plenum; 1999. p. 395-415.
- Pfeiffer E. A Short Portable Mental Status Questionnaire. *Journal of the American Geriatric Society* 1975;23:433-41.
- Radloff LS. The CES-D Scale: A Self-Report Depressive Scale for Research in the General Population. *Journal of Applied Psychological Measurement* 1977;1:385-401.
- Rennemark M, Hagberg B. Gender Specific Associations between Social Network and Health Behavior in Old Age. *Aging and Mental Health* 1999;4:320-27.
- Reyes-Gibby, Cielito C.; Aday, LuAnn; Cleeland, Charles. Impact of Pain on Self-Rated Health in Community-Dwelling Older Adults. *Pain* 2002;95:75-82. [PubMed: 11790469]
- Ross, Catherine; John, Mirowsky. Family Relationships, Social Support, and Subjective Life Expectancy. *Journal of Health and Social Behavior* 2002;43:469-89. [PubMed: 12664677]
- Rowe, John W.; Kahn, Robert L. *Successful Aging*. New York: Dell Publishing; 1998.
- Schneider, Gudrun; Driesch, Georg; Kruse, Andreas; Wachter, Michael; Nehen, Hans-Georg; Heuft, Gereon. What Influences Self-Perception of Health in the Elderly? The Role of Objective Health Condition, Subjective Well-Being and Sense of Coherence. *Archives of Gerontology and Geriatrics* 2004;39:227-37. [PubMed: 15381341]
- Smith, Anthony MA.; Shelley, Julia M.; Dennerstein, Lorraine. Self-Rated Health: Biological Continuum or Social Discontinuity? *Social Science and Medicine* 1994;39:77-83. [PubMed: 8066490]
- Susman, Joan. Disability, Stigma, and Deviance. *Social Science and Medicine* 1994;38:15-22. [PubMed: 8146705]
- Rutherford, Turnbull H.; Turnbull, Ann P. Family Support: Retrospective and Prospective. In: Wehmeyer, M.; Patton, J., editors. *Mental Retardation in the Year 2000 and Beyond*. Austin, TX: ProEd; 1999. p. 413-30.
- Twaddle, Andrew C. The Concept of Health Status. *Social Science and Medicine* 1974;8:29-38.
- US. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2. Washington, DC: U.S. Government Printing Office; 2000. Disability and Secondary Conditions; p. 6-1-6-28.
- Verbrugge, Lois M.; Jette, Alan M. The Disablement Process. *Social Science and Medicine* 1994;38:1-14. [PubMed: 8146699]
- Willett JB, Sayer AG. Using Covariance Structure Analysis to Detect Correlates and Predictors of Individual Change over Time. *Psychological Bulletin* 1994;116:363-81.
- Williamson, Jeff D.; Fried, Linda P. Characterization of Older Adults who Attribute Functional Decrements to 'Old Age'. *Journal of the American Geriatrics Society* 1996;44:1429-34. [PubMed: 8951311]
- Wood, PHN. *Disabilities, and Handicaps: A Manual of Classification Relating to the Consequences of Disease*. Geneva, Switzerland: World Health Organization; 1980. *International Classification of Impairments*.
- Zink, Jean. Adjusting to Early- and Late-Onset Disability. *Generations* 1992;16:59-60.
- Zola, Irving K. *Missing Pieces*. Philadelphia, PA: Temple University Press; 1983.
- Zola, Irving K. Self, Identity, and the Naming Question—Reflections on the Language of Disability. *Social Science and Medicine* 1993;36:167-73. [PubMed: 8421793]

TABLE 1

Variables, Coding, and Descriptive Statistics

Variables	Coding	Mean (standard deviation)
Perceived disability, W4	1 = Not at all; 5 = Very much	1.56 (1.04)
Perceived disability, W5	1 = Not at all; 5 = Very much	1.58 (1.05)
Perceived disability, W6	1 = Not at all; 5 = Very much	1.27 (.77)
Perceived disability, W7	1 = Not at all; 5 = Very much	1.40 (.87)
Perceived disability, W8	1 = Not at all; 5 = Very much	1.61 (1.03)
Total prevalent morbidity	Sum from 0 to 8	2.20 (1.50)
Total incident morbidity by W4	Ranges from 0 to 6	.86 (.92.)
Cognitive impairment	Ranges from 0 (none) to 10 (all) incorrect answers	.19 (.59)
Functional limitations	Ranges from 0 (none) to 33 (high)	1.25 (3.72)
Change in functional limitations	Difference score: W4 minus W1	1.71 (4.37)
Receives home health care	1 = Yes; 0 = No	.09 (N/A)
Stopped driving in past two years W3	1 = Yes; 0 = No	.06 (N/A)
Health anxiety W4	1 = Not at all; 5 = Very much	1.62 (.97)
Depression	Ranges from 0 (low) to 30 (high)	7.09 (5.10)
Self-rated health compared to others	1 = Much worse; 5 = Much better	4.04 (.83)
Number of living children	Ranges from 0 to 12	1.75 (1.51)
Widowed	1 = Yes; 0 = No	.46 (N/A)
Satisfied with social life W3	1 = Very dissatisfied; 5 = Very satisfied	3.91 (.82)
Change in satisfaction with social life in previous year	Difference score: W4 minus W3	-.18 (.97)
Frequency has a companion to call upon W2	1 = Never; 5 = All the time	4.07 (1.04)
Change in frequency has a companion to call upon in previous year	Difference Score: W3 minus W2	-.20 (1.16)
Age	Ranges from 71 to 98	79.34 (4.81)
Female	1 = Female; 0 = Male	.66 (N/A)
Education	1 < 12 years; 6 = Graduate degree	2.88 (1.30)
Income	1 = < \$2,500; 14 = \$50,000 or more	8.25 (2.90)

Notes: Effective N = 662. Standard deviations are not reported for binary variables. All variables are measured at baseline unless otherwise noted. Some variables were not measured at baseline. In those cases, the earliest wave of measurement is used. W1, W2, W3, etc. = wave 1, wave 2, wave 3, etc.

TABLE 2
Ordered Probit Regression Estimates of Perceived Disability: Static and Changing Covariates^a

	Static Covariates			Changing Covariates
	Model 1	Model 2	Model 3	Model 4
Total prevalent morbidity wave 1	.17 (.04)***	.15 (.04)***	.13 (.04)**	.13 (.05)*
Total incident morbidity wave 1 to wave 4	—	—	—	.15 (.07)*
Cognitive impairment	.03 (.09)***	.04 (.10)***	.02 (.15)***	.09 (.18)***
Functional limitations	.08 (.02)***	.07 (.02)***	.09 (.02)***	.18 (.03)***
Change in functional limitations wave 1 to wave 4	—	—	—	.23 (.02)***
Receives home health care	.46 (.18)*	.34 (.20)	.25 (.23)	-.09 (.27)
Stopped driving in past two years	.67 (.16)***	.69 (.17)***	.49 (.20)*	.32 (.23)
Health anxiety	—	—	.59 (.07)***	.43 (.08)***
Depression	—	—	-.004 (.01)	-.001 (.16)
Self-rated health compared to others	—	-.36 (.08)***	-.16 (.09)	-.18 (.10)
Number of living children	—	-.09 (.04)*	-.08 (.04)	-.07 (.05)
Widowed	—	.10 (.14)	.04 (.16)	.07 (.18)
Satisfied with social life	—	-.28 (.07)***	-.18 (.08)*	-.21 (.11)
Change in satisfaction with social life in previous year	—	—	—	-.16 (.10)
Frequency has a companion to call upon	—	-.19 (.06)***	-.19 (.07)**	-.13 (.11)
Change in frequency has a companion to call upon in previous year	—	—	—	.08 (.08)
Age	.01 (.01)	.01 (.01)	.01 (.02)	-.01 (.02)
Female	.01 (.12)	.08 (.13)	.13 (.15)	.34 (.17)*
Education	.02 (.04)	-.001 (.05)	.01 (.05)	-.01 (.06)
Income	-.03 (.02)	-.02 (.02)	-.01 (.02)	.002 (.03)
Survival λ	.24 (.32)	-.10 (.37)	-.31 (.43)	-.31 (.47)
Log likelihood	-516.44	-470.53	-348.21	-272.69

* $p < .05$;

** $p < .01$;

*** $p < .001$

^aSlope estimate (standard error).

Notes: Effective N = 662. All model estimates are adjusted for nonrandom attrition.

TABLE 3

Maximum-Likelihood Estimates of Level and Trajectory of perceived Disability Over Five Years: Dynamic Models

	Static Covariates Model 1		Changing Covariates Model 2	
	Level of Perceived Disability	Trajectory of Perceived Disability	Level of Perceived Disability	Trajectory of Perceived Disability
Total prevalent morbidity wave 1	.06 (.02) [*]	.08 (.02) ^{***}	.06 (.03) [*]	.07 (.02) ^{***}
Total incident morbidity wave 1 to wave 4	—	—	.01 (.01)	.01 (.01)
Cognitive impairment	.16 (.06) [*]	.12 (.04) ^{**}	.15 (.06) [*]	.11 (.04) ^{**}
Functional limitations	.10 (.03) ^{**}	.08 (.02) ^{***}	.09 (.02) ^{***}	.07 (.03) ^{***}
Change in functional limitations wave 1 to wave 4	—	—	.06 (.01) ^{***}	.05 (.01) ^{***}
Receives home health care	.28 (.13) [*]	.21 (.09) [*]	.32 (.13) [*]	.25 (.09) ^{**}
Stopped driving in past two years	.59 (.14) ^{***}	.41 (.09) ^{***}	.47 (.13) ^{***}	.31 (.09) ^{***}
Health anxiety	.20 (.04) ^{***}	.14 (.03) ^{***}	.18 (.04) ^{***}	.12 (.03) ^{***}
Depression	.01 (.01)	.02 (.01)	.01 (.01)	.01 (.01)
Self-rated health compared to others	-.65 (.16) ^{***}	-.43 (.11) ^{***}	-.60 (.15) ^{***}	-.38 (.10) ^{***}
No. of living children	-.01 (.04)	.02 (.03)	-.06 (.04)	.03 (.03)
Widowed	.01 (.03)	.003 (.02)	.01 (.03)	.001 (.02)
Satisfied with social life	-.12 (.08)	-.09 (.05)	-.17 (.08) [*]	-.14 (.05) ^{**}
Change in satisfaction with social life in previous year	—	—	-.02 (.01) [*]	-.03 (.01) ^{***}
Frequency of having a companion to call upon	-.13 (.05) ^{**}	-.06 (.03)	-.10 (.05) [*]	-.03 (.03)
Change in frequency of having a companion to call upon in previous year	—	—	.05 (.04)	.03 (.03)
Age	.001 (.002) [*]	.001 (.002) [*]	.001 (.002) [*]	.001 (.001) [*]
Female	.19 (.08) [*]	.14 (.06) [*]	.16 (.08) [*]	.12 (.05) [*]
Education	.001 (.03)	.03 (.02)	-.01 (.03)	.02 (.02)
Income	.01 (.01)	-.03 (.01) ^{**}	.01 (.01)	-.03 (.01) ^{**}
Survival λ	.17 (.20)	.05 (.14)	.11 (.20)	.01 (.13)
χ^2 (df)	164.50 (65)		170.41 (80)	
GFI	.98		.98	
AGFI	.93		.92	
IFI	.95		.96	
RMSEA	.04		.04	

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

Notes: Effective N = 382. GFI = goodness-of-fit index. AGFI = adjusted goodness-of fit index. IFI = incremental fit index. RMSEA = root mean square error of approximation.