Classes of Disability Trajectories in Later Life for Community-Dwelling and Institutionalized Older Adults

Introduction

Disability is a dynamic process that affects a person across time and age. This drastically opposes the idea of disability as a static event that takes place at one time and yields outcomes that remain constant and stable thereafter. Within recent decades, the interest of researchers has turned to trajectories of disability. Previous research on disability trajectories in late life has shown that disability may be seen as a growth process, increasing with age (see Lynch and Taylor 2003). These findings have relied on methods (hierarchical linear models, latent growth models) that fit an aggregate/average trajectory of disability for all individuals, and determine their deviation from the trajectory through the inclusion of covariates. Although this method is very telling, it assumes that individuals roughly accumulate disability in the same way over time. Previous research using this type of method has also noted the large amount of individual variation in mapping an average trajectory over the disability experience of a population (see Maddox and Clark 1992).

It is possible that subgroups of individuals have fundamentally different, nonlinear trajectories of disability. This notion is consistent with existing theory of the disablement process and previous findings of heterogeneity among older adults. The results of such findings would contribute to existing theory on the disablement process and advance knowledge about the shape or shapes of disability trajectories in late life, having implications both for research and policy.

In this research, latent class analysis will be used to model group trajectories of disability experience in later life. This semiparametric, group-based method utilizes a multinomial modeling strategy to map group trajectories existing as latent classes in the data. Since the assumption that the entire population will fall into these distinct group trajectories is not likely, these models allow for individual heterogeneity while classifying generally distinct groups of experience over age or time. The goal of this research is to measure disability trajectories in late life, and specifically to determine whether distinct group trajectories of disablement reside in the aggregate trajectory studied in previous research.

Disability and the Life Course

The life course is defined by short-term transitions nested in long-term trajectories that give each trajectory its shape and meaning (Elder, 2000). Life course trajectories are both overlapping and interrelated, progressing over long periods of time in the life of an individual or population. Within the trajectories are transitions that are fixed in time and punctuate the dynamics of change in a life (George,1993). Researchers studying health and health transitions in late life have been contributing to the life course literature for some time, but it has only been in the past decade that studies of health trajectories in late life have really emerged and actual measurement of individual-level trajectories is still somewhat rare (George, 2003). The work of Manton in 1988 is probably one of the earliest classic pieces on disability change/transition in the gerontological literature (see also Branch, 1984). This work signaled the evolution of measuring and conceptualizing disability as a collection of transitions within a trajectory of active and disabled life. Research on disability transition followed, emphasizing heterogeneity among individuals over time. (Maddox, Clark, and Steinhauser 1994; Crimmins and Saito 1993; Beckett et al. 1996). More recently, Schoeni, Freedman, and Wallace (2002) used synthetic cohorts as a way to approach disability trajectories in the years prior to death at the population level.

Research conceptualizing and measuring disability as individual-level trajectories has been more rare. Verbrugge and others (1994) analyzed trajectories of disablement in a hospitalized population. Maddox and Clark (1992) found nonlinear increase among trajectories of impairment in initially employed adults over age 65. They also found notable individual variation among the sample in addition to differential trajectories across groups when controlling for basic demographic factors. Li, Duncan, McAuley, Harmer & Smolkowski (2000) used growth curves to map ADL curves over the 1984, 1986, 1988 and 1990 waves. Overall, the authors found a linear decline in functioning in the sample with noted individual variation, consistent with results from previous disablement literature. Lynch and Taylor (2003) connected disability and depression trajectories over a decade in later life using growth curves, finding marked variation in the overall trajectory.

The literature on disability transitions and trajectories suggests that studying disability as a growth process, or individual-level trajectory, over time is appropriate and substantively informative concerning the disability experience of an aging population. It also suggests that studying average transitions or one aggregate trajectory of disability accumulation is not sufficient in explaining disability experience. Therefore, classes of disability trajectories will be examined in the population.

Data and Measures

The National Long Term Care Survey was developed to give an indication about health, disability, and service utilization among older individuals (aged 65 and older) in the United States, especially those in the population who are chronically disabled. The longitudinal component of the survey was designed to understand patterns and changes in health, disability, and the utilization of formal and informal care resources. The survey was conducted in 1982, 1984, 1989, 1994, and 1999. One of the great strengths of this data is its representativeness of both the national community-dwelling and institutional dwelling older adults. Recently, a review of surveys for studying disability trends among older adults in the U.S. revealed the NLTCS to be the best panel survey for these research topics (Freedman, Martin and Schoeni 2002).

I will use 5 waves of NLTCS data to map group trajectories of disability accumulation over almost 2 decades. Longitudinal data will be grouped into 10 year cohorts and analyzed for disability trajectories over time. Cohorts will then be compared on disability trajectory classes. Disability will be measured using Katz's Activities of Daily Living and Instrumental Activities of Daily Living (Katz et al., 1963, Lawton & Brody, 1969). The ADL index includes a list of daily activities such as walking, bathing, eating, dressing, etc. The IADL index includes items about using the telephone, shopping, preparing meals, etc. Both indexes measure whether an individual needs help carrying out these activities.

Methods

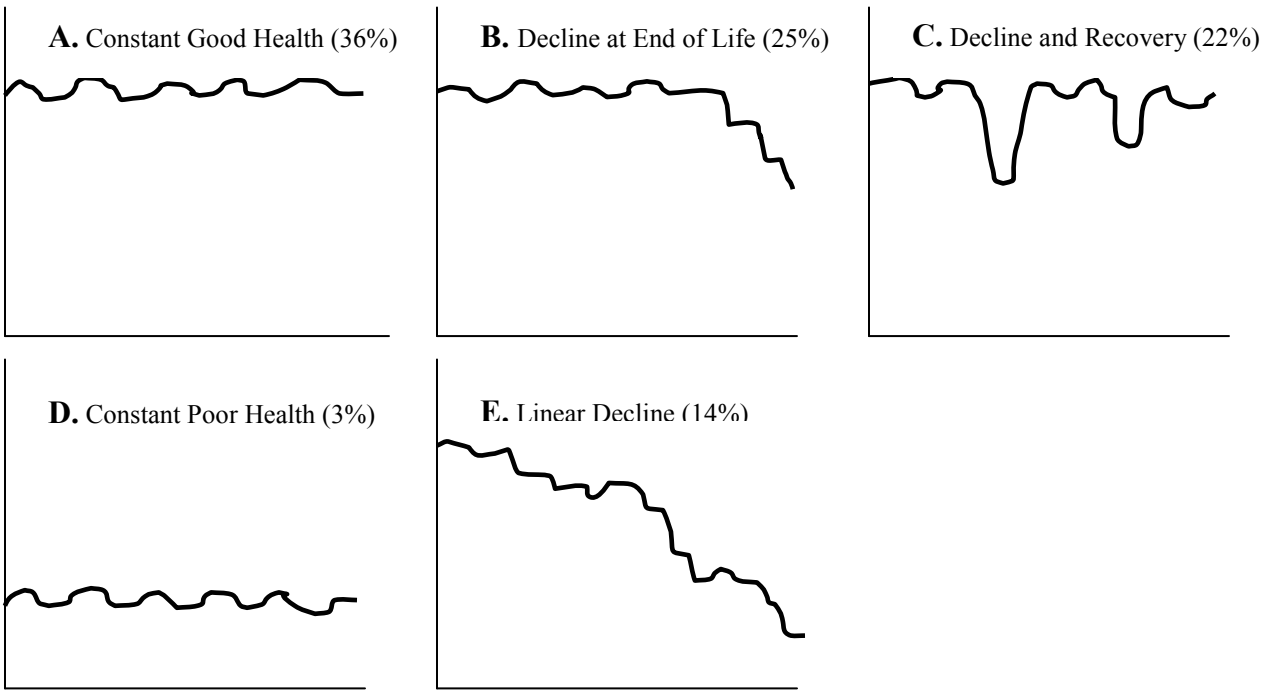
Previous longitudinal research on trajectories of disability has predominantly used growth curves, which fit an average pattern to the observed trajectories. Latent class analysis may be seen as a complement to other forms of developmental trajectory measurement-heirarchical modeling and latent growth curve modeling. The latter two strategies use continuous multivariate density functions, mapping one average trajectory over the individual trajectories. Latent class analysis uses a multinomial modeling strategy to map group trajectories existing as latent classes in the data (Jones, Nagin, and Roeder 2001). This "prototypal" classification recognizes within-group variation, since all individuals cannot be assumed to fit one and only one group trajectory (Nagin 1999).

Initially the latent class model was developed by Lazasfeld and others (Lazarfeld and Henry 1968), based on the assumption that individual attributes differ due to an unobservable (or latent) category to which they belong (Land 2001). The development of latent class models is evident in the work of Nagin and Land (1993), Roeder, Lynch, and Nagin (1999), and D'Unger, Land, McCall and Nagin (1998). This methodological tool has been used in sociology primarily for the classification of longitudinal delinquent or criminal careers. I argue that this technique is appropriate for the analysis of disability trajectories, which have already been measured using hierarchical and growth curve strategies (see Li et al. 2000).

Results

I expect to find roughly 5 classes of disability experience in the data, in accordance with the physical health typologies (Figure 1) posed by Clipp, Pavalko, and Elder (1992).[1] I also expect that the percentage of the sample in disability classes will change with cohort. Younger cohorts are expected to be more represented in Constant Good Health (Model A) and decline at the end of life (Model B), rather than Constant Poor Health (Model D) and Linear Decline (Model E). Younger cohorts are also expected to be more represented in Decline and Recovery (Model C), compared to their older counterparts.

Figure 1: Physical Health Trajectories with Sample Percentages (Clipp, Pavalko, and Elder 1992)



[1] These models refer to functioning rather than disability, therefore disability levels will be inverted to compare findings.

Discussion

This research furthers knowledge on disability trajectories in the population by examining how many subgroups (classes) of disability trajectories lie within the average trajectory previously studied and the shape of each latent class of disability trajectory in the population as proposed by previous literature. I will accomplish these goals using a method that recognizes latent classes in the data rather than assigning trajectories to classes ad hoc. Hence, this research also aims to increase the methodological toolkit that researchers currently use in this area of study.

These findings will also reveal which percentage of the sample (and population) fall within in each class, and how cohorts differ in class number and shape. This will extend knowledge on the findings of disability declines over the past decade (see Freedman, Martin and Schoeni 2002), the compression of morbidity (Fries 1980,2002) and the disablement process (Verbrugge and Jette 1994).

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