Gender Disparities in Trajectories of Functional Health Limitations

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Evidence shows an elevated rate of functional limitations for women (Murtagh and Hubert 2004; Denton, Prus, and Walters 2004; Marks 1996; Merrill and Seeman 1997; Orfila Ferrer, Lamarca, Tebe, Domingo-Salvany and Alonso 2006). Furthermore, the female disadvantage is apparent across all age groups and the gender gap in functional limitations increases with age (Newman and Brach 2001; Gorman and Read 2006; Arber and Cooper 1999). Research shows that gender differences in health are partially driven by structural, behavioral, and psychosocial factors (Verbrugge 1989; Case and Paxson 2005; Orfila et al. 2006). Gender inequities in health are just one consequence of a stratification system that differentially allots opportunities to men and women in a way that affects their health (Denton et al. 2004; Ross and Bird 1994). Men and women occupy different socio-structural locations that impact their exposure to risks that are harmful to their health, their participation in damaging behaviors, and their access to goods and resources that promote well-being (Bird and Rieker 1999; Denton et al. 2004; Rosenfield 1999).

While some research focuses on one set of explanatory mechanisms, research has shown that determinants of health include biological factors, as well as structural conditions, behavioral factors, and psychosocial factors (Orfila et al. 2006; Denton et al. 2004; Denton and Prus 1999). More recently, researchers have begun to examine the impact of childhood factors on later life health (Hayward and Gorman 2004; Haas 2007). The purpose of this research is to examine gender differentials in trajectories of functional health using latent growth curve models and an extensive set of determinants, including structural, behavioral, psychosocial, childhood, and health factors. Each set of determinants may differentially impact the gender differences in health. Childhood health and socioeconomic status factors have not been used to examine

gender differentials in health yet have been consistently linked to adult health. Several waves of data from the Health and Retirement Study (HRS) and the Study of Assets and Health Dynamics Among the Oldest Old (AHEAD) will be used to examine gender differentials in trajectories of functional health.

Socioeconomic and structural conditions are key factors which may affect the relationship between gender and health (Denton and Walters 1999; Ross and Bird 1994; Gorman and Read 2006; Read and Gorman 2006). These factors include but are not limited to income, education, occupation, employment status, marital status, age, and racial and ethnic background. Structural determinants of health explain the greatest proportion of variance in functional, chronic, and self-rated health (Denton et al. 2004; Denton and Walters 1999). Persons of lower SES report worse health, in part because they are exposed to more hardship and stress and have limited access to resources that can be used to prevent and cure disease (Ross and Bird 1994). Family size may also be an important factor, as studies have documented a positive relationship between the number of close relatives and health (Keene and Li 2005). Informal sources of social support are associated with fewer functional limitations and improvements in health.

Women and men occupy different structural locations: women are more likely than men to be unemployed, work part time, participate in unwaged labor, receive lower wages, and work in lower status occupations (Barrett 2005; Denton et al. 2004; Denton and Walters 1999; Ross and Bird 1994). Women are also more likely than men to be living alone or be single parents (Denton et al. 2004; Denton and Walters 1999; Ross and Bird 1994). Research has consistently shown that men benefit more from marriage than women (Lilliard and Waite 1995). However, women are more likely to report higher levels of social support (Denton and Walters 1999; Denton et al. 2004).

Lifestyle behaviors, such as tobacco and alcohol consumptions, exercise, and diet, are linked to health (Denton et al. 2004; Denton and Walters 1999). A healthy lifestyle can help prevent weight gain, high blood pressure, diabetes, stress, and early mortality. Health disparities may be attributed to differences by gender in health behaviors. Women report less behavior that can be damaging to their health compared to men (Read and Gorman 2006). For example, more women reported never having smoked and lower rates of binge drinking compared to men. Men are significantly more likely to be regular smokers and drinkers and overweight than women (Denton et al. 2004; Ross and Bird 1994; Barbeau, Krieger, and Soobader 2004). Men also drink more than women (Murtagh and Hubert 2004). Although men are more likely to be overweight, men engage in exercise more frequently than women (Ross and Bird 1994; Read and Gorman 2006). However, some research has failed to demonstrate that health behaviors diminish gender disparities in health (Murtagh and Hubert 2004; Gorman and Read 2006).

Psychosocial factors are additional mechanisms by which gendered social conditions may disadvantage women's health (Gorman and Read 2006; Denton et al. 2004). People exposed to more stressful life events and chronic stress are at greater risk of psychological distress, psychiatric disorders, and poor physical health. Women are more likely than men to experience stressful life events and chronic stressors in everyday life (which are linked to SES) that in turn increase their likelihood of depression. Depression is directly linked with poorer health through decreased immune functioning and heightened blood pressure. Depression is indirectly linked to poorer health through increased participation in unhealthy behaviors such as excessive drinking, lack of exercise, and smoking (Ross and Bird 1994). Women have higher rates of depressive symptoms and anxiety disorders compared to men (Rieker and Bird 2000; Mirowsky and Ross

1992; Orfila et al. 2006; Case and Paxson 2005; Rosenfield 1999), however, men have higher rates of substance abuse and antisocial disorders.

In addition to structural, behavioral and psychosocial factors that affect health, researchers have begun to examine the ways in which adult health is linked to early life exposures (Hayward and Gorman 2004; Rahkonen, Lahalma and Huuka. 1997; Blackwell et al. 2001; Haas 2007). Health inequalities can be understood as resulting from an accumulation of experiences from childhood that impact adult levels of health. Those from disadvantaged backgrounds face more health related risk factors which impact their health trajectories. Childhood SES and other childhood factors significantly impact later life health, even after controlling for other adult predictors (Haas 2007). How childhood predictors impact gender disparities in health has yet to be examined.

Most research indicates the relationship between gender and functional limitations is fairly insensitive to adjustments for other characteristics (Case and Paxson; Murtagh and Hubert 2004; Gorman and Read 2006; Read and Gorman 2006; Orfila et al. 2006; Arber and Cooper 1999; Merrill and Seeman 1997). Women report higher functional limitations that can't be explained by other factors. SES has been found to reduce the gender difference in self-rated health and life-threatening medical conditions, but has not had the same affect in accounting for the gender differences in functional limitations (Gorman and Read 2006; Read and Gorman 2006; Murtagh and Hubert 2004; Bird and Fremont 1991). Even if men and women were equivalent on characteristics such as SES, health behaviors, and psychosocial characteristics, women would still report significantly higher number of functional limitations, and their disadvantage would grow with age.

However, some research indicates the relationship between gender and functional limitations is mediated by other characteristics. Research by Murtagh and Hubert (2004) indicates that when adjustments for chronic conditions were made, gender differences in functional health disappeared. Gorman and Read (2006) found that depression accounts for a substantial portion of the gender gap in functional health. Not only have findings been inconsistent, but most research on gender differences in health have been limited to cross-sectional data or data from two time points and fail to explore the mechanisms contributing to gender differences (Gorman and Read 2006; Read and Gorman 2006; Murtagh and Hubert 2004; Arber and Cooper 1999; Denton et al. 2004; Orfila et al. 2006). This research will be conducted using eight waves of panel data to study how functional health limitations change for males and females over time. It will also examine the explanations for gender disparities in health trajectories using a more extensive set of explanatory factors.

Methodology

The data used in this analysis come from the Health and Retirement Study (HRS) and the Study of Assets and Health Dynamics Among the Oldest Old (AHEAD). Eight waves of data (1992-2006) are utilized. The HRS is a U.S. nationally representative panel study of health, retirement, and aging sponsored by the National Institute on Aging. The original wave of the HRS data was collected in 1992 and sampled 12,654 people born from 1931 to 1941 and their spouses. The AHEAD was first collected in 1993 and sampled 8,222 respondents born in 1923 or earlier and their spouses. In 1998, the original HRS data was merged with the AHEAD data. Individuals were selected from a sample of housing units generated using a multi-stage, clustered area probability sample. Face-to-face, in-home interviews were conducted at baseline and follow-up telephone interviews occur every second year, with proxy interviews after death. The

HRS and AHEAD include over-sampling of Hispanics, Blacks, and Florida residents.

Dependent Variables

The measure of functional limitations includes the following activities: walking several blocks, walking one block, sitting for about 2 hours, getting up from a chair after sitting for long periods, climbing several flights of stairs without resting, climbing one flight of stairs without resting, lifting or carrying weights over 10 lbs, stooping kneeling, or crouching, reaching arms above shoulder level, pushing or pulling large objects, and picking up a dime from the table. Respondents were asked if they had difficulty with each task and possible responses were "yes," "no," "can't do," and "don't do." Respondents who answered "can't do" are coded 'yes' and those who answered "don't do" are coded as missing. All variables are dichotomous with 0 equal to no limitation in the task and 1 equal to limitation in the task. The above indicators are combined into an additive scale with values ranging from 0 to 11. The wording of the questions assessing functional limitations among the HRS cohort changed from 1992 to 1994 and all functional limitations questions were not asked in the 1993 wave of the AHEAD. As a result, the first measure of functional limitations will come from 1994 for the HRS cohort and from 1995 for the AHEAD cohort. The reliability for the functional limitations scale has been assessed with Chronbach's alpha and is .86 for the HRS 1994 scale and .85 for the AHEAD 1995 scale (Fonda and Herzog 2004). The Chronbach's alpha for the functional limitation scales in later waves are all .87 or higher.

Independent Variables

Independent variables for this analysis include structural factors, behavioral factors, psychological factors, childhood background factors, and other health factors. The structural factors are gender, age, race/ethnicity, marital status, education, employment status, occupation,

household income and net wealth. The behavioral factors are drinking behavior, smoking behavior, exercise, and body mass index (BMI). Psychological factors are diagnosed emotional problems and depressive symptoms. Childhood background factors include childhood health, parental education, childhood SES, if a child ever moved for financial reasons, if the father was present, and if the father was unemployed. Health factors are be hypertension, diabetes, cancer, chronic lung disease, heart attack or other heart problems, stroke or transient ischemic attack (TIA), arthritis or rheumatism, seeing impairment, and hearing impairment.

Structural Factors

Gender is coded so that 0 indicates males and 1 indicates females. Age is coded as a continuous variable. Race and Ethnicity is coded into the following categories: White Non-Hispanic, Black Non-Hispanic, Hispanic, and Other Non-Hispanic. Marital status is coded as a dummy variable with the following categories: married, married but spouse absent/separated/divorced, widowed, and partnered or never married. Current employment status is a series of dummy variables indicating if the respondent is currently working full-time, working part-time, unemployed, retired, disabled, or not in the labor force. The occupation variable indicates the occupation the respondent held the longest. Occupation is coded into the following dummy variables: sales/clerical/service, mechanic/operator/agriculture, and managerial/professional/technical support. Education is coded as a continuous variable indicating number of years of school completed. Household income is total household income during the last calendar year and is logged to correct for a skewed distribution. Net wealth is net household assets and also logged.

Behavioral Factors

Drinking behavior is assessed with CAGE scale which indicates binge drinking. Respondents were asked the following four questions: Have you ever felt you should cut down on drinking? Have people ever annoyed you by criticizing your drinking? Have you ever felt bad or guilty about drinking? Have you ever taken a drink first thing in the morning to steady your nerves or get rid of a hangover? Responses to these questions are combined to form an additive scale with 0 indicating no binge drinking behaviors and 4 indicating highest level of binge drinking. Smoking behavior is assessed with two questions. The first assesses if the respondent ever smoked cigarettes and the second assess if the respondent currently smokes cigarettes. Smoking behavior is coded as a dummy variable with the following categories: never smoked, former smoker, current smoker.

Physical activity is assessed with questions asking if the respondent participates in light and/or vigorous activity 3 or more times per week. Vigorous activity includes sports, heavy housework, or a job that involves physical labor. All variables are coded into dichotomous variables indicating if the respondent participated in light or vigorous physical activity. BMI will be assessed in each wave and is calculated by dividing weight by the square of height (weight / height^2). BMI will then be coded as four dummies indicating if a respondent is normal weight (BMI of 18.5 to 25), underweight (BMI of less than 18.5), overweight (BMI of 25 to 30), or obese (BMI of above 30).

Psychosocial Factors

Two psychosocial factors are included: depressive symptoms and diagnosed emotional, nervous, or psychiatric problems. The CES-D scale is used to measure depressive symptoms. The respondent was asked if each of the following was true for the respondent much of the time in the past week: they felt depressed, felt that everything he/she did was an effort, sleep was

restless, could not get going, felt lonely, enjoyed life, felt sad, and was happy. The CES-D is an additive scale so the higher the score, the more negative the respondent's feelings in the past week. In addition to the CES-D scale for depressive symptoms, a question indicating if the respondent has even been told by a doctor they had emotional, nervous, or psychiatric problems is used. This is coded so that 0 indicates no and 1 indicates yes.

Childhood Factors

In 1998, several questions were asked which assess childhood factors. To assess childhood health, the respondents were asked, "Consider your health while you were growing up, from birth to age 16. Would you say that your health during that time was excellent, very good, good, fair, or poor?" The variable is coded 0 for poor or fair childhood health and 1 for good, very good, and excellent childhood health. Parental education is measured using a continuous variable indicating number of years of school completed. There are also variables indicating if the respondent's family was poor, if the respondent ever moved as a child for financial reasons, if the father was present in the household, and if the father ever experienced a period of unemployment during the respondents' childhood.

Health Factors

Because males and females differ in the types of conditions and illness they experience, it is not sufficient to include just an additive indicator of number of conditions the respondent has ever been diagnosed with. Instead, each condition is included in the model separately. The respondents were asked whether or not a doctor has ever told them they had the following conditions: high blood pressure or hypertension, diabetes or high blood sugar, cancer or a malignant tumor of any kind except skin cancer, chronic lung disease except asthma such as chronic bronchitis or emphysema, heart attack, coronary heart disease, angina, congestive heart

failure, or other heart problems, stroke or transient ischemic attack (TIA), and arthritis or rheumatism. These variables are coded so 0 indicates no and 1 indicates yes.

Seeing impairment and hearing impairment come from questions in which respondents were asked to rate their hearing and their eyesight. Seeing impairment is coded from 1 to 6, with 1 indicating the respondent is legally blind, 2 indicating poor eyesight and 6 indicating excellent eyesight. Hearing impairment is coded from 1 to 5, with 1 indicating poor hearing ability and 5 indicating excellent hearing ability.

Preliminary Analysis

The sample includes spouses only if they are age-eligible for each cohort. Weights are used to correct for the complex sampling design. Descriptive statistics for basic socio-demographic, childhood, and health variables are presented in Table 1. For both the HRS cohort and the AHEAD cohort, mean level of functional health limitations increases at each wave. The AHEAD cohort has a higher level of functional limitations at each wave when compared to the HRS cohort. There are more females than males in both cohorts, with a higher proportion of females in the AHEAD cohort when compared to the HRS cohort. Because males have higher levels of morbidity, more males have died compared to females in the AHEAD cohort.[1] Basic descriptive analysis shows there are gender differences in functional health for the HRS cohort and the AHEAD cohort (see Chart 1 and 2). Although it is not possible to assess whether the starting values and slopes are significantly different from each other, it is useful in providing the basis for further analysis.

Future Analysis

[1] Attrition due to mortality selection will be addressed in future analysis.

Future analysis will be done in MPlus using latent growth curve modeling and the full set of determinants. Latent growth curve modeling using a structural equation modeling approach will be used. Latent growth curve modeling is appropriate to use in this case because it can accommodate data from more than two times points to model change over time. Growth curve modeling focuses on the population mean trajectory and how individual variation about that mean relates to predictors (Duncan et al. 1999). Individual parameters for the intercept and slope correspond to the individual growth parameters for the initial level and the rate of change. Each individual trajectory varies in initial level and rate of change. The individual trajectories can be aggregated to estimate the average initial level and rate of change for the entire sample with corresponding variance for each parameter. Variance of the intercept identifies variability in the initial level across individuals. Variance of the slope identifies variability in the rate of change across individuals. It is this variability in the parameters that may be influenced by other factors.

The first part of the analysis will estimate multi-group unconditional latent growth curve models of functional. This analysis will be mostly descriptive and will establish the mean initial level and the mean rate of change in functional limitations for males and females. It will assess the variation in the initial level and rate of change to determine if further investigation is necessary and will estimate if a linear growth curve or quadratic growth curve better fits the change in functional limitations for males and females. If there is no difference in the initial level or rate of change for males and females, no further estimation is needed. The second part of the analysis will include latent growth curve modeling to test explanations of the gender differences in functional health trajectories. Structural, behavioral, psychosocial, childhood, and other health factors will be added separately in order to examine which set of factors most accounts for the gender differentials in health.

Conclusion

Although analyses for this research is in progress, past research and basic descriptive analysis shows there are significant gender differences in functional health. Not only has most research on gender differentials in health been based on cross-sectional data or data from two-points in time, it also does not consider how childhood experiences affect adult health. The purpose of this research is to not only examine trajectories of functional health for males and females using longitudinal panel data, but to also assess the extent to which structural, behavioral, psychosocial, childhood, and adult health factors explain gender differentials in functional health trajectories. This will be done using latent growth curve modeling, which will estimate the initial level of functional limitations for males and females and the growth of functional limitations for males and females.

Table 1. Descriptive Statistics HRS (1992-2004) and AHEAD (1993-2004)

	HRS			AHEAD		
	%	Mean	SE	%	Mean	SE
Functional Limitations						
1994		1.48	0.057		---	---
1996		1.61	0.051		1.86	0.174
1998		1.69	0.059		2.09	0.140
2000		1.79	0.072		2.32	0.109
2002		2.02	0.070		3.00	0.197
2004		2.18	0.073		3.50	0.148
Socio-Demographic Factors						
Female	52.31			60.7		
Age		55.83	0.049		76.83	0.005
Non-Hispanic White	81.07			87.2		
Non-Hispanic Black	10.16			7.9		
Hispanic	6.44			3.6		
Other	2.32			1.3		
Married	74.40			51.2		
Education (years)		12.73	0.082		11.58	0.030
Household Income (log)		10.55	0.031		9.85	0.012
Household Wealth (log)		10.92	0.073		10.91	0.002
Childhood Factors						
Childhood Health (Poor/Fair)	6.64			6.37		
Family SES (Poor)	30.05			32.6		
Family Moved Due to Financial Problems	16.90			17.2		
Father Ever Unemployed	18.60			21.3		
Mother's Education		9.68	0.083		8.07	0.006
Father's Education		9.41	0.083		8.03	0.013

Table 1. Descriptive Statistics HRS (1992-2004) and AHEAD (1993-2004) Cont.

	HRS			AHEAD		
	%	Mean	SE	%	Mean	SE
Health Factors						
Current Smoker	26.91			9.7		
Former Smoker	37.01			42.6		
Body Mass Index						
Underweight	1.33			4.1		
Overweight	41.40			3.9		
Obese	25.08			14.7		
Chronic Conditions (Ever diagnosed)						
Hypertension	55.30			59.9		
Diabetes	19.74			17.8		
Cancer	14.53			21.7		
Chronic Lung Disease	12.70			15.4		
Heart Disease/Problems	25.04			45.7		
Stroke or TIA	7.54			21.7		
Psychiatric Problems	16.09			17.1		
Arthritis or Rheumatism	59.83			62.57		
N		10,957			8,095	

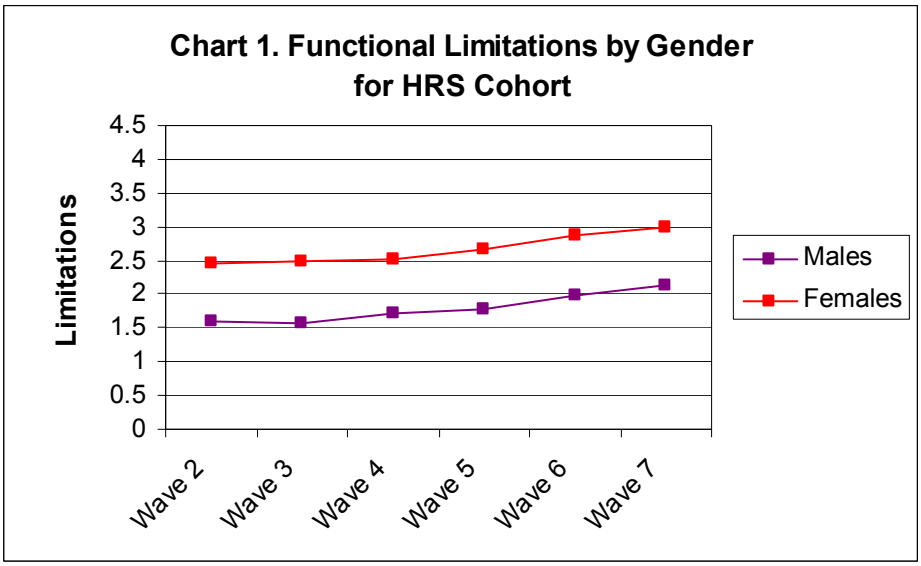
Chart 1. Functional Limitations by Gender for HRS Cohort
Limitations
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Wave 2
Wave 3
Wave 4
Wave 5
Wave 6
Wave 7
Males
Females

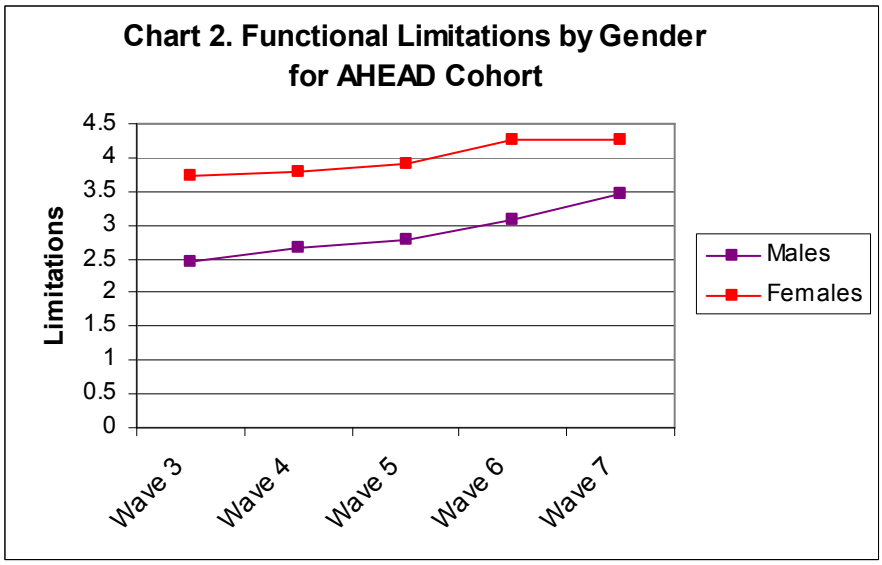
Chart 2. Functional Limitations by Gender for AHEAD Cohort
Limitations
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Wave 3
Wave 4
Wave 5
Wave 6
Wave 7
Males
Females

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