Cumulative Inequality and Racial Disparities in Health: Private Insurance Coverage and Black/White Differences in Functional Limitations

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Objectives. To test different forms of private insurance coverage as mediators for racial disparities in onset, persistent level, and acceleration of functional limitations among Medicare age-eligible Americans.

Method. Data come from 7 waves of the Health and Retirement Study (1996–2008). Onset and progression latent growth models were used to estimate racial differences in onset, level, and growth of functional limitations among a sample of 5,755 people aged 65 and older in 1996. Employer-provided insurance, spousal insurance, and market insurance were next added to the model to test how differences in private insurance mediated the racial gap in physical limitations.

Results. In baseline models, African Americans had larger persistent level of limitations over time. Although employer-provided, spousal-provided, and market insurances were directly associated with lower persistent levels of limitation, only differences in market insurance accounted for the racial disparities in persistent level of limitations.

Discussion. Results suggest private insurance is important for reducing functional limitations, but market insurance is an important mediator of the persistently larger level of limitations observed among African Americans.

Key Words: Cumulative inequality—Insurance—Functional limitations—Private insurance.

African Americans fare worse than whites in most measures of health throughout adulthood and often well into later life. African Americans have poorer self-rated health and psychological well-being, are at greater risk of early mortality, and suffer from greater psychological distress, serious illness, and disability (Farmer & Ferraro, 2005; Kelley-Moore & Ferraro, 2004; Taylor, 2008, 2010, 2011; Williams & Sternthal, 2010). For older Americans, racial disparities in disability are particularly concerning because disability has been linked to mortality, depression, loss of earnings, increased medical expenditures, and the ability to actively participate in society (Gayman, Turner, & Cui, 2008; Taylor, 2011; Turner & Noh, 1988; Yorgason, Booth, & Johnson, 2008).

Differences in socioeconomic status (SES) are a key mechanism linking racial group membership with disparities in disability. Income, education, and assets explain some health differences between older African Americans and whites (Kelley-Moore & Ferraro, 2004; Taylor, 2008, 2010, 2011). Additionally, because African Americans have limited access to private insurance (Gould & Hertel-Fernandez, 2010), racial differences in insurance coverage may also help explain racial disparities in health.

In this study, we draw on Ferraro and colleagues’ “cumulative inequality theory (CIT)” framework (Ferraro & Shippee, 2009; Ferraro, Shippee, & Schafer, 2009) to consider how private insurance coverage may account for some of the racial disparities in functional limitations. Using the 1996–2008 waves of the HRS data, we test the impact of private insurance on racial disparities in functional limitations after Medicare age eligibility. Specifically, we first estimate onset and progression latent growth models to consider racial differences in onset, level, and growth of functional limitations. Next, we consider how employer-provided, spousal-provided, and private nonemployment insurances (henceforth referred to as market insurance) mediate the relationship between race and functional limitations among African Americans and whites.

Background

Differences in SES are fundamentally important in shaping disparities in health and disability (Kelley-Moore & Ferraro, 2004; Link & Phelan, 1995; Taylor, 2008, 2010, 2011). For instance, education is negatively associated with onset and severity of functional limitations (Haas & Rohlfsen, 2010; Herd, Goesling, & House, 2007; Zimmer & House, 2003). Individuals with more income are less likely to experience onset and accumulation of functional limitations and disability and suffer from fewer functional limitations overall (Haas & Rohlfsen, 2010; Herd et al., 2007; Taylor, 2011; Zimmer & House, 2003). Similarly, those with the least household wealth tend to have more functional limitations (Haas & Rohlfsen, 2010; Smith & Kington, 1997). Clearly, SES is important for shaping physical functioning in later life.
African Americans fare worse than whites across most measure of SES. African Americans tend to have lower educational attainment, smaller incomes, and lower levels of wealth (DeNavas-Walt, Proctor, & Smith, 2011; Newburger & Curry, 2000; Oliver & Shapiro, 2006). As such, they should be at greater risk of experiencing functional limitations and suffer from more functional limitations overall. Accounting for SES, however, racial disparities in disability and functional limitations often persist. For example, Kelley-Moore and Ferraro (2004) found that controlling for education, income, home ownership, employment, and marital status accounted for the accumulating disability gap between African Americans and whites over time, but not for racial disparities in the initial level of disability. Taylor (2008) found racial differences in onset persisted after accounting for education, income, home ownership, occupational prestige, and whether respondents were homemakers for the majority of their lives. However, after accounting for access to care and insurance coverage type (Medicare, etc.), the remaining race differences were explained.

These findings suggest insurance coverage may be an important aspect of socioeconomic inequality fueling disparities between African Americans and whites. Specifically, private insurance coverage may be one mechanism that helps explain racial disparities in functional limitations, partially because patterns of private insurance coverage differ significantly between African Americans and whites (Gould & Hertel-Fernandez, 2010; Lillie-Blanton & Hoffman, 2005; Weinick, Zuvekas, & Cohen, 2000). In what follows, we turn to CIT to illuminate ways private insurance coverage may affect racial disparities in functional limitations.

Cumulative Inequality

CIT (Ferraro & Shippee, 2009; Ferraro et al., 2009) integrates and extends theoretical work on stress process, the life course, and cumulative advantage (Ferraro, 2011), and several of its axiomatic principles have utility for studying disparities in later life. First, according to CIT, inequality is produced through social systems (Ferraro & Shippee, 2009; Ferraro et al., 2009). This entails a process wherein inequality begins before birth. For instance, initial social locations provide various opportunities and obstacles for success in education (which is linked to good health) and success in occupational attainment (which is one source of income and private insurance in later life). Thus, early life circumstances shape individuals’ health, education, and career trajectories. This axiom highlights the potential that education and insurance benefits association with particular career paths should partially explain differences in functional limitations between African Americans and whites.

Second, according to CIT, inequality involves both advantage and disadvantage, which are influenced by individuals’ positions in social hierarchies (Ferraro & Shippee, 2009; Ferraro et al., 2009). Some advantages are malleable (e.g., social class), whereas others are usually permanent characteristics (e.g., gender or race). CIT highlights that it is possible to be disadvantaged in some domains and advantaged in others. Often, however, inequality diffuses across domains such that disadvantage in one domain is related to or produces disadvantage in a subsequent domain (Ferraro et al., 2009).

This axiom provides two insights into how race and private insurance coverage may relate to later life functional limitations. First, African Americans’ social position of disadvantage will be associated with increased risk of onset of functional limitations, increased level of limitations after onset, and more rapid subsequent growth in limitations. Second, those with employer-provided or spousal insurance—which tend to be good coverage and subsidized by the employer—will be in a social position of advantage to help limit the risks of functional limitations.

Third, according to CIT, trajectories of advantage and disadvantage are potentially modifiable. When advantaged in one domain of life, individuals may mobilize resources to help limit risks in other domains of life (Ferraro et al., 2009). In the case of private insurance, people without employer-provided insurance are at a disadvantage exposing them to the risks of poor health. To reduce exposure to risk, individuals may mobilize their economic or social resources to help secure market insurance. This axiom suggests that mobilizing resources to secure market insurance will reduce the risks of functional limitations endured by those without employer-provided or spousal insurance.

Insurance and Functional Limitations

Those with insurance coverage are in better health. Private coverage is associated with better self-assessed health and fewer difficulties with activities of daily living (Dor, Sudano, & Baker, 2006; Landerman et al., 1998; Quesnel-Vallée, 2004). This may be because people with private insurance have greater access to preventative care, prescription drugs, and medical technologies not covered through Medicare. Individuals who supplement Medicare with private insurance are less likely to experience onset of activities of daily living limitations (Porell & Miltiades, 2001). The role of insurance in mediating racial disparities in disability is unclear. Although Taylor (2008) found accounting for differences in access to care, Medicare/Medicaid coverage, and supplemental insurance coverage mediated the relationship between racial group membership and disability, Taylor (2011) found these factors had no substantial impact on the racial disparity in disability above basic socioeconomic indicators among a relatively young cohort of older adults similar to those used in the current analysis.

Although these studies highlight the ways private insurance influences racial disparities in disability, we are unaware of research that separately considers the impacts of employer-provided insurance, spousal insurance, and market insurance on racial disparities in onset and trajectories.
of functional limitations over time. This insurance type distinction is important because employer-based insurance provides relative advantage over market insurance (Kail, 2012) and may further elucidate racial disparities in limitations because of racial group differences in these types of insurance. Among 55–64 year olds, only 58% of African Americans have employer-provided insurance coverage compared with 69% of whites (Gould & Hertel-Fernandez, 2010), and only 9% of African Americans have insurance through a spouse’s employer compared with 15% of whites (Johnson, 2006). This may be because African Americans are less likely to have jobs that offer insurance or be married to someone whose job offers insurance (Kalleberg, Reskin, & Hudson, 2000). Additionally, only 6% of African Americans have market insurance coverage compared with 10% of whites between the ages of 55 and 64 (Gould & Hertel-Fernandez, 2010). Importantly, racial differences in market insurance persist net of other socioeconomic factors like education and income (Saver & Doescher, 2000; Saver, Doescher, Symons, Wright, & Andrilla, 2003). Several mechanisms may link the residual differences between African Americans and whites in rates of market insurance, including racial discrimination or bias in market insurance marketing, and negative attitudes or distrust toward insurance and health care (Pol, Mueller, & Addam, 2002; Saver & Doescher, 2000; Zuvekas & Taliaferro, 2003). Taken together, net of income, wealth, employment, and education, there are substantial differences in private insurance coverage between African Americans and whites.

Lower rates of private coverage may partially explain why African Americans often have less access to regular medical care (Lillie-Blanton & Hoffman, 2005; Weinick et al., 2000). Individuals who lose insurance are more likely to delay care and forgo preventative care (Burstin, Swartz, O’Neil, Orav, & Brennan, 1998). Additionally, net of education and income, those with private insurance coverage report fewer problems with activities of daily living and mobility (Landerman et al., 1998). Accordingly, insurance coverage may be an important mechanism underlying racial disparities in disability.

In summary, because African Americans have lower rates of private insurance coverage than whites, we expect this difference to account for some of the racial disparities in functional limitations. Moreover, because the relative racial differences in coverage are much larger for market insurance than they are for employment-based insurances, we expect that considering these forms of coverage separately will help further clarify the mediating relationship of private insurance coverage on racial disparities in functional limitations.

Based on previous empirical evidence and guided by CIT, we present three hypotheses. First, because they are born into social locations of disadvantage, we expect that African Americans will experience greater functional limitations in the onset or trajectory portion of the model, and that this disparity will not be fully accounted for by earlier measures of SES such as education, marital status, and employment at wave 1. Second, because racial inequality plays an important role in whether or not one’s job (or one’s spouse’s job) offers employer-provided insurance, we expect employment-based insurances to help account for racial differences in functional limitations. Finally, we expect (a) those who mobilize their resources by purchasing market insurance to have reduced risks of onset, lower levels, and slower growth in limitations, and (b) the inclusion of market insurance will help explain racial disparities due to racial differences in either the decision to mobilize resources or the external constraints in securing coverage.

Data and Method

Data

The RAND Health and Retirement Study (HRS) Data File was used for the following analyses. Beginning in 1992, the core HRS sample included 12,652 people born between 1931 and 1941 (and their spouses) and included an oversample of African Americans. Follow-ups were conducted every 2 years, resulting in a 16-year panel study designed to explore the health and economic circumstances of aging Americans (Health and Retirement Study, 2008; Juster & Suzman, 1995; National Institute on Aging, 2007; RAND Center for the Study of Aging, 2008).

The study sample was limited in two ways. First, because we focused on the differences between whites and African Americans, people whose race was coded as “other” were excluded. Second, because the relationship between insurance and disability may be different before and after age eligibility for Medicare, we limited the sample to people older than 65. Accordingly, we only used the 1996 through 2008 waves of the HRS data. The resulting unbalanced panel sample was 21,646 observations nested within 5,755 respondents.

Outcome Measure

Functional Limitations were measured as a summed 6-item scale. This scale included self-reports of having difficulty with any of the following activities: walking one block; climbing one flight of stairs; lifting or carrying 10 pounds; picking a dime up off the ground; stooping, kneeling, or crouching; and pushing or pulling large objects (α = .73; Jette, 1980; Jette & Deniston, 1978; Katz, Downs, Cash, & Grotz, 1970; Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963).

Explanatory Variables

Race was one of the central study variables in the following analyses. This time-invariant variable was coded “1” for African Americans and “0” for whites. The second set of study variables were three mutually exclusive time-invariant measures of private insurance, including employer-provided insurance (insurance through one’s
own employment or a former employer); spousal insurance (through a spouse’s current or former employer); and market insurance (private insurance directly purchased on the nongroup market in waves during which they were not covered with either employer or spousal insurance). Each measure of insurance was measured as the proportion of waves individuals were covered with that particular form of insurance as a supplement to their Medicare coverage. Because individuals may be covered with multiple forms of insurance, following Blau and Gilleskie (2008) we coded individuals who had employer-provided insurance as only having employer-provided insurance in a particular wave (regardless of other forms of coverage). Among those who did not have employer-provided insurance, we coded people who had spousal insurance as only having spousal insurance (regardless of whether they had market insurance). Finally, individuals were coded as having market insurance if that was their sole form of private coverage.

Several additional time-invariant control variables were also included. Hispanic ethnicity was coded “1” for Hispanics and “0” for non-Hispanics. Gender was coded “1” for men and “0” for women. Birth year was measured as year of birth minus 1931 (the year of birth for the oldest members of our sample). To measure employment we included a dummy variable, coded “1” for respondents who were working in the initial wave. We also included a dummy variable for selective mortality coded “0” for those who survived and “1” for those who died during the study. Income was measured as the average household income across all waves and, similarly, wealth was measured as the average household assets across all waves. To adjust for skewness and accommodate zero and negative values, we transformed both wealth and income using the inverse hyperbolic sine function (Burbidge, Magee, & Robb, 1988; Gale & Pence, 2006). Additional models in preliminary analyses were run including (a) a separate control for those who had supplemental market insurance in addition to an employer-provided plan, (b) categorical measures of education and income, and (c) models identical to those presented without the mortality control. In all cases, these variables were not significant and/or did not change the results we present subsequently.

Analytic Method

Previous findings (Taylor, 2008; Zimmer & House, 2003) suggest delayed disability is an important factor in modeling disability trajectories and that covariate effects may differ for prevention and progression of disability. We estimate a latent growth curve model with random onset to capture individual transitions and trajectories simultaneously as two separate processes through the addition of time-varying binary onset variables (analyzed using Mplus Version 3.0) to a traditional growth curve/trajectory model. Substantively, important predictors of health outcomes likely vary in their impact on timing and progression. Methodologically, ignoring timing when measuring trajectories may bias estimation of the trajectories leading to inaccurate conclusions of where health disparities lie in cumulative processes (Taylor, 2008).

To model the hazard \( (h) \) for individual \( i \) over time \( (t) \) as a function of observed covariates, we choose a logit link function to estimate the discrete-time hazard (Singer & Willett, 1993).

\[
    h_i = \frac{1}{1 + e^{-\logit_i}},
\]

\[
    \logit_i = \beta_i + \kappa_i x_i
\]

where \( \kappa_i \) represents the effects of the covariates assumed to be equal across time periods \( (t) \) and \( x \) is the vector of time-invariant covariates (including African American, Hispanic, male, birth year, mortality, education, currently married, employment at wave 1, employer-provided insurance, spousal insurance, market insurance, income, and assets). \( \beta_i \) is the baseline hazard, which is assumed to vary over time \( (t) \). Therefore, the models allow for an “unstructured” hazard across time, similar to a piecewise hazard in continuous time survival analysis (see Muthén & Masyn, 2005).

To model limitation trajectories given onset over time, the dependent variable was modified such that an individual without limitations was missing on variable \( y \) until the time period when limitation is observed. The values for \( y \) are nonmissing thereafter. Decreases in functional limitations subsequent to onset were modeled with the \( y \) variable. Consistent with previous papers using this model (Taylor, 2008; 2010; 2011), we chose to include those transitioning into disability prior to wave 1 as experiencing “onset” at wave 1 so that they could be retained in the sample and simultaneously modeled in the trajectory (level) portion of the model. Then all new transitions into disability were coded as experiencing onset in the corresponding wave. To model the level of limitation given onset \( (y) \) for individual \( i \) over time \( (t) \) as a function of covariates, we chose a linear growth model.

\[
    y_t = \alpha_i + \beta_i + \epsilon_i
\]

\[
    \alpha_i = \mu_\alpha + \gamma_\alpha x_i + \zeta_\alpha
\]

\[
    \beta_i = \mu_\beta + \gamma_\beta x_i + \zeta_\beta
\]

\( \alpha_i \) is a vector of latent intercepts, \( \beta_i \) is a vector of latent slopes, \( \lambda_i \) is a vector of loadings representing time (here fixed at 0, 1, 2, 3, 4, 5, and 6—as such the slope coefficients represent a 2-year change), and \( \epsilon_i \) are disturbance terms. \( \mu_\alpha \) and \( \mu_\beta \) are the mean intercept and slope across individuals \( (i) \). \( \gamma_\alpha \) and \( \gamma_\beta \) represent the effects of the covariates on the intercept and slope of limitations given onset, and \( x \) is the vector of
time-invariant covariates listed above. \( \zeta_{ui} \) and \( \zeta_{pi} \) are disturbance terms. The onset and trajectory of limitations are not allowed to covary due to identification restrictions, a noted limitation of this type of analysis. Future research using alternative techniques should address the connection between the timing of onset and the progression of limitations.

Although the analytic plan estimates the two components of the limitation trajectories as a function of the covariates, it does not necessarily account for selection effects. Here race, health, and other factors may select individuals differentially into multiple forms of insurance. To account for this selection, we included in our SEM-based models direct pathways (continuous regression coefficients) predicting the three types of insurance coverage over time using the covariates in our model. Because health is an important selective effect, we included an alternative health measure to disability (count of chronic conditions at baseline). We also omitted the mortality control from the selection equation because of temporal order. We can thus (a) obtain a picture of which factors select individuals into different types of coverage and (b) interpret the results of our main findings as net of selection (given the observed variables used) into insurance coverage.

**RESULTS**

**Cross-Sectional Results**

To present summary statistics (shown in Table 1) of the dependent variables, which vary by time, we calculated 3 summed measures: (a) Average experience of any onset of limitation; (b) average number of years until onset; and (c) the average level of limitation across waves after onset. According to difference tests, African Americans and whites were not significantly different in terms of whether onset occurred, but had fewer number of years, on average, until they experienced onset. Compared with whites, they also had a higher level of initial limitations after onset. There was no significant difference in employment-based insurance coverage over time across race, but African Americans had significantly less spousal coverage. The largest disparity in insurance was the difference in market insurance with African Americans covered less over time compared with whites.

### Multivariate Analyses of Functional Limitations

The linear model for the trajectory of functional limitation (without onset) yielded good fit (comparative fit index = 0.966, Tucker Lewis index = 0.969, root mean square error of approximation = 0.043). Separate models for the baseline hazards (without growth trajectories) were also tested (Loglikelihood = −7,290,655 (7)). The effects of covariates on functional limitation onset must be interpreted differently than on the trajectory coefficients because the hazard \( (h) \) is a latent variable with dichotomous indicators. The coefficients were exponentiated in order to produce proportional hazard odds ratios. The latent intercept \( (\alpha) \) and latent slope \( (\beta) \) are continuous latent variables and should be interpreted as the level and slope of functional

### Table 1. Descriptive Statistics by Race

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th></th>
<th></th>
<th>African American</th>
<th></th>
<th>Whites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean/SD</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Mean/SD</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>Any limitation onset*</td>
<td>75.74</td>
<td>0.00</td>
<td>1.00</td>
<td>77.96</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Years to onset*</td>
<td>1.26</td>
<td>0.00</td>
<td>1.40</td>
<td>1.09</td>
<td>0.00</td>
<td>2.09</td>
</tr>
<tr>
<td>Limitation level*</td>
<td>1.86</td>
<td>0.00</td>
<td>6.00</td>
<td>2.15</td>
<td>0.00</td>
<td>4.00</td>
</tr>
<tr>
<td>African American</td>
<td>15.80</td>
<td>0.00</td>
<td>1.40</td>
<td>100.00</td>
<td>0.00</td>
<td>1.40</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7.45</td>
<td>0.00</td>
<td>1.40</td>
<td>1.21</td>
<td>0.00</td>
<td>—</td>
</tr>
<tr>
<td>Male</td>
<td>45.37</td>
<td>0.00</td>
<td>1.40</td>
<td>39.47</td>
<td>0.00</td>
<td>—</td>
</tr>
<tr>
<td>Birth year—1931</td>
<td>4.81</td>
<td>0.00</td>
<td>10.00</td>
<td>4.81</td>
<td>0.00</td>
<td>2.97</td>
</tr>
<tr>
<td>Employed W1</td>
<td>35.21</td>
<td>0.00</td>
<td>1.00</td>
<td>32.82</td>
<td>0.00</td>
<td>—</td>
</tr>
<tr>
<td>Mortality</td>
<td>8.60</td>
<td>0.00</td>
<td>1.00</td>
<td>11.40</td>
<td>0.00</td>
<td>—</td>
</tr>
<tr>
<td>Education</td>
<td>12.26</td>
<td>0.00</td>
<td>17.00</td>
<td>11.26</td>
<td>0.00</td>
<td>3.21</td>
</tr>
<tr>
<td>Currently married</td>
<td>71.59</td>
<td>0.00</td>
<td>1.00</td>
<td>51.10</td>
<td>0.00</td>
<td>—</td>
</tr>
<tr>
<td>Employer-provided insurance</td>
<td>0.24</td>
<td>0.00</td>
<td>1.00</td>
<td>0.23</td>
<td>0.00</td>
<td>0.37</td>
</tr>
<tr>
<td>Spousal insurance</td>
<td>0.12</td>
<td>0.00</td>
<td>1.00</td>
<td>0.07</td>
<td>0.00</td>
<td>0.28</td>
</tr>
<tr>
<td>Market insurance</td>
<td>0.20</td>
<td>0.00</td>
<td>1.00</td>
<td>0.08</td>
<td>0.00</td>
<td>0.20</td>
</tr>
<tr>
<td>Income ($1,000)</td>
<td>58.64</td>
<td>271.87</td>
<td>0.00</td>
<td>20,013.85</td>
<td>33.29</td>
<td>33.82</td>
</tr>
<tr>
<td>Assets ($1,000)</td>
<td>515.20</td>
<td>1,230.59</td>
<td>289.75</td>
<td>25,908.87</td>
<td>128.02</td>
<td>208.89</td>
</tr>
</tbody>
</table>

*Notes.* One-tailed t test for continuous measures and a chi-squared test for dichotomous measures. Comparisons are made between African Americans and whites;

Averaged across waves within persons.

Average level after onset.

In the multivariate models, we transform income and assets using the inverse hyperbolic sine function, which have a mean of 11.22, standard deviation of 0.86, and ranges from 0 to 17.22 for income, and a mean of 12.00, standard deviation of 4.15, and ranges from −12.65 to 17.68 for assets.

\( *p < .05, **p < .01, ***p < .001.\)
limitation across time given that the individual had onset of functional limitation.

Table 2 reports the results from the nested models including race, insurance, and socioeconomic variables along with demographic controls. Table 3 reports the selection coefficients (continuous) corresponding to the models including insurance coverage. Model 1 in Table 2 presents disparities in functioning between African Americans and whites, controlling for Hispanic ethnicity, gender, age, employment status, education, marital status, and including the mortality control. Consistent with other research, African Americans were disadvantaged in the level of functional limitation over time (which is shown in Figure 1), but not in the timing of first onset or acceleration of limitation over time once indicators of earlier SES (education and marital status) were held constant (Haas & Rohlfsen, 2010; Kelley-Moore & Ferraro, 2004). More specifically, African Americans had an increase of .15 items of limitation once onset occurred that was persistent over time. In this model, there were no observed differences based on Hispanic ethnicity. Gender acted as anticipated with men expecting lower odds of limitation onset, lower level of limitations once onset occurred, and slower growth in limitation. The effects of age were mixed, with each increased year of age predicting higher onset and level of limitation but lower acceleration of limitations once onset occurred. Although seemingly counterintuitive, it is likely these protective effects of older age in this relatively young sample of older adults either (a) reflect findings of increased limitations among younger cohorts of older adults (Seeman, Merkin, Crimmins, & Karlamangla, 2010) or (b) reflect a compression effect (Fries, 1980). Being employed at baseline reduced the odds of onset by 26% and reduced the level of limitation by 0.44 items. For each year of education, the odds of onset decreased by 7%, the level of limitation reduced by .05 items, and growth was slowed overtime. Being married reduced the odds of onset by 13% and the level of limitations by .25 items. Individuals who died over the survey period had substantially earlier onset of limitation, higher levels, and faster acceleration of limitation compared with survivors.

We hypothesized private (employment or market) insurance is one important but underemphasized mechanism through which SES works to promote disparities in health across the life course and may be an important mechanism in racial disparities in functional limitations. Model 2 includes access to employer-provided insurance through one’s self and one’s spouse. When employer-provided insurances were included, the racial disparity in the level of limitation remained significant and decreased by only 3%. The effects of employer-provided insurances were substantial in and of themselves, with those having access to employer-provided insurance at all waves expecting 16%–18% lower odds of limitation onset and .29–.31 fewer limitations across waves (depending on whether coverage came from one’s self or spouse) compared with those with no employer-provided insurance. Increased coverage under one’s spouse, however, increased the acceleration of limitations by .09 limitations. This suggests that although spousal insurance provides an initial benefit, this protective effect wears off over time. Additional analyses (models not shown) show this is indeed the case. The inclusion of employer-provided insurance did not seem to affect the effects of education and marital status substantially, suggesting that the effect of employer-provided insurance in later life is somewhat independent of earlier life course achievements.

Importantly, this model also accounts for differential selection into employer-provided and spousal insurance coverage over time (shown in Model 2 of Table 3). Although African Americans in this sample were more likely to be covered through employer-provided insurance (net of other covariates), they were not statistically different regarding spousal insurance. Not surprisingly, other robust and important predictors of employer and spousal insurance coverage over time included socioeconomic indicators (education, employment status, marital status, income, and assets).

Model 3 includes the impact of market insurance to the equation upon which the previous model was estimated. Although employer-provided and spousal insurances remained highly protective for both the onset and level of functional limitation, those with market insurance at all waves expected 16% lower odds of limitation onset and .39 fewer limitations across waves. Moreover, when all types of private insurance were included, the racial disparity in the level of limitations was reduced by about half compared to Model 2 and became nonsignificant. This suggests that accounting for private health insurance is key in explaining the racial disparity in functional limitations across time and that market insurance is substantially driving this explanation. The selection portion of this equation is shown in Model 3 of Table 3. Here, African Americans were less likely to have private insurance coverage net of other covariates, consistent with previous research on market insurance disparities (Saver & Doescher, 2000; Saver et al., 2003).

Finally, Model 4 includes measures of financial resources over the observation window (income and assets both transformed to the inverse hyperbolic sine) to determine whether the protective effect of insurance remains. Income and assets were both significantly protective for the onset and level of limitations, and their inclusion reduced the effect of education on the level (but not the onset) of limitations to nonsignificance. This suggests early-life achievement remains important for the timing of disability onset, but current financial resources are primary in protecting individuals from trajectories of more severe disability over time (Zimmer & House, 2003; Taylor, 2010). The inclusion of these variables also reduced the impact of private insurance on onset to nonsignificance, but the protective effects of both employer-provided and market insurances remain significantly protective for the level of limitation over time. This suggests that although current financial resources are a
Table 2. Onset, Level, and Growth Models of Functional Limitations

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hazards odds ratio</td>
<td>Intercept</td>
<td>Slope</td>
<td>Hazards odds ratio</td>
</tr>
<tr>
<td>African American</td>
<td>0.984</td>
<td>0.148*</td>
<td>-0.002</td>
<td>0.982</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.907</td>
<td>0.023</td>
<td>-0.046</td>
<td>0.891</td>
</tr>
<tr>
<td>Male</td>
<td>0.616***</td>
<td>-0.234***</td>
<td>-0.040*</td>
<td>0.618***</td>
</tr>
<tr>
<td>Birth year—1931</td>
<td>1.048***</td>
<td>0.054***</td>
<td>-0.017***</td>
<td>1.048***</td>
</tr>
<tr>
<td>Employed W1</td>
<td>0.736***</td>
<td>-0.435***</td>
<td>0.021</td>
<td>0.742***</td>
</tr>
<tr>
<td>Education</td>
<td>0.932***</td>
<td>-0.053***</td>
<td>-0.008**</td>
<td>0.938***</td>
</tr>
<tr>
<td>Currently married</td>
<td>0.866**</td>
<td>-0.259***</td>
<td>-0.005</td>
<td>0.881*</td>
</tr>
<tr>
<td>Mortality</td>
<td>1.980***</td>
<td>0.699***</td>
<td>0.109**</td>
<td>1.996***</td>
</tr>
<tr>
<td>Employer-provided insurance</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.818*</td>
</tr>
<tr>
<td>Spousal insurance</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.839*</td>
</tr>
<tr>
<td>Market insurance</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.837*</td>
</tr>
<tr>
<td>Income (IHS)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.770***</td>
</tr>
<tr>
<td>Assets (IHS)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.953***</td>
</tr>
<tr>
<td>Intercept</td>
<td>—</td>
<td>2.590***</td>
<td>0.166***</td>
<td>—</td>
</tr>
<tr>
<td>Variance</td>
<td>0.999***</td>
<td>0.053***</td>
<td>—</td>
<td>0.986***</td>
</tr>
<tr>
<td>Cov (α, β)</td>
<td>-0.001</td>
<td>—</td>
<td>—</td>
<td>-0.002</td>
</tr>
<tr>
<td>Loglikelihood (npar)</td>
<td>-30,382.9</td>
<td>(43)</td>
<td>—</td>
<td>-33,104.1</td>
</tr>
<tr>
<td>Bayesian Information Criterion</td>
<td>61,138.1</td>
<td>—</td>
<td>—</td>
<td>66,840.2</td>
</tr>
</tbody>
</table>

Notes. References are 'whites'; 'non-Hispanics'; females; 'not employed at wave 1'; 'not currently married'; and 'did not die during the period of observation.

*p < .05, **p < .01, ***p < .001.
primary socioeconomic explanation for persistent inequality in limitation in later life, both employer-provided and market insurances have independent protective effects on this inequality as well.

**DISCUSSION**

Using the 1996–2008 waves of the Health and Retirement Study, we assessed how private insurance coverage explained racial disparities in functional limitations. Results indicated having insurance through one’s own or spouse’s employer was associated with lower odds of onset of limitation and lower levels of limitations across time. Net of employment-based insurances, however, African Americans reported greater levels of limitations that were persistent for more than a decade. After accounting for differences in market insurance, however, there were no significant differences in limitation levels between African Americans and whites. These findings provide several important insights as to how insurance coverage relates to racial disparities in functional limitations in later life.

First, consistent with cumulative inequality, the hypothesis that African Americans would be more likely to experience onset of functional limitations, greater level of initial limitations, and more rapid growth in limitations was generally supported. Although African Americans experienced similar levels of acceleration in limitations after onset compared with whites, consistent with previous work on racial disparities in disability (Kelley-Moore & Ferraro, 2004) the results show, prior to accounting for insurance coverage, African Americans had persistently higher levels of functional limitations. This highlights how positions within a racial status hierarchy can have important and lasting implications for health inequalities.

Second, according to CIT, those who mobilize resources in one domain can potentially limit the exposure to risks of disadvantage in some other domain (Ferraro et al., 2009). In this case, the hypothesis that mobilizing economic resources by purchasing market insurance would reduce risks of onset of functional limitations, lower the levels of, and slower the growth in limitations after experiencing an initial functional limitation was supported. The findings show market insurance was associated with lower risks of onset and lower levels of functional limitations. This suggests mobilizing financial resources into insurance coverage is protective against initial functional limitations and in reducing level of functional limitations. Accordingly, the source of private coverage insurance (employer or spousal vs market) is important for development of functional limitations.

Importantly, however, accounting for differences in market insurance reduced the racial differences in level of limitation to nonsignificance. This suggests that if African Americans had similar access to market insurance as whites, African Americans would not experience persistently higher levels of functional limitations in later life. In this sample, African Americans were substantially less likely to have market insurance (about 8% among African Americans compared with 22% among Whites), and this difference was a key in explaining the racial disparity in limitations. Importantly, because the final model included the effects of income and wealth, as well as the selection pathways from baseline chronic conditions and race to insurance coverage, it is more than just differences in financial resources or prior health conditions that limits African Americans’ ability or decision to purchase market insurance. Though it remains unclear what makes securing market insurance more difficult for African Americans, this highlights the long-lasting health implications of being born into a racial hierarchy.

This finding also extends CIT by suggesting that though people may have comparable resources to potentially mobilize in an effort to offset disadvantage, the mobilization process may be tempered by locations within status hierarchies. That is, because of early-life differences, certain groups may face more difficulty mobilizing resources to attenuate disadvantage in other domains. Here, it appears...
African Americans have more difficulty translating economic resources into market insurance, which might otherwise be associated with lower levels of initial functional limitations after onset. In general, this finding highlights that one of the ways early-life circumstances translate into later life disparities is through a modification of the ability to mobilize resources to limit disadvantage. In the sociological vernacular of the structure and agency dialectic, this finding suggests actors’ abilities to enact their agency are contingent upon the structural location in which they find themselves. Future research should test this proposition with additional data and other health outcomes because if this finding holds true in a variety of circumstances, it has powerful implications for our understanding of the mechanisms underscoring the lasting implications of early-life social positions as they play out over the life course.

It is unclear how a law like the Affordable Care Act would affect racial disparities in functional limitations. Extrapolating from these results, one possibility is that because the relationships between race, insurance, and functional limitations are contingent upon the form of coverage, simply having coverage might not be sufficient to attenuate the health gap between African Americans and whites. That is, unless underinsured African Americans are also securing supplemental coverage, they may continue to experience greater levels of functional limitations than whites. At the same time, another possibility is that if a law like the Affordable Care Act were to incentivize otherwise underinsured African Americans to secure market insurance, their patterns of health insurance may end up looking more similar to whites—thereby potentially reducing racial disparities in functional limitations.

**Limitations and Future Research**

Although our analysis has the benefits of modeling multiple components of disablement trajectories and selection effects into insurance coverage simultaneously, one limitation is the lack of time-varying covariates. Other forms of growth curve models (random effects or HLM) may incorporate time-varying covariates, but unfortunately the additional estimation of the hazard resulted in a necessary listwise deletion of the covariates. Estimation of time-varying covariates, thus, diminished the sample substantially due to attrition. Sensitivity analyses of the outcomes (onset and level of functional limitations) suggest our findings are replicated at least up to a decade, at which point the significant effects of all covariates diminish, likely due to small sample size and selective mortality.

Another key limitation is that, although we are able to document that African Americans have lower rates of market insurance and we account for this, health, and other sources of selection in our models, we are not able to fully test why they have lower rates of market insurance. Prior research has shown these differences persist net of economic differences and may arise because of (a) consumption choices (possibly driven by mistrust of the medical industrial complex) or (b) processes of discrimination or biases in the insurance market place (Pol et al., 2002; Saver & Doescher, 2000; Zuvekas & Taliaferro, 2003). Because we document market insurance (a) has important direct effects on functional limitations—net of SES and other
forms of insurance coverage—and (b) plays an important role in racial disparities in functional limitations, we hope future research will further explore the factors driving the racial differences in market insurance.

**Conclusion**

African Americans experience higher levels of limitation, once they become disabled, over at least a decade of later life. Although employment-based insurances did not fully attenuate the racial gap in functional limitations, the gap was explained away by variation in market insurance coverage. This highlights both the importance of type of private coverage in the relationship between insurance and health and also the important role that coverage differences play in understanding racial disparities in functional limitations.

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**References**


Health and Retirement Study. (2008). *Public use dataset*. Ann Arbor, MI: Produced and Distributed by the University of Michigan with funding from the National Institute on Aging (Grant Number NIA U01AG009740).


