LONGITUDINAL CHANGES IN SELF-REPORTED

EXPECTACTIONS FOR NURSING HOME USE

IN THE HEALTH AND RETIREMENT STUDY

by

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ABSTRACT

The Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973) is a frequently used framework for examining the factors that bear upon the decision to pursue and utilize health services (Andersen & Newman, 1973; Mui, Choi, & Monk, 1998). According to this model, an individual's predisposing characteristics, their enabling resources, and their degree of need combine to determine whether or not they will pursue health services such as nursing home care. The current study investigated the relations between variables predicted by the Behavioral Model of Health Services Use to influence longitudinal expectations for nursing home use among adults 50 years of age and older. Variables of interest were drawn from the 2002-2008 waves of the Health and Retirement Study (HRS) and included demographics, previous health services use, possession of insurance that pays for nursing home care, social support, cognitive status, emotional health, and functional status. Results suggested that the variables selected based upon the Behavioral Model of Health Services Use exhibited a limited ability to predict changes in nursing home use expectations across time. Limitations of the current study, as well as potential areas for future studies, were discussed.

DEDICATION

This dissertation is dedicated to the memory of my grandfather, Alvin Parker, who never failed to take an interest in my education. His curiosity about, and encouragement of, my educational pursuits inspired me to pursue my Ph.D. and, by extension, complete this study.

LIST OF ABBREVIATIONS AND SYMBOLS

HRS	Health and Retirement Study
e.g.	*exempli gratia*, or "for the sake of an example"
AHEAD	Assets and Health Dynamics among the Oldest Old study
%	Per cent
ADL	Activities of Daily Living
IADL	Instrumental Activities of Daily Living
CES-D	Center for Epidemiological Studies Depression scale
BMI	Body Mass Index
n.d.	No date
¶	Paragraph
i.e.	*id est*, or "that is"
NIA	National Institute on Aging
TICS	Telephone Interview of Cognitive Status
CODA	Children of the Depression
WB	War Babies
EBB	Early Boomers
=	Equal to
EPESE	Iowa Established Populations for Epidemiologic Studies of the Elderly
ACL	Americans Changing Lives (ACL) survey

SEM	Structural Equation Modeling
MLR	Maximum Likelihood Estimation with Robust Standard Errors
CFA	Confirmatory Factor Analysis
X^2	Chi-square test: a test of model fit used to determine whether a sample of data came from a population with a specified distribution (Snedecor & Cochran, 1989)
df	Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data
CFI	Comparative Fit Index
TLI	Tucker-Lewis Index
RMSEA	Root Mean Square Error of Approximation
STB	Standardized Beta
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
S.E.	Standard Error
$<$	Less than
R^2	Coefficient of determination: the square of the sample correlation coefficient
F	F-test: determines the likelihood that a sample distribution follows the F-distribution
N	Sample size: the number of respondents included in the reported analysis
ADAMS	Aging, Demographics, and Memory Study
WAIS-R	Wechsler Adult Intelligence Scale-Revised

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1. Introduction

This dissertation uses the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973) as a theoretical framework by which to investigate self-reported expectations for future nursing home use among respondents from the 2002-2008 waves of the Health and Retirement Study (HRS). First, relevant background literature is reviewed. Second, the significance of the current study is explained. Third, hypothesized relations between variables of interest are offered. Fourth, the sample and variables of interest of the current study are described. Finally, the specific methodological approach of this study will be detailed, the results of the analyses will be described, and the implications of the results will be discussed.

Background

The Behavioral Model of Health Services Use. The Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973; see Figure 1) is a frequently used framework

Figure 1. Behavioral Model of Health Services Use.
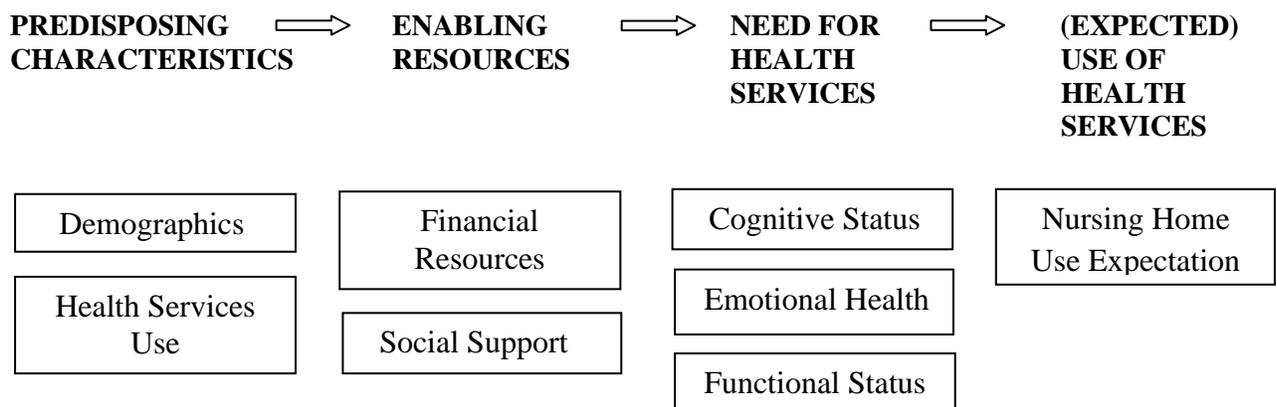
PREDISPOSING ⟹ **ENABLING** ⟹ **NEED FOR** ⟹ **(EXPECTED)**
CHARACTERISTICS   **RESOURCES**   **HEALTH**   **USE OF**
                                           SERVICES   **HEALTH**
                                                             SERVICES

| Demographics | Financial Resources | Cognitive Status | Nursing Home Use Expectation |

| Health Services Use | Social Support | Emotional Health | |

| | | Functional Status | |

for examining the factors that bear upon the decision to pursue and utilize health services (Andersen & Newman, 1973). In its earliest, most basic form, the model proposes that an

individual's use of health services is driven by three types of factors. Predisposing characteristics, or those traits that make an individual inclined to use health services, make up the first type of factors included in the Andersen (1968) model (Andersen & Newman, 1973; Greene & Ondrich, 1990). Demographic traits such as age and gender, social structure variables including interpersonal interactions and culture, and health beliefs all fall under the umbrella of predisposing characteristics (Andersen, 1995). Enabling resources, or those individual- and community-level factors that facilitate an individual's use of health services, are included as the second group of variables within the Andersen (1968) model. Examples of enabling resources include financial resources (such as the possession of insurance), access to and the availability of health resources, and the existence of social relationships (Andersen, 1995). An individual's need for health services, as explained by their health beliefs and social situation, represent the third type of factors that predict health services use and might include perceived and/or evaluated need for health services (Andersen, 1995).

Predisposing Characteristics. In keeping with the Andersen (1968) model, previous research has generally supported the premise that demographic attributes serve as predisposing characteristics that influence health services–and in particular, nursing home use. Studies by Akamigbo and Wolinsky (2006); Cai, Salmon, and Rodgers (2009); Lindrooth, Hoerger, and Norton (2000); Murtaugh, Kemper, and Spillman (1990); and others have consistently found a positive correlation between older age and likelihood for nursing home placement. While some studies (e.g., Cai, Salmon, & Rodgers, 2009; Kersting, 2001) have found female gender to be associated with decreased risk of nursing home use, most others (e.g., Greene & Symons, 1983;

Hanley, Alecxih, Wiener, & Kennell, 1990; Wolinsky, Callahan, Fitzgerald, & Johnson, 1992) have contested this result, with men being less likely to enter a nursing home than women. The increased rates at which women enter nursing homes hold true, even when controlling for marital status (Lindrooth, Hoerger, & Norton, 2000). In one study, Akamigbo and Wolinsky (2006) found that being married served as a protective factor against nursing home admission, while in another study (Akamigbo & Wolinsky, 2007), they concluded that marital status was associated with decreased risk of nursing home placement for Caucasian, but not African American, respondents. Educational achievement was negatively related to the risk of nursing home placement according to Lindrooth, Hoerger, and Norton (2000), and while Akamigbo and Wolinsky (2007) found similar results, this correlation was only significant among Caucasian (as opposed to African American) respondents. Relations have also been found between race and nursing home use. Cai, Salmon, & Rodgers (2009) reported that being Hispanic or African American reduced the risk for nursing home admission, and Akamigbo and Wolinsky (2007) noted that African Americans were less likely than Caucasians to make use of nursing home services, despite increases in the availability of such facilities. In support of these findings, Himes, Hogan, and Eggebeen (1996) pointed to the exceptional familial bonds that exist between many Hispanic family members, while McInnis-Dittrich (2005) highlighted the increased likelihood for both Hispanic and African American individuals to make use of family caregiving. Moreover, Schmid and colleagues (2010) found that African American families displayed greater prospective treatment preference agreement than Caucasian families (Schmid, Allen, Haley, & DeCoster, 2010). Headen (1992) attributed the lower rates of nursing home use among African

Americans to different degrees of access to nursing homes, cultural factors, and geographical considerations, while others (e.g., Dilworth-Anderson, Goodwin, & Williams, 1999; Rosenthal, 1986) emphasized the African American social norm in which women traditionally provide care and assistance for aged or disabled family members. Other studies (Akamigbo & Wolinsky, 2006; Davis & Lapane, 2004; Engle & Graney, 1995; Falcone & Broyles, 1994; Greene & Ondrich, 1990; Kemper & Murtaugh, 1991; Mui & Burnette, 1994; Wallace, Levy-Storms, Kington, & Andersen, 1998; Wolinsky et al., 1992) have also found lower rates of nursing home use among African Americans, despite the tendency for older African Americans to be in poorer health than their older Caucasian counterparts.

Evidence that demographic characteristics influence the likelihood of future nursing home placement among individuals with dementia, however, is mixed. Being older, of female gender, and unmarried (Gaugler, Kane, Kane, Clay, & Newcomer, 2003), as well as being of non-Caucasian (Gaugler et al., 2003) or of either Black or Hispanic ethnicity (Yaffe et al., 2002) have been found to be associated with lower rates of nursing home use among individuals with dementia. These findings, however, were not supported by a literature review conducted by Gaugler, Yu, Krichbaum, and Wyman (2009), who concluded that demographic characteristics were not consistently related to nursing home admission among individuals with dementia. Of the studies included in this literature review, from 59.5 to 80.0 percent reported nonsignificant relations between age or gender and nursing home admission, while a majority of studies found inconclusive relations between race or ethnicity and use of nursing home services (Gaugler et al., 2009).

Enabling Resources. In concert with a given individual's predisposing characteristics, the resources to which they have access may also influence their likelihood of utilizing health services (Andersen, 1968; Andersen & Newman, 1973). Financial resources, such as greater assets, higher income, or possession of insurance that will cover long-term care expenses, represent one of the most pertinent types of enabling resources. Holden, McBride, and Perozek (1997), however, suggest that the relations between financial resources and long-term care decision making are not entirely understood. Cai, Salmon, and Rodgers (2009) concluded that owning a home was correlated with a decreased likelihood of entering a nursing home. On the other hand, Gaugler and colleagues' (2009) systematic review of factors that predict nursing home admission among individuals with dementia found that most studies have reported nonsignificant correlations between income and nursing home placement. Gure, Kabeto, and Langa (2009) reported that among older adults with a low risk of nursing home placement, there was no difference in nursing home use between those who did or did not have a long-term care insurance policy.

Other enabling resources have also been found to correlate with nursing home placement. For example, a negative correlation has been found between social support, as measured by the number of individuals living in an individual's household (Akamigbo & Wolinsky, 2007), having children (Akamigbo & Wolinksy, 2006; Reschovsky, 1996), or having others who provide help and assistance (Akamigbo & Wolinsky, 2006) and risk for nursing home placement. Cai, Salmon, & Rodgers (2009) found a positive relation between living alone and entering a nursing home, while Gaugler and colleagues (2009) reported that a majority of studies have not

found living alone to be a significant predictor of nursing home placement among individuals with dementia.

Need for Health Services. Even after predisposing characteristics and enabling resources are considered, the factors which most directly influence whether or not an individual will utilize health services are those that represent the person's need for such services (Andersen, 1968; Andersen & Newman, 1973). In the realm of long-term care, variables such as cognitive status, functional status, and emotional status have been found to most consistently predict nursing home placement (Gaugler et al., 2009; Holden, McBride, & Perozek, 1997).

Among older adults, cognitive impairment is a serious problem that negatively influences the risk of nursing home placement. Akamigbo and Wolinsky (2006) and Cai, Salmon, and Rodgers (2009) reported that good cognitive function is related to decreased likelihood of nursing home use. Additionally, Gaugler and colleagues (2009) revealed that, among individuals with dementia, both degree of cognitive impairment and a diagnosis of Alzheimer's disease were significantly associated with the risk of nursing home placement in a majority of included studies.

A variety of studies (e.g., Agüero-Torres et al., 1998; Blaum, Ofstedal, & Liang, 2002; Gill, Williams, Richardson, Tinetti, 1996, as cited in Wang, van Belle, Kukull, & Larson, 2002; Greiner, Snowdon, & Schmitt, 1996; Hébert, Brayne, & Spiegelhalter, 1999; Leveille et al., 1998, as cited in Raji, Ostir, Markides, & Goodwin, 2002; Moritz, Kasl, & Berkman, 1995; Stuck et al., 1999; Wang, van Belle, Kukull, & Larson, 2002) have also documented the positive relations between declines in cognitive status and functional status. For example, Blaum,

Ofstedal, & Liang (2002) reported that among Assets and Health Dynamics among the Oldest Old (AHEAD) study participants, measurements of functioning difficulty and disability, as well as rates of most diseases and disorders, were highest among respondents who also exhibited low cognitive performance. They went on to conclude that between 20 and 40 percent of the functional deficits experienced by older adults can be attributed to low cognitive performance, over and above the influence of demographic characteristics, level of education, or current health status. Gallo, Schoen, and Jones (2000) found that including cognitive impairment within the overall definition of impairment (which traditionally includes only deficits in activities of daily living and instrumental activities of daily living) resulted in an increase in the number of Baltimore Epidemiologic Catchment Area participants who were defined as disabled, as well as an increase in the number of years of impairment experienced by these individuals. Gallo et al. (2000) concluded that current functional measures, which do not include measures of cognitive functioning, may overestimate active life expectancy as cognitively impaired participants in their study exhibited decreases in active life expectancy of one and two years for men and women, respectively.

Cognitive impairment is additionally related to poor emotional health. According to Blaum, Ofstedal, and Liang (2002), however, the direction of causation between these two factors is uncertain. In their cross-sectional analysis of AHEAD data, Blaum and colleagues (2002) found that low cognitive performance and depressive symptoms were comorbid in 12.2% of study respondents. Additionally, Gaugler and colleagues (2009) found that the impairment in cognitive status caused by dementia is positively related to both increased likelihood of nursing

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home care and declines in emotional health. They additionally concluded that individuals with

dementia who had more severe levels of cognitive impairment, a diagnosis of Alzheimer's

disease, declines in activities of daily living (ADL) skills, behavioral problems, or depression

were most likely to require nursing home care (Gaugler et al., 2009).

As suggested by Gaugler and colleagues (2009), poor emotional health negatively

impacts functional status. Findings from a longitudinal analysis of Seattle-area Group Health

Cooperative members by Wang, van Belle, Kukull, and Larson (2002) agree with this

contention, as they revealed a positive association between depression and decreased functional

ability. The influence of poor emotional status on functional status may be even stronger when

coupled with cognitive impairment. In a prospective cohort study of older Mexican American

adults, Raji, Ostir, Markides, and Goodwin (2002) found that participants with depressed affect

performed more poorly than did participants who did not exhibit depressive symptoms on

measures of physical performance at two-year follow-up. Raji and colleagues (2002) also found

that participants with both cognitive impairments and depressed mood exhibited significantly

greater physical impairment at two-year follow-up than individuals with cognitive impairments

alone and nondepressed mood. Of course, the relation between poor emotional health and poor

functional status may be bidirectional. According to a longitudinal analysis of HRS data

conducted by Choi and Bohman (2007), respondents' scores on the Center for Epidemiological

Studies Depression (CES-D) scale in 2000 were significantly predicted by health and disability

status in 1998, even after controlling for CES-D scores in 1998.

Functional status is another factor that contributes to the likelihood of requiring nursing home care. Akamigbo & Wolinsky (2006) reported that difficulties with activities of daily living (ADLs) and instrumental activities of daily living (IADLs) were important factors that increase an individual's probability of entering a nursing home, and Cai, Salmon, and Rodgers (2009) found the same relation between IADL declines and nursing home admission. Additionally, Gaugler and colleagues (2009) concluded that 60% of studies reported a significant relation between ADL declines and nursing home use among individuals with dementia. According to a systematic literature review by Stuck, Walthert, Nikolaus, Büla, Hohmann, and Beck (1999), numerous factors lead to declines in functional status among community-dwelling older adults, including two of the strongest contributors—cognitive impairment and depression. Other factors reported in the literature to decrease functional status included disease comorbidity, high or low (as opposed to moderate) Body Mass Index (BMI) scores, functional impairment of the lower extremities, decreased rate of social contact, decreased amounts of physical activity, abstinence from (as opposed to moderate use of) alcohol, poor self-perceived health, smoking, and impaired vision.

Outcome Variable. It is predicted that all of the factors listed above (i.e., demographics, possession of insurance, social support, cognitive status, emotional health, and functional status) contribute to respondents' longitudinal expectations regarding future nursing home entry. In fact, expectations for nursing home use appear to approximate actual risks of utilizing nursing home services (Lindrooth, Hoerger, and Norton, 2000), demonstrating that individuals somehow appear to utilize data about their own risk for nursing home placement and integrate this

information into their personalized expectations of nursing home use. For example, men and women have different likelihoods of entering a nursing home, and these gender-based differences are reflected in respondents' self-reported nursing home use expectations (Holden, McBride, Perozek, 1992). Further support for the predicted relations between risk factors and nursing home expectations is offered by Akamigbo and Wolinsky (2006), who found that age, gender, educational attainment, geographic region of residence, social support, income, Medicaid coverage, self-rated health, incontinence, and cognitive function all served to discriminate respondents who estimated their expectations for future nursing home placement at between 11 and 50 percent from those who rated their likelihood of nursing home use at zero percent.

Of particular interest is the relation between cognitive status and longitudinal expectations for future nursing home use. Few studies have investigated the links between changes in cognitive status and subsequent shifts in expectations for nursing home use. In fact, the aforementioned result from Akamigbo and Wolinsky (2006) is one of the only pieces of evidence supporting a link between poor cognitive status and expectations for nursing home use, and this finding was drawn from a cross-sectional analysis. It is possible that, as an individual's cognitive status declines across time, they might correctly view this decline as indicative of an increased risk for nursing home placement and alter their expectations for future nursing home use accordingly. This, however, is not the only (or even the most likely) scenario. Snow et al. (2005) found that older adults with dementia underreported their level of impairment relative to a clinician's report, and results from a study by Graham, Kunik, Doody, and Snow (2005) suggest

that individuals with Alzheimer's disease overestimated their performance on particular cognitive activities.

The results from these studies are reflective of the tendency among individuals with dementia to experience anosognosia, or disordered awareness of their disease and the impairments it causes (Cosentino & Stern, 2005). Diminished awareness is frequently exhibited by individuals with cognitive impairment, with up to 81% of individuals with Alzheimer's disease (Smith et al., 2000; as cited in Cosentino & Stern, 2005) and 60% of individuals with Mild Cognitive Impairment (Vogel et al., 2004, as cited in Cosentino & Stern, 2005) displaying signs of anosognosia. When intact, awareness spans a range of functions, from the more basic (such as arousal and awareness) to the more complex (such as monitoring events, assessing one's surroundings, and evaluating one's actions; Clare, 2010). In order to achieve more complex levels of awareness, however, one may need to call upon metamemory (Cosentino & Stern, 2005), or the ability to engage in self-monitoring while simultaneously incorporating beliefs and knowledge (Bieman-Copland & Charness, 1994; Perfect & Stollery, 1993; as cited in Clare, Whitaker, & Nelis, 2010). Individuals with dementia have often been found to experience difficulties in implementing metamemory to engage in more advanced forms of awareness, resulting in the use of outdated personal information to make self-evaluations and judgments regarding future performance (Graham et al., 2005), and this same pattern is expected to emerge when individuals with cognitive impairments rate their need for future nursing home placement. As a result, individuals experiencing declines in cognitive status across time may in fact underestimate their future nursing home need.

Another way to explain the manner in which cognitive decline potentially impacts expectations for future nursing home use might be to say that cognitive impairment decreases self-concept clarity. The idea of self-concept clarity is based upon the notion that people differ with regards to (a) what they think about themselves, (b) how clear and confident they are about these ideas, and (c) how these ideas are composed and retained in memory (Baumgardner, 1990; Burger & Guadagno, 2003; Campbell, 1990; Campbell & Lavallee, 1993; Campbell et al., 1996; Guadagno & Burger, 2007; Nezlek & Plesko, 2001; Setterlund & Niedenthal, 1993). As Graham and colleagues (2005) noted, individuals with dementia often base what they think about themselves upon information that was accurate in the past but is no longer relevant. The possession and utilization of such outdated ideas leads to decreases in self-concept clarity among individuals with dementia, resulting in a heightened risk that their estimations of future possibilities and risks will also be outdated and incorrect.

The notion of diminished self-concept clarity as an explanation for the impact of cognitive impairment on nursing home expectations may be contrasted to that of expectancy confirmation (Darley & Fazio, 1980). Closely related to Merton's (1948) self-fulfilling prophesy, expectancy confirmation posits that individuals develop expectations about other people (or objects or ideas), act in ways that are congruent with these expectations, and receive feedback that appears to confirm the validity of their original expectations. With regards to nursing home expectations, then, expectancy confirmation may come into play when individuals form an opinion about whether or not they will require future nursing home care, and then behave in ways that will attenuate or exacerbate their risk factors for needing such care, which

would then move them closer to fulfilling their original expectations. In the event that an individual is experiencing cognitive decline, however, this process becomes less clear. Perhaps, as noted above, an individual with dementia would think about himself or herself based upon outdated information (Graham et al., 2005), which would probably suggest a lower need for care. If this is the case, expectancy confirmation would suggest that the individual with dementia would then act in ways that are congruent with the expectation that they will not require nursing home care, or at best, require a level of care lower than that provided by a nursing home. Expectancy confirmation, however, would not account for the likelihood that other individuals who are aware of the individual's cognitive impairment (e.g., caregivers) would almost certainly provide feedback suggestive of the need for a higher level of care, such as nursing home care. As a result, it would appear that diminished self-concept clarity may provide a better explanation than expectancy confirmation for the impact of cognitive impairment on nursing home expectations.

Significance

Self-rated expectations of nursing home use are an important research topic for several reasons. First, expectations regarding the need for future nursing home care may explain the manner in which older individuals plan, or fail to plan, for end-of-life care. It has been noted that older adults rarely purchase long-term care insurance (Lindrooth, Hoerger, & Norton, 2000), despite the fact that nursing home care is both costly and relatively commonplace (Norton & Newhouse, 1994; Sloan & Norton, 1997; Norton, 2000). As a result of the reluctance or inability to acquire such nursing home coverage, approximately 62% of the nearly $90 billion dollars

spent annually on nursing home admissions in the United States is publicly financed (American Geriatric Society Foundation for Health in Aging, n.d.), According to Holden, McBride, & Perozek (1997), if people who are at risk of requiring nursing home care recognize this need well before it becomes imminent, they may purchase long-term care insurance or save money to pay for the care they require. Alternately, if individuals who have the greatest likelihood of entering a nursing home do not form expectations regarding this event, even financial incentives may not encourage them to prepare for the costs of long-term care.

Second, this study is of significance because it uses the Behavioral Model of Health Services Use (Andersen 1968; Anderson & Newman, 1973) and employs longitudinal analyses to investigate the relations between factors that predict health care utilization and self-rated expectations of nursing home use among adults 50 years of age and older. While other studies have explored the relations between predictors of health care utilization and self-rated expectations for nursing home use (e.g., Akamigbo & Wolinsky, 2006; Holden, McBride, & Perozek, 1992; Lindrooth, Hoerger, & Norton, 2000), these studies have largely been cross-sectional in nature or have at best utilized data from only two time points. The current study is distinguished from these previous efforts as it makes use of four waves of HRS data. Including four time points in the longitudinal analyses conducted for the current study is expected to allow for the dynamic interplay between factors that influence, and are influenced by, self-rated expectations for nursing home use in a way that cross-sectional studies or studies utilizing fewer waves of data cannot examine. The current study will not, however, be capable of comparing respondents' nursing home expectations (as investigated by Akamigbo & Wolinsky, 2006;

Holden, McBride, & Perozek, 1992; Lindrooth, Hoerger, & Norton, 2000) with their actual rates of admission into nursing home facilities according to proxy data collected during exit interviews. All of the respondents in the current study will be community dwelling adults across all four waves (i.e., 2002, 2004, 2006, 2008) of the study. For this reason, none of the respondents will be residing in nursing homes at the time of the 2008 data collection wave.

Hypotheses

With the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973) serving as a theoretical framework (see Figure 1) , the primary aim of the current study is to investigate the relations between variables that predict longitudinal expectations for nursing home use among adults 50 years of age and older. Variables for analysis will be drawn from the HRS.

Hypotheses were tested using longitudinal data from the HRS, a nationally-representative sample of more than 22,000 Americans age 50 years and older and their spouses (Health and Retirement Study, n.d., About the Health and Retirement Study, ¶ 1; Smith, Taylor, & Sloan, 2001).

Predisposing Characteristics:

(1)   Older respondents will have higher expectations for future nursing home use than younger respondents, and expectations for future nursing home use are predicted to increase more quickly with advancing age.

(2)   Across time, female respondents will have higher expectations for future nursing home use than male respondents.

(3)   Across time, respondents with lower levels of educational attainment will have

        higher expectations for future nursing home use than respondents with higher

        levels of educational attainment.

(4)   Across time, Caucasian respondents will have higher expectations for future

        nursing home use than respondents of other races (e.g., African Americans,

        Hispanics/Latinos, and Asian Americans).

(5)   Across time, respondents who have made use of health services (including

        hospitalization, nursing home admission, outpatient surgery, home health services,

        or other health services) within the previous 24 months will have higher

        expectations for future nursing home use than respondents who have not made use

        of such health services within the previous 24 months.

Enabling Resources:

(6)   Across time, respondents who do not have insurance that pays for long-term care

        (i.e., those without long-term care insurance/Medicaid/Medicare) will have higher

        expectations for future nursing home use than respondents with insurance that

        pays for long-term care. This is because individuals with such insurance may be

        able to pay for alternative forms of care, such as home health or assisted living

        services.

(7)   Across time, respondents with lower levels of social support (i.e., lacking access

        to someone who can assist them with activities of daily living) will have higher

expectations for future nursing home use than respondents with higher levels of social support.

Need for Health Services:

(8)   Across time, respondents with lower levels of objective and/or self-rated cognitive status will have higher expectations for future nursing home use, while respondents with higher levels of objective and/or self-rated cognitive status will have lower expectations for future nursing home placement.

(9)   Across time, decreases in emotional health will result in increasingly higher expectations for future nursing home use (i.e., an "increased slope" of expectation).

(10)   Across time, decreases in functional status (i.e., with activities of daily living or instrumental activities of daily living impairments) will result in increasingly higher expectations for future nursing home use (i.e., an "increased slope" of expectation).

2. Method

Sample

The current study utilizes data from the HRS collected between 2002 and 2009 (See Figure 2). The HRS is supported by the National Institute on Aging (NIA U01AG009740) and the Social Security Administration and contains data pertaining to physical and mental health, insurance coverage, financial status, family support systems, labor market status, and retirement planning. It is a nationally-representative sample of older Americans and their spouses (Health and Retirement Study, n.d., About the Health and Retirement Study, ¶ 1; Smith et al., 2001) and is stratified to oversample African Americans, Hispanics, and Florida residents (Siegel et al.,

Figure 2. Data Collection Path.

		2002	2003	2004	2005	2006	2007	2008
Sample	HRS	→		→		→		→
	CODA	→		→		→		→
	WB	→		→		→		→
	EBB					→		→
Crosswave Tracker		◯		◯		◯		2008

Abbreviation Key	Notes:
CODA – Children of the Depression (1923 – 30) WB – War Babies (1942 – 47) EBB – Early Boomers (1948 – 53)	= → initial interview year for cohort

Note. This figure adapted from http://hrsonline.isr.umich.edu/images/gif_1.gif.

2003; Smith et al., 2001). Data was originally collected from HRS respondents in one of two ways: through a face-to-face interview, or through an interview with a proxy. Later waves of data collection were completed using telephone follow-up (Smith et al., 2001).

In the current study, HRS data pertaining to the variables of interest were available for 1,487 respondents across all four waves (i.e., 2002, 2004, 2006, and 2008). These 1,487 respondents ranged in age from 63-98 years and had a mean age of 76.03 years. Seventy percent of these respondents were female. The majority (86.8%) of these respondents were Caucasian, with 11.8% reporting their race as African American and the remaining 1.4% reporting that they were of another race. Most (94.9%) respondents were not of Hispanic ethnicity; only 5.1% of respondents in the current study were of Hispanic ethnicity, with 3.3% of the sample reporting that they were Mexican American and the remaining 1.8% of respondents reporting that they were of another Hispanic heritage (e.g., Cuban American).

Predictor Variables

The variables included in the current analyses are as follows and were drawn from the HRS based upon the theoretical framework provided by the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973). For more information about the variables included in the current analyses, please see Table 1.

Predisposing Characteristics. Variables that reflect respondents' demographic characteristics include those pertaining to age, years of education, gender, and race/ethnicity. Respondents' ages at baseline, as well as their years of education, were included as continuous variables. Respondents' gender was coded as a dichotomous variable (i.e., male or female).

Table 1. Variables of Interest in the HRS.

Variable Name	Description of Variable
HAGE, JAGE, KAGE, LAGE	Respondent's age when administered the 2002, 2004, 2006, and 2008 HRS interview, respectively
SCHLYRS	Respondent's years of education
GENDER	Respondent's gender
RACE	Respondent's race
HISPAN	If respondent self-identified as being Hispanic, into which Hispanic group (e.g., Mexican) would they be categorized?
HN099, JN099, KN099, LN099	In the last two years, have you been a patient in a hospital overnight?
HN114, JN114, KN114, LN114	In the last two years, have you been a patient overnight in a nursing home, convalescent home, or other long-term health care facility?
HN134, JN134, KN134, LN134	In the last two years, have you had outpatient surgery?
HN189, JN189, KN189, LN189	In the last two years, has any medically-trained person come to help you, yourself?
HN202, JN202, KN202, LN202	In the last two years, did you use any special facility or service which we haven't talked about?
HN001, JN001, KN001, LN001	Are you currently covered by Medicare health insurance?
HN004, JN004, KN004, LN004	Are you covered under Part B of Medicare?
HN006, JN006, KN006, LN006	Are you currently covered by (Medicaid / [STATE NAME FOR MEDICAID])?
HG015, JG015, KG015, LG015	Does anyone ever help you dress?
HG020, JG020, KG020, LG020	Does anyone ever help you get across a room?
HG022, JG022, KG022, LG022	Does anyone ever help you bathe?
HG024, JG024, KG024, LG024	Does anyone ever help you eat?
HG029, JG029, KG029, LG029	Does anyone ever help you get in or out of bed?
HG031, JG031, KG031, LG031	Does anyone ever help you use the toilet?
HD101, JD101,	Respondent's self-rated memory

KD101, LD101	
HD170, JD170, KD170, LD170	Respondent's score (range = 0-10) on 10 items drawn from the Telephone Interview for Cognitive Status (TICS)
HD174, JD174, KD174, LD174	Number of words correctly remembered in an immediate memory task administered during 2002, 2004, 2006, and 2008, respectively
HD184, JD184, KD184, LD184	Number of words correctly remembered in a delayed memory task administered during 2002, 2004, 2006, and 2008, respectively
HD110, JD110, KD110, LD110	You felt depressed.
HD111, JD111, KD111, LD111	You felt that everything you did was an effort.
HD112, JD112, KD112, LD112	Your sleep was restless.
HD113, JD113, KD113, LD113	You were happy.
HD114, JD114, KD114, LD114	You felt lonely.
HD115, JD115, KD115, LD115	You enjoyed life.
HD116, JD116, KD116, LD116	You felt sad.
HD117, JD117, KD117, LD117	You could not get going.
HD118, JD118, KD118, LD118	You had a lot of energy.
HG014, JG014, KD014, LG014	Because of a health or memory problem do you have any difficulty with dressing, including putting on shoes and socks?
HG016, JG016, KG016, LG016	Because of a health or memory problem do you have any difficulty with walking across a room?
HG021, JG021, KG021, LG021	Because of a health or memory problem do you have any difficulty with bathing or showering?
HG023, JG023, KG023, LG023	Because of a health or memory problem do you have any difficulty with eating, such as cutting up your food?
HG025, JG025, KG025, LG025	Because of a health or memory problem do you have any difficulty with getting in or out of bed?
HG030, JG030, KG030, LG030	Because of a health or memory problem do you have any difficulty with using the toilet, including getting up and down?
HG041, JG041, KG041, LG041	Because of a health or memory problem, do you have any difficulty preparing a hot meal?

HG044, JG044, KG044, LG044	Because of a health or memory problem, do you have any difficulty with shopping for groceries?
HG047, JG047, KG047, LG047	Because of a health or memory problem, do you have any difficulty with making phone calls?
HG050, JG050, KG050, LG050	Because of a health or memory problem, do you have any difficulty taking medications
HG059, JG059, KG059, LG059	Because of a health or memory problem, do you have any difficulty with managing your money, such as paying your bills and keeping track of expenses?
HP032, JP032, KP032, LP032	Respondent's self-rated expectation (as a percent chance) of moving into a nursing home within the next 5 years

Despite the fact that the HRS oversampled for African American respondents, the number of racial and ethnic minority participants was very small, so respondents' self-reported race (i.e., Caucasian, African American, American Indian, Alaska Native, Asian, Native Hawaiian, Pacific Islander, or something else) was included as dichotomous variables (i.e., Caucasian versus any other race). Additionally, self-reported hospital admissions and nursing home stays within the previous two years were coded as two dichotomous variables (i.e., yes or no).

Enabling Resources. Variables that measure possession of insurance include those that ask about possession of or participation in Medicaid, Medicare, and long-term care insurance. Participation in Medicaid, Medicare, or Medicare Part B was included by way of three dichotomous variables (i.e., yes or no). Possession of long-term care insurance that covers nursing home care and/or in-home personal or medical care was coded as a separate dichotomous variable (i.e., yes or no).

Variables tapping into social support assess whether respondents have other individuals in their social circles to whom they can turn for help and assistance. Whether respondents have other individuals in their social circles to whom they could turn for help and assistance was assessed by way of six questions asking whether anyone helps the respondent dress, get across a room, bathe, eat, get into or out of bed, or use the toilet. Responses to each item were coded as dichotomous variables (i.e., yes or no) that indicate whether or not the respondent has access to other individuals who are able to provide such help.

Need for Health Services. Variables that measure the latent variable "need for health services" represent three separate constructs: cognitive status, emotional health, and functional status. According to Ofstedal, Fisher, and Herzog (2005), cognitive functioning had rarely been investigated among a larger, nationally representative sample of older adults prior to the creation of the HRS. As a result, the influence of cognitive impairment on daily functioning is still not well understood. Assessing cognitive status, therefore, represented a vital factor during the construction of the HRS (Ofstedal et al., 2005). Unfortunately, the paucity of previous research provided few examples of the types of measures to be included in the surveys (Ofstedal et al., 2005). HRS developers turned to literature from the fields of psychology and geriatrics, using previous studies and measures including the Mini-Mental State Exam (Folstein, Folstein, and McHugh, 1975), the Short Portable Mental Status Questionnaire (Pfeiffer, 1975), an Australian community study (Christensen et al., 1994), and the Swedish Twin Study of Aging (Nesselroade et al., 1998), as guidance in the development of their measures (Ofstedal et al., 2005).

Cognitive status was measured both subjectively and objectively in the HRS. For the current study, subjective cognitive status was measured by asking respondents, "How would you rate your ability to think quickly at the present time?" Responses were coded on a 5-point Likert-type scale, with 1 meaning "excellent" and 5 meaning "poor." Objective cognitive status, on the other hand, was measured in the current study in two different ways. First, respondents were presented with 20 words and they were prompted to recall these words immediately and after a delay. The total number of words remembered by respondents under both immediate and delayed recall conditions was coded as two separate continuous variables. Second, respondents were given 10 questions drawn from the modified Telephone Interview of Cognitive Status (TICS) (Brandt et al., 1993). These questions required respondents to count backwards; recall the current day, month, year, and day of the week; provide the name for two described objects, and give the names of the current United States President and Vice President. Higher scores were indicative of greater cognitive impairment, with correct responses earning a score of "1" and incorrect responses earning a score of "2". The sum score for these 10 items (range = 0-20) was then coded as a continuous variable. Together, these three scores (i.e., number of words recalled immediately, number of words recalled after a delay, total score for the 10 TICS items) represented a respondent's objective cognitive status.

Due to the relative lack of national studies evaluating cognitive status, it was difficult for the developers of the HRS cognitive measures to benchmark survey distributions against those found in earlier studies. When the HRS cognitive functioning items were compared to those included in the 1982 Iowa Established Populations for Epidemiologic Studies of the Elderly

(EPESE), 1986 Americans Changing Lives (ACL) Survey, and the 1993 AHEAD, however, there was notable consistency across studies (Ofstedal et al., 2005). A more in-depth exploration of the quality of the HRS cognitive functioning items was evaluated by Herzog and Wallace (1997), who revealed a somewhat complex two-factor structure (i.e., a memory factor and a mental status factor) with positive relations between cognitive performance and health, education, and age. Herzog and Wallace (1997) additionally concluded that the HRS cognitive functioning measures possess acceptable psychometric properties (despite lower than expected reliabilities, which fall between .58 and .64) (Ofstedal et al., 2005).

As a multifaceted construct that is difficult to define or measure, emotional health is a challenge to assess by way of a survey such as the HRS (Steffick, 2000). For the current investigation, emotional health was evaluated using respondents' answers to HRS questions drawn from the Center for Epidemiologic Studies-Depression (CES-D; Radloff, 1977) scale. The CES-D scale contains 20 items derived from previous depression measures such as Minnesota Multiphasic Personality Inventory (Dahlstrom and Welsh, 1960) depression subscale and those developed by Beck, Ward, Mendelson, Mock, and Erbaugh (1961); Zung (1965); and Raskin, Schulterbrandt, and Reating (1967). The CES-D was designed for inclusion in larger data collection efforts and was intended to calculate the rate of depressive symptoms throughout the general population (Radloff, 1977). The CES-D is a well-established scale that has been utilized to measure affective symptoms in many previous studies and found to exhibit high internal consistency (Radloff, 1977). Due to the time restraints imposed by the administration of

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an already lengthy survey, only 11 of the 20 CES-D items were included in the first wave of the

HRS, and this number was further reduced to eight for subsequent HRS waves. The eight

CES-D questions utilized in the HRS query respondents about the presence of symptoms linked

to depression (e.g., restless sleep, sadness, loneliness).

Much like the full 20-item CES-D, responses to the eight CES-D questions included in

the HRS may be assigned a value from zero to three (with "none of the time" worth zero, "some

of the time" worth 1, "most of the time" worth 2, and "all of the time" worth 3 points and

positively-worded items "reverse-scored") or, as in the current study, they may be coded

dichotomously (with responses that do not reflect depressive symptoms worth zero points and

responses indicative of the presence of depressive symptoms worth 1 point). A total score

ranging from zero to 24 (or, from zero to 8 when responses are coded dichotomously) may then

be derived for the eight-item CES-D by summing the points earned by each response, with high

scores indicating greater symptoms of depression. Various researchers have also adopted other

scoring approaches, such as assigning differential weights to the various CES-D questions, and

as a result, there does not appear to be a uniformly agreed upon cutoff score indicating

significant depressive symptomatology for research purposes. Nevertheless, the abbreviated

CES-D included in the HRS demonstrates good internal consistency and construct validity

(Steffick, 2000). Additionally, Cronbach's alphas ranging from .77 to .83 reflect good reliability

for the eight CES-D items utilized in the HRS (Steffick, 2000).

Unlike cognitive functioning or emotional status, the evaluation of physical functioning

has been a staple of most large-scale studies involving older adults (Fonda & Herzog, 2004).

Examples of previous surveys that have measured functional status include the EPESE, the

National Health Interview Survey, and the National Long-Term Care Survey Supplement on

Aging (Wiener, Hanley, Clark, & Van Nostrand, 1990, as cited in Fonda & Herzog, 2004). In

the HRS, functional status was measured using six items related to activities of daily living (i.e.,

eating, toileting, bathing, dressing, transferring, and walking across a room) and five items

related to instrumental activities of daily living (i.e., preparing meals, grocery shopping, using

the telephone, managing medications, and managing finances). An exploratory factor analysis

conducted by Wallace and Herzog (1995) revealed that these items reflect three domains: (1)

mobility, (2) strength, and (3) difficulty with ADLs. Cronbach's coefficient alphas of .70 - .92

for most of the physical functioning scales (except an experimental scale used in the 1992 HRS

data collection wave, which had a Cronbach's alpha of .60) reflect a fair degree of reliability.

Moderate inter-factor correlations between the physical functioning variables ranging from .19 to

.55 suggest that the factors are distinct from each other yet still might reflect a latent, second-

order factor of overall functional status (Fonda & Herzog, 2004). In the current study, responses

to the functional status questions asking whether respondents had difficulty with various

functional tasks were coded in a dichotomous manner (i.e., yes or no), with high scores

indicating greater functional impairment.

Outcome Variable

Self-Rated Expectation of Nursing Home Use. During each HRS data collection wave,

respondents were asked to estimate their likelihood of moving into a nursing home. When

necessary, respondents were informed that "Nursing homes are institutions primarily for people

who need constant nursing supervision or are incapable of living independently. Nursing

supervision must be provided on a continuous basis for the institution to qualify as a nursing

home." Participants were asked not to include admissions to adult foster care facilities or short-

term hospital stays in their estimation of moving into a nursing home (but the HRS questionnaire

did not provide further information for participants as to the defining characteristics of an adult

foster care facility). The question used to assess this likelihood of moving into a nursing home

varied by age, with respondents under the age of 65 years asked, "(What is the percent chance)

that you will ever have to move to a nursing home?" and respondents over the age of 65 years

asked, "(What is the percent chance) that you will move to a nursing home in the next five years?"

Responses will be coded as a continuous variable ranging from 0 percent to 100 percent, with

higher scores indicating higher expectations of future nursing home use.

Data Analysis

The Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman,

1973) provides theoretical support for measurement models that contain indicators contributing

to seven latent variables nested within three categories: *predisposing characteristics* (i.e.,

demographics, past health services use), *enabling resources* (i.e., possession of insurance and

social support), and *need for health services* (i.e., cognitive status, functional status, and

emotional health). (See Figure 1.) These seven factors are defined as previously described in

this document. The Behavioral Model of Health Services Use (Andersen, 1968; Andersen &

Newman, 1973) also provides theoretical support for latent variable models that test for the

contributions of demographics, past health services use, possession of insurance, social support,

cognitive status, functional status, and emotional health in predicting longitudinal changes in nursing home expectations. (For an illustration of a sample Latent Growth Curve Model to be used in this study, see Figure 3.) The null hypothesis for each model is that there is no difference between the hypothesized model and a model in which the predictor variable does not contribute to longitudinal changes in nursing home expectations. For example, Figure 3 represents a model in which the latent construct "health services use" (HEALTHSERV), made up of indicator variables indicating whether respondents (a) had an overnight stay in a hospital (HN099_NEW), (b) had an overnight stay in a nursing home (HN114_NEW), (c) used home health services (HN189_NEW), and used other health services (HN202_NEW), predicts the slope (SLOPE) and intercept (ICEPT) of changes in respondents' nursing home expectations across four time points (i.e., HP032 = nursing home expectations in 2002, JP032 = nursing home expectations in 2004, KP032 = nursing home expectations in 2006, LP032 = nursing home expectations in 2008).

In the current study, Latent Growth Curve Modeling, a type of Structural Equation Modeling (McArdle & Epstein, 1988; Meredith & Tisak, 1990), was used to estimate the influences exerted by (a) age, gender, education, and race and (b) changes in possession of insurance, social support, cognitive status, functional status, and emotional health on self-rated nursing home use expectancies among study participants across four data collection waves (i.e., 2002, 2004, 2006, and 2008). These models were run using Amos version 18 (SPSS, Chicago, IL). To correct for non-normal distributions of data, maximum likelihood estimation with robust standard errors (MLR) was used. Missing data was accounted for using full information maximum likelihood estimation, which according to Enders and Bandalos (2001) and Gold,

Figure 3. Sample Latent Growth Curve Model.
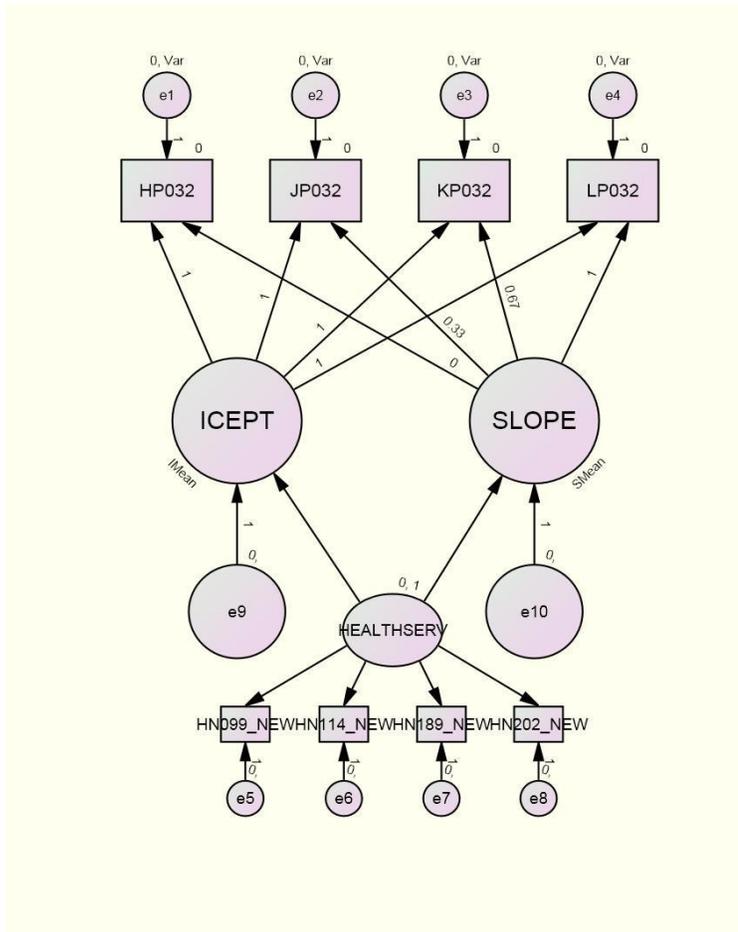
 Bentler, and Kim (2002) is preferable to ad hoc methods of accounting for missing data (e.g.,

listwise and pairwise deletion) in structural equation models.

Model development. In the current study, model development followed a step-by-step

approach. First, potential latent constructs were developed as appropriate. Second, these

potential latent constructs were tested using Confirmatory Factor Analyses (CFAs) in order to

determine whether the chosen variables formed a viable latent construct. Third, all of the models

were constructed and tested for model fit using the following process: (a) models made up of

single variables (e.g., age, race, sex) or latent constructs validated by CFAs; (b) models respecified by entering individual variables when the latent construct was not viable; and (c) models respecified by summing individual variables as appropriate. For all models that exhibited sufficient model fit, the significance of the slopes and intercepts for nursing home expectations was determined.

In order to test the hypotheses proposed in the current study, a total of 13 factors were ultimately developed. Each factor corresponded to (a) one or more of the seven constructs (i.e., demographics, health services use, financial support, social support, cognitive status, emotional status, functional status) represented in the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973; see Figure 1) and (b) one or more of the 10 hypotheses proposed above. While some of these factors included only a single variable (i.e., age, gender, education, race), others included multiple variables (i.e., health services use; insurance possession; social support; cognitive status; emotional status; functional status, whether separated into ADLs and IADLs or conceptualized as one unitary construct; and "multimorbidity", a combination of cognitive, emotional, and functional status). Those factors which were proposed to be made up of multiple variables and conceptualized as latent constructs were tested using Confirmatory Factor Analysis (CFA). Latent constructs that were confirmed using CFA were each included in a separate Latent Growth Curve Model to determine whether, and in turn how, they predicted changes in nursing home expectations over time. Factors that were conceptualized as latent constructs but were not confirmed using CFA were entered into Growth Curve Models as individual variables (rather than as latent constructs). Finally, those

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factors which were proposed to be made up of multiple variables, were not confirmed as latent

constructs via CFA, and did not exhibit sufficient model fit as individual variables were

respecified as appropriate and entered into Growth Curve Models as a single summed variable.

Testing for Model Fit and Significance. Each Growth Curve Model was evaluated for

model fit. Model fit was determined using multiple indices, including the X^2 null hypothesis

significance test, Chi-square to degrees of freedom ratio (X^2/df; values of approximately two

indicate adequate fit; Wheaton, Muthen, Alwin, & Summers, 1977), Comparative Fit Index,

Tucker-Lewis Index (CFI & TLI; exact fit = 1.00, close fit = 0.95 – 0.99, acceptable fit = 0.90 –

0.95; Bentler & Bonett, 1980), and root mean square error of approximation (RMSEA; exact fit

= 0.00, close fit = 0.06 – 0 0.01, acceptable fit = 0.08 – 0.06; Browne & Cudeck, 1993). Models

exhibiting at least acceptable fit were further evaluated to determine whether the predictor

variable(s) accounted for significant model intercepts (i.e., differences in nursing home

expectation at baseline, or the 2002 data collection wave) and slopes (i.e., changes over time in

nursing home expectation). Models yielding significant intercepts and slopes were then

interpreted so as to explain the nature of the differences in intercepts and slopes predicted by the

model. Finally, all of the predictor variables that successfully predicted differences in intercepts

and slopes in their respective models were entered into one model to test the ability of these

factors to predict nursing home use expectation as proposed by the Behavioral Model of Health

Services Use (Andersen, 1968; Andersen & Newman, 1973).

It should be noted that some disagreement exists regarding the results generated by

Latent Growth Curve Modeling, which is a form of Structural Equation Modeling, and the

interpretation of model fit within the domain of this analytic technique. According to Barrett (2007), two schools of thought have developed pertaining to the interpretation of model fit in Structural Equation Modeling. While some investigators and statisticians insist upon the use of the X^2 null hypothesis significance test to ascertain a model's goodness of fit, others utilize approximate fit indices such as the Comparative Fit Index (CFI) and root mean square error of approximation (RMSEA) to serve this purpose. The use of such approximate fit tests, Barrett (2007) acknowledges, arose due to the X^2 test's sensitivity to increases in sample size—that is, models that would be adjudged as "good fitting" were they based upon a smaller number of cases are often deemed by the results of a X^2 test to exhibit poor fit when they include a larger number of cases. While Barrett (2007) argues that the X^2 null hypothesis significance test is still the only true statistical test for SEM models at present, he concedes that using a "multi-faceted model assessment approach" may be warranted when there are theory-driven bases for a model's accuracy. As the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973), upon which the current study is founded, is a frequently used framework that has withstood years of investigative scrutiny, the author has decided to adopt the use of multiple fit indices as appropriate to determine model fit while acknowledging the opinion of some authors that the X^2 null hypothesis significance test is the only true statistical fit index.

3. Results

Confirmatory Factor Analyses

Of the 13 factors proposed to predict changes in nursing home expectation across time

(i.e., age; gender; education; race; health services use; insurance possession; social support;

cognitive status; emotional status; functional status, whether separated into ADLs and IADLs or

conceptualized as one unitary construct; and "multimorbidity", a combination of cognitive,

emotional, and functional status), nine were conceptualized as latent constructs. Table 2

provides summary statistics of the Confirmatory Factor Analyses that were conducted for each

factor conceptualized as a latent construct. Results indicated that the variables selected to

represent Health Services Use and the Activities of Daily Living tasks classified under

Functional Status exhibited the statistical properties necessary to form latent constructs. As a

result, these two factors hypothesized to predict nursing home expectations were entered into

latent growth curve models as latent constructs. In the case of the Health Services Use latent

construct, one variable (i.e., whether the respondent has undergone outpatient surgery) did not

achieve a significant standardized beta per the confirmatory factor analysis and was removed

before it was entered into the latent growth curve model. For this reason, the Maximum

Likelihood Estimates and model fit statistics reported in Table 3 were derived from a Health

Services Use latent construct made up of only the four significant variables per testing via

confirmatory factor analysis. The variables selected to represent Insurance Possession, Social

Support, Cognitive Status, Emotional Status, Functional Status (both as a unitary construct made

of ADLs and IADLs, and as a construct consisting of only Independent Activities of Daily

Table 2. Results from Confirmatory Factor Analyses of Proposed Latent Constructs.

Latent Construct	Est.(SE)	*p*	*STB*	X^2	df	*p*	RMSEA
Health Services Use				2.240	5	.815	.000
Overnight Hosp Stay	.222(.016)	***	.471				
Overnight NH Stay	.079(.005)	***	.492				
Outpatient Surgery	-.010(.014)	.482	-.023				
Home Health	.185(.010)	***	.682				
Other Services	.116(.010)	***	.371				
Insurance Possession				10.762	2	.005	.054
Social Support				99.790	9	.000	.082
Cognitive Status				28.671	2	.000	.095
Emotional Status				429.269	27	.000	.100
Functional Status				256.659	44	.000	.057
Functional Status - ADLs				13.646	9	.136	.019
Difficulty Dressing	.192(.011)	***	.553				
Difficulty Walking	.113(.008)	***	.436				
Difficulty Bathing	.137(.008)	***	.538				
Difficulty Eating	.046(.005)	***	.290				
Difficulty Getting In/Out Bed	.123(.008)	***	.501				
Difficulty Using Toilet	.108(.009)	***	.392				
Functional Status - IADLs				70.369	5	.000	.094
Multimorbidity				3042.244	252	.000	.086

*** = < .01; STB= Standardized Beta.

Living), and Multimorbidity (i.e., Cognitive, Emotional, and Functional Status combined into

one unitary construct), on the other hand, did not exhibit the statistical properties necessary to

form latent constructs (see Table 2) and were entered into separate growth curve models as

individual indicator variables and not as latent constructs.

Assessment of Model Fit

Table 3 provides summary statistics of the tests of model fit conducted for each growth

curve model containing one factor hypothesized to predict nursing home expectations. Eight of

the 10 original models (i.e., age; gender; education; race; the health services use latent construct;

individual variables representing social support; individual variables representing emotional status;

and the functional status latent construct derived from Activities of Daily Living tasks) exhibited

acceptable fit. The two original models which did not initially exhibit acceptable fit

Table 3. Maximum Likelihood Estimates and Model Fit Statistics for Growth Curve Models.

Predictor variable	Estimate(S.E.)	P	$X^2(df)$	p	Model fit		
					TLI	CFI	RMSEA
Age			12.891(8)	.116	.991	.995	.020
Slope	-.009(.019)	.627					
Intercept	.726(.084)	***					
Gender			12.317(8)	.138	.994	.995	.019
Slope	.243(.256)	.341					
Intercept	-.089(1.157)	.939					
Education			6.536(8)	.587	1.002	1.000	.000
Slope	.016(.040)	.685					

	Estimate (SE)	p	χ²(df)	p			
Intercept	.242(.180)	.179					
Race			6.8237(8)	.554	1.002	1.000	.000
Slope	.022(.341)	.948					
Intercept	1.110(1.544)	.472					
Health Services Use (latent construct)			26.796(25)	.366	.999	.999	.007
Slope	-.128(.883)	.884					
Intercept	.147(.666)	.825					
Health Services Use (sum – baseline)			8.521(8)	.384	.999	.999	.007
Slope	-.022(.125)	.858					
Intercept	.100(.566)	.859					
Health Services Use (sums – longitudinal)			11.837(14)	.619	1.003	1.000	.000
Sum of Health Services Use in 2002							
Slope	-.028(.128)	.827					
Intercept	-.090(.580)	.877					
Sum of Health Services Use in 2004							
Slope	-.234(.124)	.059					
Intercept	1.143(.560)	.041					
Sum of Health Services Use in 2006							
Slope	.234(.121)	.053					
Intercept	.157(.546)	.774					
Sum of Health Services Use in 2008							
Slope	.048(.109)	.657					
Intercept	-.331(.493)	.503					

	Estimate (SE)	p	χ²(df)	p			
Insurance Possession (individual variables)			3764.008(17)	.000	-3.008	.000	.385
Insurance Possession (sum – baseline)			6.598(8)	.581	1.002	1.000	.000
Slope	-.690(.715)	.335					
Intercept	6.710(3.233)	.038					
Insurance Possession (sums – longitudinal)			2462.085(20)	.000	-.018	.273	.287
Social Support (individual variables)			96.306(24)	.000	.929	.962	.045
Help with Dressing - 2002							
Slope	-.247(.605)	.683					
Intercept	.164(2.744)	.952					
Help with Walking - 2002							
Slope	-3.121(1.233)	.011					
Intercept	6.550(5.587)	.241					
Help with Bathing - 2002							
Slope	.525(.899)	.559					
Intercept	.074(4.073)	.985					
Help with Eating - 2002							
Slope	2.066(2.255)	.360					
Intercept	-11.634(10.218)	.255					
Help with Getting In/Out of Bed - 2002							
Slope	-.745(1.325)	.574					
Intercept	2.091(6.007)	.728					

Help with Toileting – 2002							
Slope	2.181(2.254)	.333					
Intercept	-14.461(10.215)	.157					
Cognitive Status (individual variables)			7370.170(18)	.000	-6.166	.000	.524
Cognitive Status (objective rating)			6985.202(15)	.000	-5.642	.000	.559
Cognitive Status (subjective rating)			3821.566(9)	.000	-3.569	.000	.534
Emotional Status (individual variables)			25.754(24)	.366	.998	1.000	.007
Feeling Depressed - 2002							
Slope	.101(.378)	.789					
Intercept	-2.587(1.700)	.128					
Felt Activities were Efforts - 2002							
Slope	-.085(.282)	.763					
Intercept	.311(1.270)	.807					
Was Sleep Restless - 2002							
Slope	-.159(.258)	.538					
Intercept	.272(1.162)	.815					
Was Happy - 2002							
Slope	.401(.437)	.359					
Intercept	-2.099(1.967)	.286					
Loneliness Felt - 2002							
Slope	.019(.336)	.955					
Intercept	.836(1.510)	.580					

Enjoyed Life - 2002						
Slope	-1.066(.523)	.042				
Intercept	7.373(2.353)	.002				
Felt Sad - 2002						
Slope	-.177(.344)	.607				
Intercept	1.349(1.549)	.384				
Felt Unmotivated - 2002						
Slope	-.217(.278)	.434				
Intercept	.729(1.248)	.559				
Full of Energy - 2002						
Slope	-.005(.252)	.986				
Intercept	3.168(1.131)	.005				
Functional Status – ADL (latent construct)			59.578(40)	.024	.986	.988	.018
Slope	1.427(.877)	.104				
Intercept	-1.251(.662)	.059				
Functional Status (individual variables)			30.909(28)	.321	.996	.999	.008
Difficulty Dressing - 2002						
Slope	-.509(.369)	.167				
Intercept	2.660(1.665)	.110				
Difficulty Walking - 2002						
Slope	.994(.484)	.040				
Intercept	-1.723(2.185)	.430				

Difficulty Bathing -
2002

Slope	-.306(.506)	.545
Intercept	-3.817(2.287)	.095

Difficulty Eating -
2002

Slope	.859(.759)	.258
Intercept	-2.614(3.429)	.446

Difficulty Getting
In/Out of Bed - 2002

Slope	.225(.516)	.663
Intercept	2.284(2.332)	.327

Difficulty Using
Toilet - 2002

Slope	.314(.442)	.447
Intercept	-2.031(1.996)	.309

Difficulty Meal Prep -
2002

Slope	-.268(.445)	.546
Intercept	-.050(2.008)	.980

Difficulty Shopping -
2002

Slope	.744(.427)	.082
Intercept	-5.065(1.930)	.009

Difficulty Phone Calls
- 2002

Slope	-.171(.760)	.823
Intercept	-2.777(3.434)	.419

Difficulty Medication
- 2002

Slope	1.156(.782)	.139
Intercept	-.738(3.533)	.835
Difficulty Managing Money - 2002		
Slope	-.421(.519)	.417
Intercept	4.180(2.343)	.074

*** < .01; Note: Table 2 above provides a list of the CFAs conducted for proposed latent constructs (i.e., the first step of the analyses). Table 3 provides a list of all models tested for model fit and evaluated for significant slopes and intercepts for nursing home expectations. When a CFA failed to confirm a latent construct as viable (in Table 2), the second step of the analyses began, in which all of the variables from that proposed latent construct were entered into a model individually, and not as a latent construct. The model was then evaluated for adequate fit and, if fit was adequate, the slopes and intercepts for nursing home expectation were considered. Models that failed to achieve adequate fit or did not exhibit significant slopes and intercepts for nursing home expectation were respecified and retested.

(i.e., Insurance Possession and Cognitive Status) were respecified and tested again for model fit.

One of these two models (i.e., Insurance Possession) achieved acceptable fit upon respecification,

resulting in nine of 10 possible models exhibiting acceptable fit.

Cognitive Status was the only model which did not achieve acceptable fit after an initial

test or subsequent respecification. According to a Confirmatory Factor Analysis (please see

Table 2 above), the variables selected to make up the latent construct of Cognitive Status did not

exhibit the statistical properties necessary to form a latent construct. As a result, the variables

which had been selected for the latent variable Cognitive Status were entered into a growth curve

models as individual variables, but this model did not achieve acceptable fit. The Cognitive

Status model was then respecified into two different models: one that included the three

variables reflecting objective measures of cognitive status, and one that only included a single

variable reflecting subjective cognitive status. This choice was made as a previous confirmatory factor analysis of the objective variables proposed for inclusion in the Cognitive Status latent variable did not exhibit the statistical properties necessary to form a latent construct, and summing all four of the Cognitive Status variables did not seem to be appropriate as a means of respecifying the model. Again, neither of these models exhibited acceptable fit.

Assessment of Model Significance

Table 3 provides summary statistics of the tests of model significance conducted for each growth curve model hypothesized to predict nursing home expectations that achieved acceptable model fit. Six of the variables that were included within one of the nine models that achieved acceptable model fit successfully predicted differences in their models' intercepts (i.e., initial ratings of the outcome variable) for nursing home expectations. These variables were (1) Age in 2002, (2) the sum of the Health Services Use variables from the 2004 data collection wave, (3) the sum of the Insurance Possession variables in 2002, (4) the "Enjoyed Life" variable from the Emotional Status factor in 2002, (5) the "Felt Full of Energy" variable from the Emotional Status factor in 2002, and (6) the "Difficulty Shopping" variable from the Functional Status factor in 2002. Three of the variables that were included within one of the nine models that achieved acceptable model fit successfully predicted changes in their models' slopes (i.e., changes across time in nursing home expectation from the 2002 to the 2008 data collection wave). These variables were (1) the "Help with Walking" variables from the Social Support factor in 2002, (2) the "Enjoyed Life" variable from the Emotional Status factor in 2002 and (3) the "Difficulty Walking" variable from the Functional Status factor in 2002. The directions

of all these relations are described below.

The assessments of model significance completed by way of growth curve modeling partially supported the hypotheses proposed in the current study:

Predisposing Characteristics:

(1) The hypothesis that older respondents would have higher, and faster growing, expectations for future nursing home use than younger respondents was partially supported. Age in 2002 significantly predicted differences in nursing home expectations in 2002 such that for every one year increment in age, there was a 0.726% higher expectation for future nursing home use as measured in 2002. There was not, however, a significant relation between age and rate of change across time in nursing home expectations.

(2) The hypothesis that across time, female respondents would have higher expectations for future nursing home use than male respondents was not supported.

(3) The hypothesis that across time, respondents with lower levels of educational attainment would have higher expectations for future nursing home use than respondents with higher levels of educational attainment was not supported.

(4) The hypothesis that across time, Caucasian respondents would have higher expectations for future nursing home use than respondents of other races was not supported. In order to determine whether the variables of interest predicted nursing home expectation in a different manner for Caucasian and African American respondents, a multivariate regression analysis in which the predictor variables of interest were tested for their ability

to predict nursing home expectations among only African American respondents (N = 176) was conducted. The results of this analysis were non-significant, $R^2 = .233$, $F(42) = .956$, $p = .554$. An additional multivariate regression analysis was conducted to determine whether the variables of interest predicted nursing home expectation in a different manner for Hispanic (N = 76) and non-Hispanic respondents, and this analysis was also non-significant, $R^2 = .594$, $F(40) = 1.279$, $p = .231$. Admittedly, the possibility of an interaction effect between race and Hispanicity does exist, but the extremely low number of respondents in the current study self-identifying as both African American and Hispanic (i.e., $N = 2$) eliminates the possibility of testing for such a phenomenon.

(5) The hypothesis that across time, respondents who had made use of health services within the previous 24 months would have higher expectations for future nursing home use than respondents who had not made use of health services within the previous 24 months was not supported. However, differences in nursing home expectations in 2002 were significantly related to a summed score of health services used in 2004, with a score of 0 equating to no use of health services and a score of 5 equating to the use of five different types of health services. Specifically, for every 1.143% increase in nursing home expectation measured in 2002, there was a one-point increase in the health services use summed score for respondents in 2004. This significant relation only existed, however, between respondents' nursing home use expectations in 2002 and their summed scores of health services used in 2004.

Enabling Resources

(6) The hypothesis that across time, respondents who did not have insurance that pays for nursing home care would have higher expectations for future nursing home use than respondents with insurance that pays for nursing home care was not supported. However, a dichotomized variable for insurance possession in 2002, with a value of 0 equating to possession of no insurance and a value of 1 equating to possession of at least one form of insurance, was significantly related to differences in nursing home expectations in 2002. Specifically, respondents with at least one form of insurance in 2002 had a 6.710% higher expectation for future nursing home use at baseline (i.e., in 2002) than did respondents without insurance.

(7) The hypothesis that across time, respondents with lower levels of social support would have higher expectations for future nursing home use was partially supported. Respondents who endorsed having someone who helped them walk across a room in 2002 exhibited a statistically significant decrease in their nursing home expectations of 9.363% across the six years of the current study relative to those who did not report having anyone who helped them walk across a room in 2002.

Need for Health Services

(8) The hypothesis that across time, changes in cognitive status would be related to changes in future nursing home use was not supported.

(9) The hypothesis that across time, decreases in emotional health would result in increasingly higher expectations for future nursing home use was partially supported.

Respondents' answer to the question, "(Much of the time during the past week…) You enjoyed life. (Would you say yes or no?)" in 2002 significantly predicted differences in nursing home expectations in 2002 and changes in nursing home expectations across time. Interestingly, respondents who endorsed enjoying life much of the time during the past week in 2002 had a 7.373% *higher* expectation for future nursing home use as estimated in 2002 than did respondents who did not endorse enjoying life much of the time during the past week in 2002. Additionally, every one unit increase in response to the "enjoying life much of the time during the past week" item in 2002 was related to a 3.198% *decrease* in nursing home expectations across the six year period measured during the current study. Respondents' answer to the question, "(Much of the time during the past week…) You had a lot of energy. (Would you say yes or no?)" in 2002 also predicted differences in nursing home expectations in 2002. Respondents who endorsed having a lot of energy during the past week in 2002 had a 3.168% *higher* expectation for future nursing home use as estimated in 2002. Having a lot of energy during the past week in 2002 was not significantly related to change in nursing home expectations across time, however. Finally, it should be noted that although it is possible that emotional health as a construct may have a curvilinear (or nonlinear) relation with nursing home expectations, it was not possible within the HRS to construct such a model as the emotional health variables within this dataset were in essence coded dichotomously.

(10) The hypothesis that across time, respondents with decreases in functional status would

have higher expectations for future nursing home use was partially supported.

Specifically, every one unit increase in response to the question, "Because of a health or

memory problem do you have any difficulty with walking across a room?" in 2002 was

related to a 2.982% increase in nursing home expectations across the six year period

measured during the current study. Additionally, respondents who in 2002 endorsed

having difficulties with shopping for groceries because of a health or memory problem

interestingly had a 5.065% *lower* expectation for future nursing home use at baseline

(i.e., in 2002) than did respondents who reported no such difficulty.

Test of the Andersen Model

As the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman,

1973) served as the theoretical framework by which variables were chosen for inclusion in the

current study, a model was constructed using all variables that significantly predicted either the

slopes or intercepts for nursing home expectations. The purpose of this model was to test the

ability of the data from the current study to support the Andersen model. In this model, each

significant variable (i.e., Age in 2002; the sum of the Health Services Use variables from the

2004 data collection wave; the sum of the Insurance Possession variables in 2002; the "Help with

Walking" variables from the Social Support factor in 2002; the "Enjoyed Life" variable from the

Emotional Status factor in 2002; the "Felt Full of Energy" variable from the Emotional Status

factor in 2002; the "Difficulty Shopping" variable from the Functional Status factor in 2002; and

the "Difficulty Walking" variable from the Functional Status factor in 2002) was entered

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individually such that they all directly predicted the slopes or intercepts for nursing home expectations. This model exhibited acceptable model fit, $X^2(22, N=1487) = 34.654$, $p = .042$, $X^2/df = 1.575$, CFI = .970, TLI = .992, RMSEA = .020, indicating support for the Andersen model predicting nursing home expectation from the selected HRS variables.

Table 4 provides summary statistics of the tests of significance conducted for the growth curve model testing the Andersen model's ability to predict nursing home expectations. Four of the variables that were included within this test of the Andersen model successfully predicted differences in the intercept (i.e., initial ratings of the outcome variable) for nursing home expectations. These variables were (1) Age in 2002, with every one year increase in age related to a .705% higher nursing home expectation at baseline (i.e., in 2002); (2) the "Enjoyed Life" variable from the Emotional Status factor in 2002, with respondents who endorsed enjoying life in the past week having a 6.451% *higher* expectation for future nursing home use at baseline (i.e., in 2002) than respondents who did not enjoy life in the past week; (3) the "Felt Full of Energy" variable from the Emotional Status factor in 2002, with respondents who endorsed feeling full of energy in the past week having a 2.557% *higher* expectation for future nursing home use at baseline (i.e., in 2002) than respondents who did not feel full of energy in the past week; and (4) the "Difficulty Shopping" variable from the Functional Status factor in 2002, with respondents who endorsed having difficulty shopping for groceries having a 3.401% *lower* expectation for future nursing home use at baseline (i.e., in 2002) than respondents who did not having difficulty shopping for groceries. Two of the variables included within the test of the Andersen model successfully predicted changes in the slope (i.e., changes across time in nursing

home expectation from the 2002 to the 2008 data collection wave). These variables were: (1) the

"Enjoyed Life" variable from the Emotional Status factor in 2002, with respondents who

endorsed enjoying life in the past week having a 2.646% *lower* expectation for future nursing

home use the six year time period of the current study than respondents who did not enjoy life in

the past week; and (2) the "Difficulty Walking" variable from the Functional Status factor in

2002, with respondents who endorsed having difficulty walking having a 2.961% higher

Table 4.   Maximum Likelihood Estimates for the Growth Curve Model Testing the Andersen
            Model.

Predictor variable	Estimate(S.E.)	p
Age		
Slope	-.006(.019)	.758
Intercept	.705(.084)	***
Sum of Health Services		
Use in 2004		
Slope	-.109(.117)	.355
Intercept	.383(.516)	.457
Sum of Insurance		
Possession in 2002		
Slope	-.706(.719)	.326
Intercept	4.640(3.160)	.142
Enjoyed Life - 2002		
Slope	-.902(.435)	.038
Intercept	6.464(1.912)	***
Felt Full of Energy - 2002		
Slope	-.004(.242)	.986
Intercept	2.556(1.065)	.016
Difficulty Shopping –		
2002		
Slope	.465(.391)	.234
Intercept	-3.457(1.718)	.044
Difficulty Walking –		
2002		
Slope	.987(.464)	.033
Intercept	-1.923(2.039)	.346

*** < .01

expectation for future nursing home use across the six year time period of the current study than respondents who did not have difficulty walking.

Post-hoc Analyses

As age was the only demographic variable included in the current study that significantly predicted either the slope or intercept for nursing home expectations, a series of post-hoc analyses were conducted in which the relations between each predictor variable and nursing home expectations were stratified by age. The purpose of these post-hoc analyses was to determine whether the ability of each variable to predict the slopes and intercepts for nursing home expectations varied by age. In order to facilitate these post-hoc analyses, the Age variable utilized in the analyses above was divided into three groups: respondents between the ages of 60 and 69 years of age, respondents between the ages of 70 and 79 years of age, and respondents aged 80 years and older. Models in which each variable predicted the slope and intercept for nursing home expectations were analyzed for all three of the age groups, and then were compared. This approach, however, yielded only one model that exhibited acceptable model fit and successfully predicted either the slope or intercept for nursing home expectations that varied by age. This model, which included age and race as predictors of nursing home expectations, exhibited significant model fit, X^2 (32, N=1487) = 54.079, p = .009, X^2/df = 1.690, CFI = .973, TLI = .975, RMSEA = .022. In this model, race predicted differences in nursing home expectation over time, but only among the oldest (i.e., 80+ years) age group. Compared to respondents of all other races, Caucasian respondents reported an approximate decrease in nursing home expectation of 6.351% across the six year time period of the current study

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(i.e., Estimate = -2.117, S.E. = 1.067, p = .047). In an effort to account for socioeconomic

differences, education was added to this model with similar results: Caucasian respondents

continued to report an approximate decrease in nursing home expectation of 6.324% across the

six year time period of the current study (i.e., Estimate = -2.108, S.E. = 1.066, p = .048) relative

to respondents of other races.

4. Discussion

In the current study, six variables suggested by the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973) individually predicted differences in respondents' baseline (i.e., 2002) nursing home expectations. These variables were part of the "demographics" and "past health services use" factors from the "Predisposing Characteristics", the "financial resources" factor from the "Enabling Resources", and the "emotional status" and "functional status" factors from the "Need for Health Services" constructs of Andersen's model. These findings are similar to, yet distinct from, results obtained by Akamigbo and Wolinski (2006) in their cross-sectional study of Assets and Health Dynamics among the Oldest Old (AHEAD) respondents aged 70 years and older. While age was found to predict nursing home expectations in both studies, results from Akamigbo and Wolinski (2006) suggest that in addition to age, gender, education, social support, health status, and an interaction between race and gender are related to nursing home expectations. In the current study, which included a younger cohort of respondents, whether one made use of health services, had insurance, enjoyed life, felt full of energy, and had difficulty shopping, as well as age, influenced expectations for future nursing home placement. The differences in the findings may be attributed to the use of data drawn from different samples (e.g., ages 63-98 years in the current study vs. ages 70 years and older in Akamigbo and Wolinski) and different datasets (i.e., HRS in the current study vs. AHEAD in Akamigbo and Wolinksi), as well as the implementation of different analytic techniques (i.e., latent growth curve modeling in the current study vs. multinomial and binary logistic regression in Akamigbo and Wolinski) in these two studies.

Only three variables, however, independently predicted longitudinal changes in nursing home expectation across the six year time period in the current study. That two of these variables were conceptualized as being part of the "emotional status" (i.e., "Enjoyed Life") and "functional status" (i.e., "Difficulty Walking") factors, respectively, may speak to the importance of the "Need for Health Services" construct from Andersen's model, at least in terms of predicting longitudinal changes in expectations for health services use. That is, a greater number and wider variety of variables may exert influence on an individual's estimation of their future need for nursing home services at one point in time, but those variables conceptualized as representing one's "need for health services" may be the factors that "rise to the top" and influence changes in nursing home expectations across time. If true, this might suggest that, for individuals who exhibit certain qualities or "risk factors" within the Predisposing Characteristics and Enabling Resources domains, expectations for future nursing home placement may increase over time if declines in emotional and/or functional status occur. Such a series of events would seem to be in accord with the tenets of the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973). As a result, interventions could be designed to target individuals with Predisposing Characteristics and Enabling Resources that put them at risk of nursing home placement so as to encourage them to plan for and prepare to access this level of care.

The results of a model designed to test the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973), in which multiple variables simultaneously predicted nursing home expectation, also offer support for the Andersen model. In this model,

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variables from the "demographics" (i.e., age), "emotional status" (i.e., "Enjoyed Life" and "Felt Full of Energy"), and "functional status" (i.e., "Difficulty Shopping") factors of the Andersen model were related to baseline (i.e., 2002) nursing home expectations, while variables from the "emotional status" (i.e., "Enjoyed Life") and "functional status" (i.e., "Difficulty Walking") factors of the Andersen model predicted longitudinal nursing home expectations. This pattern of results again raises the possibility that age, a Predisposing Characteristic, as well as variables conceptualized as representing one's "need for health services", may be the factors included in the Andersen model that "rise to the top" and influence changes in longitudinal nursing home expectations.

It should be noted, however, that the current study is based upon the original conceptualization of the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973), which several researchers (e.g., Bradley et al., 2002; Kim & Chiriboga, 2009; King, Jang, Chiriboga, & Polivka, 2006) have criticized (along with a more recent revision, e.g., Andersen, 1995) for its lack of attention to cultural factors that may influence health services use. One study (i.e., Bradley et al., 2002) has found that attitudes and knowledge, social norms, and perceived control distinguished African American and White focus group members and that their inclusion may therefore appropriately expand the Andersen model (1995). Despite the fact that the respondents in the current study were largely White and non-Hispanic, it is possible that the inclusion of cultural factors in this analysis may have resulted in a richer portrait of the factors influencing the development of longitudinal nursing home expectations.

The importance of age as a predictor of nursing home expectations in the current study is

supported by previous research (e.g., Kokmen, & O'Brien, 2000), which found advanced age to

be the most potent factor influencing nursing home use. The ability of age to predict nursing

home expectations, along with the lack of significance offered by many of the other factors

hypothesized to predict nursing home expectations in the current study, served as the rationale

for post-hoc analyses in which the relations between each significant predictor variable and

nursing home expectations were stratified by age. While race did not independently predict

nursing home expectations, these post-hoc analyses revealed that Caucasian respondents had an

approximately six percent drop in their nursing home expectations across time, but only among

the oldest (i.e., 80+ years) age group. This finding is interesting as, in many previous studies

(e.g., Akamigbo & Wolinsky, 2007; Cai, Salmon, & Rodgers, 2009; Himes, Hogan, & Eggebeen,

1996; McInnis-Dittrich, 2005), Caucasian race has been related to increased likelihood of

nursing placement. This result from the current study may be attributed to the tendency for

minority care recipients, and in particular, African American care recipients, to be placed in a

nursing home more slowly, or at a later age, than Caucasian care recipients (Stevens et al., 2004).

Alternately, this finding may suggest that Caucasians who reach an advanced age (i.e., over 80

years) without requiring nursing home care may evaluate themselves as having their care needs

met. This may be due to the relative absence of disabling conditions that would necessitate

nursing home care, or the presence of other caregiving supports that minimize the need for

nursing home care. Additionally, this result may indicate (a) the presence of a cohort effect

among this sample of older adults, such that race is a salient predictor of nursing home

expectations, but only for older adults aged 80 years or over, or (b) that race rises in importance

as a predictor of nursing home care across time and only exerts a significant influence near the end of life.

Several findings revealed by the current study were surprising and, perhaps initially, counterintuitive. First, it was found that respondents who endorsed having difficulty walking across a room in 2002 experienced an increase in nursing home expectations across time, while respondents who reported that they had someone to help them walk across a room in 2002 had a statistically significant decrease in longitudinal nursing home expectations. On first glance, it might appear that these findings might in large part pertain to the same group of people. Descriptive statistics for the variables indicating whether respondents (a) had difficulty walking across a room and (b) had someone to help them walk across a room, however, reveal that while 92.8% of (or 1,380 of the 1,487) respondents in the current study reported having difficulty walking across the room, only 1.1% of (or 16 of the 1,487) respondents endorsed having someone to help them walk across a room. The number of respondents who reported having someone to help them walk across a room was exceptionally low, but a significant result was nevertheless obtained. Therefore, this finding may suggest that individuals who had someone to help them walk across a room perceived themselves to be less impaired than individuals who did not have some to help them walk across a room, thereby causing them to attenuate their expectations of requiring future nursing home care. Alternately, respondents who had someone to help them walk across a room may have perceived themselves as just as impaired as, or even more impaired than, respondents who had no one to help them walk across the room, but they may have viewed the individual who helped them walk across a room as a potential source of

caregiving who would help to minimize their need for future nursing home care.

Second, it was found that at baseline (i.e., in 2002), respondents who endorsed enjoying life much of the time during the past week had an approximately seven percent higher expectation for future nursing home use than did respondents who did not endorse enjoying life much of the time during the past week. It could be argued that individuals who reported that they did not enjoy life much of the time during the previous week may have been exhibiting signs of poor emotional health. Along with comorbid declines in cognitive status (Blaum et al., 2002; Gaugler et al., 2009) and functional ability (Raji et al., 2002; Wang et al., 2002), the presence of poor emotional health would, as predicted, represent a risk factor for nursing home placement. Respondents experiencing poor emotional health, however, may not evaluate themselves as being more likely to enter a nursing home, perhaps due to the presence of anxiety, and in particular, "death anxiety." If respondents were in fact positive for anxiety, which is related to poorer quality of life (Mendlowicz & Stein, 2000, as cited in Smallbrugge, Pot, Jongenelis, Beekman, & Eefsting, 2005) and well-being (DeBeurs et al., 1999, as cited in Smallbrugge et al., 2005), and more specifically, depression, cognitive impairment, and stroke (Smallbrugge et al., 2004), these symptoms may have led these respondents to form inaccurate estimations of their risk of future nursing home placement. Alternately, these symptoms may have indicated to such respondents that they would in fact die before requiring nursing home services. If these respondents were also experiencing death anxiety, this may have inhibited them from engaging in end-of-life planning (Wong, Reker, & Gesser, 1994, as cited in Carr & Khodyakov, 2007), or at least kept them from doing so in a forthright manner.

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The tendency for respondents who endorsed enjoying life much of the time in the previous week to have higher expectations of future nursing home use at baseline (i.e., in 2002) may also be explained in part by the Strength and Vulnerability Integration model (Charles, 2010). According to the tenets of this theory, older adults who capitalize on their strengths in order to modulate their responses to negative situations (such as the receipt of distressing information) are likely to experience better emotional health with advancing age. In keeping with the Strength and Vulnerability Integration model, then, those respondents who endorsed enjoying life much of the time during the previous week plausibly may have had, or were beginning to develop, impairments that might lead to future nursing home use. Despite being aware of these developments, which most people would find upsetting, these respondents were better able to regulate their emotional responses, thereby maintaining positive affect and state of mind while making accurate assessments about their possible future need for a nursing home admission. It should be noted, however, that despite the unexpected finding that enjoying life was related to higher nursing home expectations at baseline, this relation did not hold true over time. Across the six year period measured during the current study (i.e., 2002 to 2008), enjoying life much of the time during the past week as measured in 2002 was related to an approximately four percent decrease in nursing home expectations. This finding, however, is in keeping with the literature, as well as the hypothesis posed in the current study.

Third, it was found that respondents who in 2002 endorsed having difficulties with shopping for groceries because of a health or memory problem had an approximately five percent lower expectation for nursing home use than did respondents who reported no such

difficulty. It should be noted that, of the functional abilities assessed in the current study, only grocery shopping would require respondents to venture out of their homes. Despite a lack of support in the literature for this proposition, the possibility exists that individuals with relatively mild health or memory problems that allow them to function well in their homes but present difficulties in the community (e.g., vision impairments that disallow them from driving a car) may have their needs met by availing themselves of family members, friends, or other community supports who take them shopping or deliver food to their homes. Upon having this need met, it is conceivable that such individuals might be relatively free of impairments that would necessitate a nursing home admission, and as a result, they would be able to successfully age in place.

Fourth, while it was predicted that respondents without insurance that would pay for long-term care would have higher expectations for future nursing home use than would respondents who had such insurance, this hypothesis was not supported. In fact, at baseline, respondents with at least one form of insurance had an approximately seven percent higher expectation for future nursing home use than did respondents without insurance. As suggested by some previous studies (e.g., Holden, McBride, & Perozek, 1997), the manner in which possession of financial resources influences long-term care decision making remains unclear. Unfortunately, the results of the current study do little to clarify this issue. Information about how long ago, and under what conditions, respondents initially became qualified for and/or purchased insurance that would provide for future long-term care needs may begin to elucidate the relation between insurance possession and nursing home expectations. For example, it may

be that individuals tend to purchase long-term care insurance if and when they are diagnosed with an illness or disorder that would increase their need for nursing home care. If such were the case, the originally-proposed hypothesis that respondents who do not have insurance that pays for nursing home care would have higher expectations for future nursing home use would be ill-founded. In the current study, however, insurance possession was only related to higher nursing home expectations at baseline; future studies are required to determine why this difference did not persist across the current study's six-year time period.

There are a number of possible explanations for the lack of support for past health services use and cognitive status as predictors of longitudinal nursing home expectations. In the current study, the variables from which data regarding past hospital, nursing home, and other health services use were drawn may be of limited utility in predicting future nursing home expectations. This is due to the nature of the questions included in the current study, and specifically, the range of responses for which they allow. Examples of the questions included in the current study that assess health services use among respondents include, "In the last two years, have you been a patient in a hospital overnight?" and "In the last two years, have you been a patient overnight in a nursing home, convalescent home, or other long-term health care facility?" Questions asked in this manner essentially dichotomize respondents into two groups: those who have received health services, and those who have not. There may still be a difference, however, between respondents who frequently received health services and those who infrequently used health services. For instance, respondents who had many previous hospitalizations may have different longitudinal nursing home expectations than respondents

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who only had one previous hospitalization. Unfortunately, the data in the current study do not allow us to test this possibility. Despite this, the quantity of health services used by respondents may have been indirectly included within the current study, however, as the model for health services use was ultimately respecified to include a predictor variable that was a sum of the types of health services used by respondents, both at baseline (i.e., 2002) and across the current study's six year time period. The respecified model that included the sum of health services used in 2004 indicated that nursing home expectations in 2002 were significantly related to the predictor variable (i.e., the sum of health services used in 2004). This finding may suggest that considering the quantity of health services utilized by a respondent rather than simply whether or not a respondent has used a given form of health service may provide a more nuanced view into the influence of health services use on nursing home expectations.

The cognitive status factor as conceptualized in the current study was not a significant predictor of nursing home use expectations, despite utilizing variables that should have roughly approximated the two-factor (i.e., a memory factor and a mental status factor) structure for cognitive status revealed by Herzog and Wallace (1997). While the current study used four variables to represent cognitive status—(1) self-rated memory, (2) immediate recall of items from a word list, (3) delayed recall of items from a word list, and (4) a sum of several items from the TICS (i.e., counting backwards from 20; reporting the current month, day, year, and day of the week; giving the name for a tool used to cut paper; giving the name of a prickly plant that lives in the desert; giving the name of the current United States President; giving the name of the current United States Vice-President)—Herzog and Wallace (1997) had access to even more

cognitive status variables. Their investigation of the measures of cognitive functioning in the

AHEAD survey included all of the aforementioned measures of cognitive status, as well as a

serial sevens task and a modified version of the WAIS-R that was only included in an

experimental module of the AHEAD survey. It remains a strong possibility that the HRS

includes questions that would significantly predict nursing home use expectations, but the most

potent of these questions might be found within the Aging, Demographics, and Memory Study

(ADAMS), a supplement to the Health and Retirement Study (HRS) which is sponsored by the

National Institute of Aging (grant number NIA U01AG009740) (ADAMS Supplement to the

Health and Retirement Study, public use dataset, 2007). Participation in the ADAMS involved

completion of an in-home, three- to four-hour structured cognitive assessment administered by a

neuropsychology technician trained in the collection of data used to conduct dementia

evaluations. It is expected that the cognitive data collected from ADAMS respondents would be

much richer than that derived from the four cognitive status variables included in the current

study. Unfortunately, the four waves of the ADAMS spanning the duration of the current study

included only a subset of all HRS respondents between 2002 and 2008. As a result, the number

of HRS respondents participating in these four waves of the ADAMS would be quite small (i.e.,

approximately 277) relative to the sample size of the current study (i.e., 1487), limiting power to

detect meaningful effects.

Another possible explanation for the lack of additional findings within the current study

may be the restrictions imposed by the time frame of the analyses. The current study included

data from four waves of the Health and Retirement Study (i.e., the 2002, 2004, 2006, and 2008

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surveys). As a result, the scope of the current study only allowed for the development of

longitudinal nursing home expectations over an approximately six year period. While the overall

sample included in the current study did indeed report changes in their expectations for future

nursing home use over this time frame, the change for this group was relatively small (i.e., a

15.355% increase in expectations from 2002 to 2008). As suggested by the Behavioral Model of

Health Services Use (Andersen, 1968; Andersen & Newman, 1973), a wide variety of factors

predict future health services use (and, by extension, *expectations* for future health services use).

Each of these factors, in turn, will only account for a small percentage of the variance in

expectations for future health services use across time. Since the overall change in expectations

for future nursing home use was relatively small across the six year time period of the current

study, and since each possible predictor would only be able to explain a small amount of this

small change, the "weaker" of the chosen predictor variables may have been unable to account

for a statistically significant amount of this change. Should the current study be conducted again

over a longer time period, say, 20 years, it is conceivable that respondents would exhibit a

greater amount of change in their longitudinal expectations for future nursing home use, thereby

allowing each possible predictor to account for a greater amount—and in some cases, perhaps, a

statistically significant amount—of change.

Limitations

The generalizability of results to members of certain racial and ethnic minority groups

represents one limitation of the current study. While the HRS is a nationally-representative

sample of more than 22,000 Americans age 50 years and older and their spouses (Health and

Retirement Study, n.d., About the Health and Retirement Study, ¶ 1; Smith, Taylor, & Sloan, 2001), only 1,487 of these individuals, all of whom participated in each of the data collection waves from 2002-2008, are included in the current study. Of these 1,487 respondents, only 11.8% reported their race as African American, only 1.4% reported their race as something other than Caucasian or African American, and only 5.1% reported their ethnicity as Hispanic. This is in spite of HRS data collection efforts that intentionally oversampled African Americans and Hispanics (Siegel et al., 2003; Smith et al., 2001).

Another limitation posed by the current study is its reliance on the use of secondary data. While the HRS is an exceptionally rich dataset, including information about physical and mental health, insurance coverage, financial status, family support systems, labor market status, and retirement planning for adults 50 years of age and older, the questions and response options included in the HRS interviews were not specifically designed for the purpose of testing the Behavioral Model of Health Services Use (Andersen, 1968; Andersen & Newman, 1973). As a result, some of the factors proposed by the Andersen model were well represented within the HRS data, while other factors were not. While developing an interview to specifically assess the factors included within the Andersen model might have addressed this concern, it would be impossible for the author to recruit anything resembling the number and diversity of individuals who have participated in the HRS. For this reason, the author gratefully utilized HRS data in the current study while recognizing the few occasions on which HRS questions and response options were not optimal.

A common limitation of many longitudinal studies, particularly those involving older

adult respondents, relates to the tendency for the "strong" participants to survive, or continue

their participation in the study. That is, with each successive time point in a longitudinal analysis,

the "fit" members of the sample are more likely than the "unfit" respondents to remain in the

study throughout its duration. In the current study, respondents who experienced illness; entered

a hospital, nursing home, or other facility; or otherwise could not participate in all four data

collection waves were exluded from analyses. As a result, selection effects decrease the

generalizability of findings from the current study sample to the population at large.

Conclusions and Implications

The current study successfully contributes to the literature regarding expectations for

future nursing home use in several ways. First, this study provides support for use of the

Andersen model (Andersen 1968; Anderson & Newman, 1973) as a theoretical framework by

which to investigate not only health services use, but also *expectations* for future health services

(including nursing home) use. Second, this study used factors suggested by the Behavioral

Model of Health Services Use (Andersen 1968; Anderson & Newman, 1973) to help explain

why older individuals may generally fail to plan for end-of-life care. Specifically, this study

demonstrated the importance of the Need for Health Services factors from the Andersen model,

including emotional and functional status, in predicting older adults' changes in nursing home

expectations over time. As the respondents in the current study were drawn from a sample of

older adults residing in the community, some of the factors that represent vulnerability for health

services use as suggested by the Andersen model may not have been present among these

relatively healthy older adults. For this reason, perhaps, the possible influence of poor cognitive

status as a predictor of nursing home use expectations was not supported in the current study, even though perceptions of memory decline and the perception of reduced time left to live have been shown to influence end-of-life decision making in earlier studies (e.g., Allen, Hilgeman, & Allen, 2011). Following the results generated by the current study, future investigators may continue to use the Andersen model to explore the relations between factors that do, and perhaps do not, influence individuals' perceptions of their need for future health care. Additionally, this study may serve as a guide for future care planning. As older adults may only decide that changes in their emotional and functional status signal a need for nursing home admission as this admission becomes imminent, others involved in the health care decisions made by older adults (particularly family members and physicians) may need to be aware of—and alert older adults to—the predisposing or enabling "risk factors" that increase their likelihood for future nursing home use (Briss et al., 2004).

Future studies investigating the factors that predict individuals' longitudinal expectations for nursing home use may build upon the current study in several ways. First, data collected from caregivers and proxy respondents, as well as data from study respondents, could be jointly analyzed to create a more complex, and perhaps complete, picture of the forces that drive individuals to believe they may require future nursing home care. This will likely be a complicated undertaking as care recipients and their caregivers often have differing opinions regarding the need for care or the type of care to be received (e.g., Ditto et al., 2001; Fagerlin, Ditto, Danks, Houts, & Smucker, 2001; Karel & Gatz, 1996; Schmid, Allen, Haley, & DeCoster, 2010; Sulmasy et al., 1998). Such analyses, however, may improve our understanding of the

dynamic interplay between care recipients and caregivers, particularly with respect to factors

including caregivers' health status (Buhr, Kuchibhatala, & Clipp, 2006; Fisher & Lieberman,

1999), the burden imposed upon caregivers by their caregiving duties (Yaffe et al., 2002), and

social support (Kim & Chiriboga, 2009). The Stress and Coping Model (Pearlin, 2010; Pearlin,

Mullan, Semple, & Skaff, 1990) may be considered as a conceptual framework upon which such

future studies are based, owing to this model's inclusion of and focus on caregiver characteristics,

including socioeconomic status and primary/secondary stressors.

Second, it may be possible to obtain a more finely-tuned understanding of nursing home

expectations and the factors that influence these expectations among older adults in the United

States by testing for regional differences in these factors. As both access to nursing home

services, and norms regarding utilizing these services, likely vary in different parts of the country,

the current study could be extended by adding geographic region as a variable of interest.

Additionally, a study similar to the current study could be conducted in which qualitative

information is collected about nursing home availability, preferences, and expectations,

potentially by way of focus groups held in several different areas of the United States. Third,

opportunities exist to (a) conduct studies similar to the current study among respondents in other

nations, and (b) make cross-cultural comparisons of nursing home expectations and the factors

that influence these expectations. The HRS has inspired longitudinal, population-based studies

among the older adult residents of other countries (e.g., the English Longitudinal Study of

Ageing; the Survey of Health, Ageing, and Retirement in Europe; and the Mexican Health and

Aging Study), and similar studies are being coordinated in numerous other nations (e.g.,

Australia, China, Ireland, Japan, South Korea, Thailand) (Health and Retirement Study, n.d.).

These efforts represent a potent prospect for learning even more about how older adults develop

expectations for future nursing home use, and how these expectations may be influenced in

different ways by racial and cultural differences (which might be categorized under the

"Predisposing Characteristics" section of the Andersen model), as well as legal and

governmental constraints, systemic and structural considerations, and economic opportunities

and barriers (which might be categorized under the "Enabling Resources" section of the

Andersen model).

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